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Student created multimedia projects in the k-4 school: Effects on student learning

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Abstract

Walk into any classroom in the country, and you're likely to see students looking up information to produce a written paper which will probably be seen only by the teacher, doing worksheets involving recognition of fraction parts, or answering questions related to the reading in science class, etc. These are all good activities in themselves, but they are also activities that often fall short of developing the student's maximum potential for learning. It has been suggested that the addition of multimedia projects to the classroom can enhance and improve the depth of student learning. This project explores the literature to discover if, in fact, multimedia can be used as a valuable complement to instruction, and how best to encourage the implementation of student- · created multimedia projects into one district's classrooms.

Student Created Multimedia Projects in the K-4 school:
Effects on Student Learning

A Graduate Project
Submitted to the Division of Educational Technology
Department of Curriculum and Instruction
in Partial Fulfillment
of the Requirements for the Degree
Master of Arts in Education

University of Northern Iowa

by
Nancy Sampson
July 1996

This Research Project by: Nancy Sampson

Titled: Student Created Multimedia Projects in the K-4 school: Effects on
Student Learning

has been approved as meeting the research requirement for the Degree
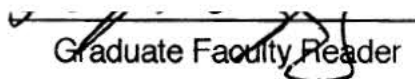of Master of Arts in Education.

Sharon E. Smaldino

10-17-96
Date Approved

Graduate Faculty Reader

Leigh E. Zeitz

10/17/96
Date Approved

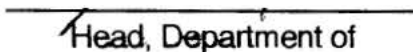Graduate Faculty Reader

Greg P. Stefanich

10-17-96
Date Approved

Head, Department of
Curriculum and Instruction

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Introduction

Walk into any classroom in the country, and you're likely to see students looking up information to produce a written paper which will probably be seen only by the teacher, doing worksheets involving recognition of fraction parts, or answering questions related to the reading in science class, etc. These are all good activities in themselves, but they are also activities that often fall short of developing the student's maximum potential for learning. It has been suggested that the addition of multimedia projects to the classroom can enhance and improve the depth of student learning. This project explores the literature to discover if, in fact, multimedia can be used as a valuable complement to instruction, and how best to encourage the implementation of student- created multimedia projects into one district's classrooms.

Many teachers are interested in using multimedia projects with students, but often have trouble envisioning how to begin in their particular classrooms. "I don't have access to that piece of technology", "Great idea, but it would never work at my grade level", and "not applicable with my curriculum" are typical teacher reactions. This project is an attempt to identify how to best help change that attitude.

Research Focus

The intent of this project was to determine if current professional literature supports the premise that using student-created multimedia projects at the elementary level can improve student learning, ie. to ascertain in what ways learning might be improved through the utilization of multimedia, and to identify projects which may motivate teachers to begin using multimedia projects with students in their own classrooms.

Terms

Turner (1992) defines hypermedia as software that stores sensory information such as pictures, sounds, or movies. In hypermedia any piece of information can be linked to any other piece in a web-like fashion for easy access. Multimedia is defined as the integration of text, graphics, animation, sound, video and music under computer control.

Literature review

The hypothesis beginning this examination of literature was that the addition of multimedia projects to the classroom can improve student learning. Also of interest was how improvement occurred, and what would be the best ways to begin implementation of student-created multimedia projects into one district's classrooms.

Recurring themes throughout the literature reflect how the interactive, multi-faceted nature of multimedia technology seems to support several of the major theories in the field of education such as: Bloom's Taxonomy (Baugh,1993), Gagne's events, constructivism

(Knight & Knight, 1995;Toomey & Ketterer, 1995), Gardner's Seven Intelligences and other multiple learning styles theories (Riddle, 1995), cooperative learning (Fontana, L., Dede, C., White, C., Cates, W. M., 1993; Gouzouasis, 1994; Riddle, 1995; Rada, R., Acquah, S., Baker, B., Ramsey, P., 1993; Brown, 1993; Milton & Spradley, 1996; Strommen, 1996), and learner centered contexts - teacher as facilitator rather than purveyor of all knowledge (Turner, 1992) .

