HyperReport: A multimedia management tool for report of information writing

Stephanie D'Antignac Reeves

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HYPERREPORT:
A MULTIMEDIA MANAGEMENT TOOL FOR
REPORT OF INFORMATION WRITING

A Project
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
Education: Instructional Technology Option

by
Stephanie D'Antignac Reeves

September 1996
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A MULTIMEDIA MANAGEMENT TOOL FOR
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Stephanie D’Antignac Reeves
September 1996
Approved by:

Rowena Santiago, First Reader
Date 8/27/96

Sylvester Robertson, Second Reader
ABSTRACT

Writing is a significant part of the middle school Language Arts curriculum. Students must become competent writers in any of eight different styles, including Report of Information. They do not, however, appear to be writing often enough to master the skills involved in writing. So, the California Framework Commission has called upon teachers to find challenging and creative ways to motivate students to write more.

In that light, students are using computers to integrate graphics, sound, and animation in combination with their writing to create richly compelling multimedia presentations on a variety of topics. These presentations, called hypercompositions (HC), result in high-quality assessments of writing.

However, students seem to get bogged down in the development of HC because they do not have a step-by-step process for completing their projects. They may become frustrated and feel overwhelmed and thus may choose not to take advantage of the rich benefits HC can offer.

This project, entitled HyperReport, is a computer based program that helps students by guiding them through the HC development process. With it, students learn to create a storyboard, design a project map, and create a hypercomposition stack using HyperStudio. They learn to organize their media and use an established sequence for incorporating graphic, sound, text, and animation elements to their stacks.
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CHAPTER ONE

Introduction

Computer technology is changing the way students and educators look at writing. Research reveals that computerized writing aids such as grammar and spell checking programs increase student creativity (Berbhardt & Wojahn, 1990). Likewise, word processors are powerful tools for student writers because they allow students to generate more fluid writing. Revisions are varied and more intense because students are more willing to revise and thus develop a deeper understanding of the writing process. But, computers can be used for far more than just traditional word-processor writing.

With computers as a centerpiece, students can create “hypercompositions” (HC) - multimedia presentations that combine text with music, narration, graphic images, and movies to communicate ideas and information in a more compelling way (Ambron & Hooper, 1988). Hypercompositions are non-linear. Information is broken down into small chunks of information that users explore as they please (See Figure 1.1). Students elaborate on ideas beyond the traditional tools of pencils, crayons, books, and paint.

Writing constitutes a significant part of the language arts curriculum from kindergarten to high school. Middle school students are required to write in eight different styles. One of the eight styles is Report of Information (ROI). In ROI writing, they define a topic or problem to research, conduct the research using primary and secondary sources, and then report their findings to a specific audience. Students are expected to present specific and concrete information in a focused and organized manner (MVUSD, 1996). The most effective approach to ROI writing utilizes the writing process. This process is a student-centered integration of reading, writing, thinking, and
Traditional Linear Text

Traditionally written media are linear and generally are read from beginning to end.

(One-way information transfer)

Non-Linear Hypercomposition

(Two-way information transfer as students interact with computer)

Non-linear transfer of information allows user to control what information is accessed and in what order.

Figure 1.1. Linear and non-linear navigation. Comparison shows that non-linear navigation is more interactive than traditional linear text.
speaking that the U.S. Department of Education (1986) considers the most effective way to teach writing. Students engage in brainstorming and other organizational prewriting activities, compose a rough draft, revise the composition for content improvement, edit for grammar and mechanical corrections, and write and publish the final draft. But the ROI writing process is not limited to producing a traditional research paper. It goes beyond traditional writing when students develop hypercomposition for ROI. They choose a topic of interest to themselves, read and research, organize their information, design the presentation, organize and draft the text, select and integrate the various media, revise according to peer and teacher conferences, and then publish their work in the form of a multimedia presentation (Botts, 1995). In order to develop the presentation, the student "dwells on a concept and considers how to present it well, [so] the concept will be understood when it is presented" (Hooper, 1990, p.15). These meet both the goals and the U.S. Department of Education's writing process approach.

Report of Information writing relies on a variety of strategies for presenting and assessing information, (MVUSD, 1987). With HC, each medium acts as a separate strategy within the presentation and serves as one ROI assessment strategy among many others: traditionally written report, video production, dramatic presentation, and speech. Hypercomposition fosters individual creativity and flexibility within a wide variety of structured tasks.

Heinich et al (1996) report that ROI hypercomposition is conducive to collaborative learning, is an effective way to implement whole language strategies across the curriculum, and is authentic and multisensory. They further state that it allows
students to show connections in what they learn in a variety of media. Furthermore, when students are engaged in authentic work that is important to them, they feel good about the work that they do and thus are more inclined to do quality school work (Glasser, 1993).

Cognitive skills are also developed with HC. Students sharpen their research, organizational, and critical thinking skills as they develop the information for their presentations. They must read, synthesize, and organize the information to be presented. Their written and oral language skills are improved.

Language arts students must, through a rigorous, integrated core curriculum, engage in a meaningful investigation of knowledge, values, and skills (California Department of Education, 1987). "In integrated units of study, teachers emphasize the rich connections among content areas, teach students the interrelatedness of knowledge and skills, and foster a holistic view of learning" (p. vi). Students must be able to think logically, read with understanding, write with clarity, speak articulately, and listen with comprehension (Conroy and Hedley, 1990).

As part of this mandate, students are required to write on a wide range of topics, in a variety of writing styles including problem solution, speculation about cause and effect, story, autobiographical incident, and report of information. Traditionally, these topics are treated as routine activities for individual students wherein compositions of five to seven paragraphs are assigned. But, students indicate that they are bored, while teachers seem locked into a repetitive routine rather than challenged to give their best teaching (English-Language Arts Curriculum Framework and Criteria Committee, 1987). With the implementation of the California English-Language Arts framework, teachers are being
called upon to be more creative and stimulating, and students are being challenged to demonstrate writing skills across the curriculum.

Despite this challenge, however, students are actually writing very little. Seventy-five percent of eighth grade students receive an hour or less of instruction in writing in the average week (Hill, 1992). Half of the 12th graders surveyed by Hill reported writing no more than two papers in a six week period, and only 20% of 12th graders had written five or more papers. Of the fourth grade papers reviewed, most averaged 84 words, while the papers of eighth graders averaged only half a page.

The improvement of the quality of student writing is a primary concern of writing instructors. Writing activities must motivate students to spend more time writing, utilize the writing process, involve topics that are interdisciplinary, and encourage student creativity and flexibility. The writing must reflect real meaning and purpose.

Hypercomposition as a Solution

Developing hypercompositions is one way to encourage students to write more and write well. In doing so, students use language as a tool to communicate their ideas on a variety of topics, in a myriad of subjects. They apply what they know to solve problems. Students uncover specific details, organize and then report them using written and oral language in combination with graphics, sound and animation. HC is part and parcel of a collaborative, whole-language writing process that is authentic and challenging to students.

Students must be challenged to produce quality school work; but they are not likely to do so until they are given quality assignments such as those given when developing multimedia projects. Students who do their best on each useful assignment
and put significant time and effort into their work will produce quality work (Glasser, 1993). They feel good about the work they do and take pleasure in knowing they have accomplished something through their own hard work. Consequently, when students put forth their best efforts they improve not only the quality of their writing, but the overall quality of their work, as well.

Hypercomposition is Collaborative

Students must develop a variety of approaches to solving problems including the ability to work in groups and write collaboratively. HC strengthens these skills. With traditional written assignments, classes work together to brainstorm ideas, but the bulk of the writing process is done alone. Students reunite to peer edit each other's work and then rewrite alone. Collaborative work generally results in a higher calibre of work than students would have attained individually (Odegard, 1993). Students benefit from cooperative learning because they help each other (Bruder, 1992). They learn more when they teach because they must consider the problem, organize and process what they know about the problem, and then effectively communicate what they know to someone else. Co-authoring HC entails the sharing of ideas, shared decision making, and sharing the task of developing the project (Dale, 1994).

Students can divide the research work and multiple steps for creating HC into manageable segments. Groups can use a "blended dialogic model" of collaborative writing (Dale, 1994) in which students share a dialog about the topic and verbally express their ideas. From this, they create a blended, collaborative response to the writing topic. Even when there is productive disagreement within the group, positive progress can be made.
Students think critically about the ideas, strategies, and opinions of other members of the group, negotiate their differences, and reach consensus.