The creation of multimedia demands active participation from users and provides students with opportunities to manipulate and express themselves through graphics, animation, sound, video, and music. Choosing, listening, speaking, writing and drawing involve the learner like no other teaching method (Barrett, 1993). Multimedia constructions provide a method for students to communicate their ideas in a way that is similar to what they encounter in their daily world (watching TV, listening to music and playing video games), as opposed to a total dependence on print to relay their messages. Since students of all ages are so familiar with many kinds of media, multimedia software may be able to inspire motivation and access creative thoughts that paper and pencil alone cannot. Multimedia software equips both teacher and student with aural, visual, and textual strategies for communicating knowledge (Riddle, 1995). Another factor in the motivation of students to use hypermedia applications may lie in the fact that such use implies an audience for the students' work other than just the teacher. Students are

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now coming to the materials with a real purpose (Gouzouasis, 1994).

Multimedia technologies can contribute to the development of higher-order thinking skills because they facilitate learning via structured discovery, student motivation, multiple learning styles, the navigation of web-like representations of knowledge, learner authoring of materials, the collection of rich evaluative information, and collaborative inquiry (Fontana, 1993). Toomey & Ketterer (1995) contend that the introduction of multimedia creates a classroom context within which [the teachers] can perform roles of influential mediators and facilitators by working collaboratively with the other mediators in the room, namely other children and technology itself.

Long-term understanding requires active, prolonged engagement in which the learner seeks out and manipulates information (Turner, 1992). Children adapt hypermedia technology for themselves and make changes in how they use it. In so doing they may develop and refine thinking skills such as problem solving, reflecting, analyzing, defining relationships, and numerous other skills to aid their learning (Toomey & Ketterer, 1995).

A multimedia presentation seems to naturally force an examination of content-sifting and weighing the pieces of information to get the most important and interesting information into the project-that a paper project usually doesn't. "Students made enormous amounts of spontaneous text revisions. With traditional written reports, they usually

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made revisions only after I corrected their drafts" (Turner, 1992, p. 5).

Riddle (1995) notes that many of her students shifted from general,

nondescript ideas in paper projects to more specific, detailed, unique

expression of these same ideas in the hypermedia projects. With a single

media (print), her students said the hardest part of the assignment was

thinking of ideas. However with multimedia, the questions centered on

how to do something rather than what to do.

Many authors reported seeing a more creative side to their

students than they had seen before (Turner, 1992; Riddle 1995). This

seems to be due at least in part to the ease of including multisensory

material and working "in chunks" (Turner, 1992). Multimedia allows the

students to express themselves and their worlds differently than they do

with traditional learning materials (Riddle, 1995).

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Project

Based on information obtained during informal personal

observations prior to the outset of this project, it seems that the reluctance

of many teachers in the target district to try multimedia projects in their

classes is often a result, at least in part, of their inability to visualize ways

that multimedia projects might be useful at their level or in their specific

curriculum area (C. Johannsen, personal communication, June 6, 1996).

Therefore, a need to create a picture in the minds of teachers of what a

multimedia project is, and how it could relate to their own students and

curriculum was seen. To create this picture, it was felt that it would be

beneficial to compile a sample list of multimedia projects that could be

used at various grade levels and within many different curriculum areas.

Much of the literature addressing student created multimedia

projects leans more towards the sharing of project ideas rather than

scientific studies with hard data regarding student comprehension

(Barrett, 1993; Baugh, 1993; Kennedy, 1995; Thorp, 1995; D'Ignazio,

1993; Ekhaml, 1996; Lankes, 1996; Ahern & Warner, 1995), often

targeted toward an older level of students (Hay, K., Guzdial, M, Jackson,

S., Boyle, R., Soloway, E. 1994; Milton & Spradley, 1996; Brown, 1993;

Rada et. al., 1993). Many of these projects easily served as catalysts for

other related ideas that could be used at the K-4 level.

A list of 56 projects supporting curriculum at the various K-4 grade

levels was developed. Projects varied from traditional research pieces, to

a kindergarten class cookbook created with technical help from older students. See Appendix A for sample projects from that list. Examples of some of the projects are detailed in the following paragraphs.

In language arts classes, older students could create electronic board books, multimedia stacks aimed at teaching concepts such as opposites, number, or rhyming, to younger students. Third or Fourth graders studying prepositions, for example, could create an opposites stack for kindergartners to use. The act of choosing clip art, text, and voice to clearly illustrate the concept involves much higher levels and different types of thinking skills than filling out worksheets would. Having a real audience for their work is much more motivating for the students than simply doing an assignment that the teacher will check.

Social studies students studying early explorers could work in cooperative groups to create animated maps of an explorer's route. Pop-up screens featuring graphics, video or text bytes would be incorporated at various sites along the route. Sifting and condensing informational content for maximum audience clarity involves critical thinking skills not always needed in the typical paper and pencil assignment.