Collaborative HC can be an asset to students of all ability levels. Students with different backgrounds, interests, and skills bring a variety of talents to a group (Gay & Grosz-Ngate, 1994). Consequently, collaborative HC can be an effective means for accommodating and addressing differences in students' understanding and skills which helps all of the group members to excel. Regardless of their ability levels they can be involved in complex and challenging tasks. (Sheingold, 1991).

Hypercomposition Provides an Authentic Assessment

Hypercompositions allow students the opportunity to work in a constructivist environment in which learners make their own meanings from contextual scenarios (Marra & Jonassen, 1993). They answer questions that become relevant to them based upon their own research. They determine the difficulty of and the energy investment in their projects. When they understand the relationship between what they do in the classroom and what is of interest to them, their investment in the work increases; the work is authentic.

As students construct meaning from their interactions with others, they formulate hypotheses from information they gather and test and communicate what they think (Merrill, 1991). They are unconcerned with what subject is being taught because what they are doing in the classroom approximates what they do outside the classroom. The activities are authentic. While it is true that traditional composition that fits these requirements are also considered authentic, HC uses equally, if not more authentic means
to process information in a far richer manner than can often be done with traditionally written assignments.

With HC, students do less drill and memorization and become problem solvers who construct their own meanings from the information available to them. Multimedia technology can become the construction kit of the future much like the Legos and Erector Sets so common in the classroom today (Perkins, 1991). Students increase their skills, take pride in work that is meaningful to them, and learn to effectively use information. Because of this, they work hard to produce the best project they can. And, the harder they work on their HC the harder they work on their writing. The harder they work on their writing, the better it becomes (Glasser, 1992).

When students are seriously involved in creating HC, they are challenged to reason, question, integrate and synthesize information from different sources. "Such 'higher order' activities help students to understand and remember information and ideas" (Sheingold, 1991, p. 19). They become more confident in their knowledge of the subject and therefore can be more authoritative in their presentation. HC can increase a student's chances for successful ROI writing and is, therefore, a viable alternative assessment tool.

Hypercomposition Supports Whole Language Instruction

Skills-based programs that focus on brief narratives, work sheets, or teach independent skills in isolation are relatively ineffective. They lack the connections that allow student to make meaning of the material. Furthermore, programs and assignments that focus on one of the language arts at a time are equally ineffective (English Language Arts Committee, 1987). What works better are instructional programs that integrate all of
the language arts: listening, reading, writing, thinking and speaking; in other words, whole
language.

Hypercomposition encompasses a whole language approach by its very nature
because it incorporates graphics, sound, and text. Students integrate their listening,
speaking, reading, and writing skills as they select a topic, research, plan, and develop
projects that are authentic, compelling and connected to the world around them.

When students are working collaboratively on a multimedia assignment, they listen
to each other and discuss the assignment among themselves. At some point they come to
a consensus and perhaps use a synthesis of their ideas to create their presentations. At
that point they have already used thinking, listening, and speaking skills. As they research
and then write the text for their presentation, they use additional language arts skills such
as listening and speaking when they make audio and video recordings of their ideas. As
problems occur to them, they go through the whole language process all over again and
thus refine their projects.

Statement of Need

A main concern that writing instructors have, even when students are using HC, is
the lack of efficiency in developing student projects. Although students frequently invest
significant amounts of time trying to construct HC, too often, those efforts are done
haphazardly and fall short of the intended mark because the students do not know how to
manage themselves and their project. Consequently, they sometimes find HC
overwhelming and frustrating. Researchers have observed and agree on a need for structure
within Hypercomposition that will help students go through the non-traditional process of
developing HC (Koh, Loo & Chua, 1993). Although structure initially causes some loss of freedom and spontaneity of composition, it ultimately encourages better writing, enhances creativity, and reduces the cognitive overhead required to organize the various media available.

Purpose of the Project

Students who know how to conduct their research and are adept at using computers, scanners, CD-ROMs, laser disk players and other equipment need a means for organizing their resources, designing the project, and completing the development process. In doing so, students will be able to meet the goals of improving their writing in a challenging manner where they exercise their creativity in a way they find interesting and motivating. This project, entitled HyperReport, will provide students with a structured, step-by-step process for developing their own Report of Information hypercompositions using HyperStudio®. It takes the student through storyboarding, developing a navigational map, organizing graphic art, video, animation, and sounds. By using HyperReport, students will be able to complete their projects in a structured and time efficient manner.

Not only will HyperReport serve as a tool for the student, but it will assist the teacher in the classroom. Guiding a student through the hypercomposition process can be a daunting task for the teacher. Figures 1.2 -1.4 illustrate the tasks that must be accomplished if the student is to develop a hypercomposition. First, students must be able to conduct research. In order to do so they must, at the very least, select an appropriate topic and then narrow that topic according to audience and time constraints, locate sources that will offer appropriate multimedia material, take notes, and prepare a
Figure 1.2. Task analysis (conducting research). The tasks required to complete the first step of developing a multimedia report of information are identified.
Developing a Multimedia Report of Information

1. Conduct Research

2. Write Convincingly
   - 2.1 organize notes
   - 2.2 type rough draft
   - 2.3 revise draft
   - 2.4 edit draft
   - 2.11 create outline
   - 2.21 present information clearly
   - 2.31 check content & organization
   - 2.41 check grammar & spelling

3. Develop Multimedia

Figure 1.3. Task analysis (write convincingly). The tasks required to write convincingly, a prerequisite to developing multimedia, are identified.
Developing a Multimedia Report of Information

1. Conduct Research
   - 3.12 create storyboard
   - 3.22 save images to disk
   - 3.32 scan charts, pictures
   - 3.52 record narration
   - 3.62 check all navigation buttons

2. Write Convincingly
   - 3.11 screen design
   - 3.21 scan & digitize images, clips
   - 3.31 use existing clip art
   - 3.41 bullet main points
   - 3.51 special effects
   - 3.61 check spelling, sounds

3. Develop Multimedia
   - 3.1 project map
   - 3.2 locate all media
   - 3.3 import graphic images
   - 3.4 import text & headings
   - 3.5 import sounds, music, narration
   - 3.6 finalize the project

Figure 1.4. Task analysis (develop multimedia). Once prerequisite steps are completed, developing the multimedia involves seventeen separate tasks.
bibliography. Next, students must also effectively organize, analyze and synthesize the information they have gathered into a system of notes. Students must be able to develop a detailed outline in order to write effectively. After initial ideas have been developed into a rough draft, students must then edit and revise their writing. Finally, to facilitate the assembly all of the media sources into one hypercomposition, students must organize their various media sources, select text for the screen and for narration, import sounds and music digitize pictures, charts, maps, etc.

For the teacher, the number of steps may be difficult to manage because groups of students may be at varying stages of development at any given time. As a result, teachers find themselves repeating procedural information numerous times. On the other hand, teachers may just pace the class so that all groups are at the same stage at the same time. With HyperReport, guidance can be provided to students when they are actually ready to use it. The teacher's time can then be more effectively spent in facilitating student research and on assisting students with the concepts they are learning.

Moreover, if students knew exactly what they needed to do, and knew that they could turn to a program such as HyperReport precisely when they needed to, they would be less intimidated to create a hypercomposition. Students would be able to focus on every step knowing that there was a tool that could help them with what to do next. Furthermore, since there are over 30 tasks to go through, from the selection of the topic to finalizing the project, it is conceivable that different students would have questions about any one of those 30 steps. If the teacher were the only resource for those answers, few students would be assisted.
A computer based project that provides such information, guidance, and structure gives students what they need to know so they may communicate effectively what they have learned about a subject. With HyperReport students can develop more creative and compelling hypercompositions in an efficient manner with less frustration.
Nearly all American adults can read and write at a basic level, but fewer than half can use a bus schedule or accurately record car-maintenance information (Gleick, 1995). Consequently, efforts are being made to increase the competency of American students. For example, Goals 2000 seeks to ensure that students not only demonstrate competency in English, mathematics, science, history, and geography; but that students learn to use their minds well, so that they may be prepared for responsible citizenship, further learning, and productive employment. If American students are to reach these goals they must complete challenging assignments, rather than passively receive information. They must develop cognitive skills through activities, such as frequent writing that employs the writing process. And, they must use multiple resources such as electronic technology, classic works of literature, and science laboratories rather than rely upon the exclusive use of lecture and textbooks (Patrick, 1991).