Following a traditional research project resulting in print reports, students can create an electronic visitors guide to an imaginary classroom zoo (inhabited by the researched animals). Students would create a map showing the location of each animal in the zoo as the guide's home card. Users clicking on various areas of the map would get

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explanatory text, or other media information regarding the animals.

Students in each of the grade levels could create developmentally appropriate versions of an "All About Me" stack. Clip art, computer drawing tools, digital cameras or scanned in photos plus text and/or voice recordings could be used to give facts about themselves, their favorite things about school, and a self portrait. Older students can create short individual stacks to be linked together into a class stack. Figure 1 represents an sample individual home card from a third grade student, the project would need to be simplified for younger students.

Hi, my name is Martha Jones,
I'm in 3rd grade at Lincoln School.

These are some of my favorite things

foods   things to do
books   TV show/Movies   school subjects
role models   other

figure 1

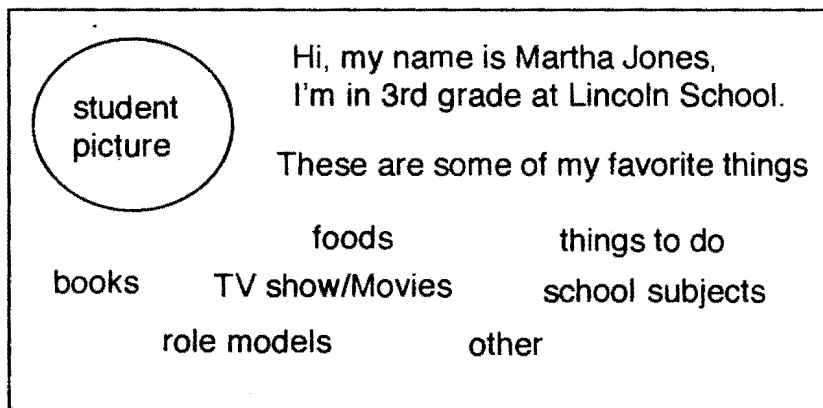Each of the described projects provides multiple opportunities for the enhancement of student learning through various means including: the adaptation of multiple learning styles for both the project creators and users, cooperative working situations, information synthesis, the involvement of an audience other than the teacher, and the use of problem solving skills that can be applied in other learning situations, to

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mention a few. These projects are heavily learner-centered, with the students being in charge of choosing which media, pieces of text, or graphics are to be included in the projects. The teacher often would be found working in the background as more of a facilitator, helping the student with technical and information retrieval issues.

The project lists along with cover letters containing practical everyday terms describing the concepts of multimedia stacks and slideshows were distributed to a representative sampling of elementary teachers from within our district. These readers represented a variety of grade levels and computer expertise. Each reader was asked to evaluate the projects on several points (see Appendix B and C for sample cover letter and evaluation form).

Respondent's reactions

The respondents' reactions to the lists of project ideas were generally positive. As expected, there were negative comments. However, all negatives were directed toward the lack of availability of specific equipment in some buildings, none regarding the content or usefulness of the projects for students. Using a reference scale of 1 to 5, the responses broke down as follows:

• 80% of the respondents stated that the suggested multimedia projects would be very beneficial for student learning in their classrooms.

• 60% of the respondents observed that the multimedia projects

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would be more beneficial for student learning than the types of projects currently in use in their classrooms.

•100% of the respondents were able to identify specific multimedia projects that they felt could be immediately included in their own classrooms.

•80% of the respondents were able to suggest multimedia project ideas of their own after viewing the project list.

Respondents commenting on the flexibility of multimedia projects, noted that every child from TAG student to Resource student could benefit from the experience. They were impressed with the possibility of multimedia authoring to help students become more proficient at evaluating the vast amount of information available and often allows them to make more effective use of that information. One respondent surprised herself by finding several projects that she was excited about trying, even though lack of technological expertise especially in regards to the use of graphics makes her nervous.

Preliminary results of this project indicate that the distribution to teachers of specific, concrete sample projects may well be an effective method of introducing and encouraging the use of unfamiliar technological methods such as student multimedia authoring projects in our classrooms. Many of the respondents expressed appreciation for having an unfamiliar teaching tool demystified and made more practical for them as a first step toward implementation.

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Conclusions and recommendations

After consideration of Bloom's Hierarchy of Cognitive Behaviors (cited in Baugh, 1993) and Gardner's Theory of Multiple Intelligences (cited in Baugh, 1993; Riddle, 1995), it is understood that student learning from any research project can be enhanced by having the students produce some sort of a presentation aimed at sharing their information with fellow classmates; be it an oral report, a poster, float for a mini parade, diorama, mobile, video or cassette tape, or other form of display. Such a presentation requires some creativity and decision-making on the part of the student regarding which pieces of information are most relevant to the audience, therefore requiring the student to function, at least in part, at the higher cognitive levels as well as synthesizing information through a variety of modalities. A multimedia stack or slideshow can be an excellent addition to such presentations. As an aid to oral reports, graphics, key phrases and video clips can be projected for the class to view using some type of projection device. Thus, this use of multimedia not only helps keep the presenter organized, but also helps to calm nervous butterflies as the student's audience will be looking at the screen and not the speaker.

A review of the literature concerning the use of multimedia authoring at the elementary level reveals that although much of the literature tends to be subjective in nature rather than quantitative, most authors seem to be in agreement that the use of multimedia authoring

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tools with children leads to higher academic skill levels and self-esteem (Baugh, 1993; Fontana, 1993; Knight & Knight, 1995; Riddle, 1995; Toomey & Ketterer, 1995), as well as increased cooperation among students (Fontana, et. al., 1993) and higher motivation (Barrett, 1993; Gouzouasis, 1994; Riddle, 1995; Turner, 1992) towards their class work. These benefits come about in part as a result of the nature of multimedia, which allows students to express their thoughts and ideas in more personalized ways than the traditional pencil and paper assignment thus compelling students to become an more active participant in their learning.

Since multimedia authoring has been found to have positive impact on student learning, it is recommended that all K-4 students have access to and opportunities to use multimedia authoring tools as part of their regular classroom experiences. The nature of their projects should, of course, be tailored toward the developmental level of the students.

The results of this project indicate that the distribution of a practical list of specific, concrete sample projects to teachers may well be an effective method of introducing and overcoming resistance to the use of unfamiliar technological methods such as student multimedia authoring. The distribution of such a list as a method of encouraging the integration of new technologies into classroom curriculum is also recommended .

The use of multimedia applications can help students go beyond

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the everyday classroom assignment and can give them opportunities for doing and therefore understanding, rather then just hearing or seeing. Perhaps the Chinese proverb (Confucius, n.d.) says it all.

"I hear, and I forget.

I see, and I remember.

I do, and I understand."

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Appendix A

K-4 Multimedia Projects

Sample Ideas

Art

1. Multimedia stack describing individual art projects from the Egyptian unit, Including how to information and scanned photos of their projects along with background information regarding the unit.

2. Individual multimedia portfolios-created by scanning in, or taking digital photos, etc. of student artwork during the year.

3. Student scan in examples of certain types of art work (collage, clay sculpture, etc.) including information on the various media and processes.

ESL or Foreign Language

1. English/language multimedia stacks created to help students imprint the the new language in their minds. Students set the cards up so that pressing on either of the words or the sentence would result in hearing them read aloud. This project would work well with English/non English speaking pairs of students.

rojá   red

The m&m is red.
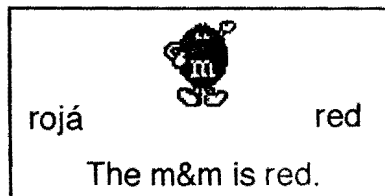
Field Trips

1. Take a digital or XapShot camera along on a field trip. Back at school, students create multimedia stacks of the trip. Pictures from brochures and snap shots taken on the trip can then be added along with text.

Math

1. Create a multimedia stack of student created story problems using clip art or digital photos for visualization.

2. Student created multimedia stacks on how to do column addition with regrouping, long division, or other math processes.

3. What number am I? - students create clues for a particular number such as: I am a 2 digit Number. I am > 52 . The sum of my digits is < 8. My first digit is an odd number. individual stacks are then linked to create a class stack.

Misc

1. A day in the life of... Ms So & So's 3rd Grade - Students create cards detailing a "typical" day of school. Use at Open House for parents, send to penpal classes or use with incoming students and their parents

2. Class Photo Album or Digital Yearbook - individual pictures, class activities and events, etc.

3. Multi-age multimedia stacks co-authored by mixed grade pairs. Content of stack is of interest to young one, older one helps with

research and technical skills.

Music

    1. Create a multimedia stack based on the life and works of a composer.

    2. Use a song from class as the basis for a "living book" or illuminated piece.

P.E.

    1. Students create a stack detailing the history, rules, playing area, equipment, etc. of any sport or game. ie. "Gymnastics" history of gymnastics, spotlights on current famous gymnasts, dictionary of gymnastics terms, etc.

    2. Olympics-five divisions - 1 button inside each ring on title card 1-history 2-sites 3-events 4-famous athletes 5-current favorites

Reading/language Arts

    1. Make a "choose your own adventure" project involving a favorite book character such as Mark Brown's Arthur or Beverly Cleary's Ramona.

    2. Electronic autobiography - including: still video, sound, scanned artwork, sound and text. (birth - family - pets - etc.)

    3. Create a "living book". Turn Amelia Bedelia or an original work into a multimedia stack.

    4. Class multimedia stack of favorite poems, illustrated and read aloud.

Science

1. Use the knowledge gained from standard research reports to create new imaginary animals. Pair up, each pair creates a new imaginary animal by combining some characteristics of each of their animals.   ie. sea otter + pelican = ottican. Create card(s) describing and illustrating the new animal, it's characteristics, habitats, etc.

2. Animated slideshow - show the movement of the earth's crust and lava in a volcano. Could also animate the water cycle, life cycle of frogs, plant growth, solar eclipse, rotation/revolution of planets.

Social Studies

1. Presidents/inventors/Famous people - electronic visitors guide to a Wax museum. Individual cards contain "fast facts" (birth, death, famous for?, etc. same for all cards) and 2-4 other student chosen information bits.

2. Regions of USA - multimedia version of "Letters from Felix". Students type in an innovation of the text to use as template for individual multimedia stacks for each region. Different groups of students are responsible for each region.

3. Career studies - students research and put together short multimedia stacks of what career they may want pursue. Link together into a class stack.

4. My Town - scan and describe local pictures, news clippings, or video clips as part of Iowa History curriculum.

Younger students (Kindergarten or so)

1. Mr. M's Favorite Things - Have students use KidPix to create pictures of things starting with the letter m. Add a recording of their voice telling about the picture. Create a slide show.

2. Class Cook Book - Students draw pictures of their favorite food or their parent cooking it, dictate cooking instructions to an older keyboarding buddy. Could add short voice overs, put into stack or slideshow form.

Appendix B

Thanks so much for helping me with this project, I hope you find something useful in it that we can try to work together on next year.

Before you get started a little background information is probably in order so that we are all on the same wave length.

- A multimedia stack is created in a program such as HyperStudio (each building will have at least one copy in the LMC next year). The stack is made up of a series of "index cards" that can be accessed in random order.

- In a multimedia slide show the "cards" can only be accessed in a linear "page by page" order. Slide shows can be created in KidPix or ClarisWorks, both of which are available in your buildings.

- Both multimedia stacks and multimedia slide shows can contain combinations of text, sound, moving video, still video and other graphics to get information across to the reader in an interesting fashion. Still graphics can be brought in in several ways: photos of objects or pictures can be imported by scanning (Otho will have a scanner), using a digital camera (QuickTake or QuickCam), digitizing still (XapShot) or motion video (Otho has the needed hardware), using computer drawing tools to create your own images or importing commercial clip art. Motion video can be

brought in from CDROM or Laser discs in addition to digitizing self-made video.

Research shows that student-created multimedia projects enhance higher level thinking, cooperative skills, depth of learning, motivation, etc. for students, often being much more beneficial for student learning than typical paper and pencil assignments alone. Please be thinking of these types of skills as well as the obvious academic skills when making your comments.

Thanks again,

Appendix C

1. The listed multimedia projects would be beneficial for student learning
in my classroom.

1	2	3	4	5
not at all				very

2. How would you expect the benefits of some of these projects would
compare with the types of projects currently in use in your classroom?

1	2	3	4	5
less beneficial				more beneficial

3. Which specific student skills do you see that would be improved
through a multimedia approach to student projects?

4. Were project descriptions clearly worded and understandable?

   yes   no

5. Were you able to find any projects that would be usable in your
particular classroom situation?   yes   no   Which ones?

6. Do you have other ideas you'd like to see developed into a multimedia project?

7. Please write any comments (positive or negative) that you feel would be useful towards the revision of these project ideas.