Although the State of California established its three primary educational goals prior to the implementation of Goals 2000; the state's goals are consistent with national goals (Goals 2000). California's goals are to prepare students to become productive, skilled, and literate employees; to help students develop into informed and thoughtful citizens; and to produce culturally literate adults (California State Department of Education, 1987). In order to accomplish these goals, the English-Language Arts curriculum must emphasize instruction that is based upon the instructional needs and personal experiences of the students. The activities that students do must interrelate
listening, speaking, reading and writing; and they must be an integral part of the general curriculum. Finally, there should be a broad range of assessments.

The Language Arts Framework declares that language arts must be a curriculum priority because it allows students to access knowledge in all subject areas (Nemetz, 1987). The Framework further states that the effective use of language is key to lifelong learning strategies which will permit students to acquire the technical skills needed when they enter the work world. While exposure to lasting and compelling literature provides opportunities for students to question and connect with the past and present, it is when students engage in the writing process that they discover a means for clarifying their thinking. The writing process is a tool for all curricular areas because as they improve their writing skills through the revision process. They also discover that they indeed have something to say (English-Language Arts Curriculum Framework and Criteria Committee, 1987).

The language arts curriculum focuses on the writing process where students first concentrate on content, then on form, and ultimately on correctness. According to The St. Martin's Handbook, the writing process encompasses all of the mental activities that accompany the physical act of composition (Lunsford & Connors, 1995). These activities are often repetitive and sometimes erratic since writers may, for example, develop the ideas for the conclusion while they are revising an unrelated paragraph. Lunsford and Connors outline a 7-step writing process with consideration of the audience and purpose for writing as the initial step. This may involve persuading, informing, or explaining something to a reader. The second step is to explore the question, problem or ideas to be
addressed. Planning comes next and requires the writer to decide how to organize the information. This organizational plan leads the writer through the subsequent step of drafting. Drafting is considered the central part of composition. This is the stage where the writer tries out information and arguments. The fifth step is revision where a careful rereading and analysis of the draft is done. This is where the writer considers the effectiveness of the argument, the clarity of information and the organization of details. This is also the step in the process that may send the student back to the exploration stage to find more information or insights into the problem. After the writers complete this step, they move into the editing and proofreading step. Here they examine the correctness of their writing. They check and correct spelling, punctuation, and sentence structure. The final step in the writing process is the one in which students think critically about the work they have done. This is where they consider their strengths and weaknesses as a writer.

There are many types of writing that must be taught in the middle school classroom, among them are narrative and descriptive writing, expository writing, and research writing. Figure 2.1 details the various forms of writing, as well as the sequential steps in the writing process that are used for writing instruction in California's Moreno Valley middle schools (Moreno Valley Unified School District, 1989.)

Writing as Part of the Curriculum

Many content-area teachers think that the ultimate goal of language arts and the teaching of writing is for writing to be transparent and unimportant (Slevin, Fort & O'Connor, 1990). That is, good writing should not get in the way of the truthfulness of
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I= Introduced  T= Taught  R= reinforced

*Figure 2.1. Writing as a process. (Adapted from Moreno Valley Unified School District).*
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I= Introduced  T= Taught  R= reinforced
the content. It is only when writing is bad that it really gets any attention at all.

However, this belief in the neutrality of writing reduces students to "mediocrity and ... does not promote reflection, wit, humanity and persuasion..." (p.11).

Writing does, however, have meaning in and of itself. It is a reflection of the way students think and how well they understand content. Writing is evidence of the students' fundamental relationship with what they are studying. And, their purpose for writing shapes the form the writing takes because it can be used to communicate information, express ideas, to impress teachers and peers, or just to improve skills and understanding (Harris & Cunningham, 1994). Writers, much like readers, move back and forth between mental images. Writers move from the mental image they want to portray to the constructed text and back again. This back and forth effort of rereading, reconfirming, and rethinking that occurs during the writing process helps to firm the notions that writers have about the topics about which they are learning and writing. For this reason, the writing process is important to learning content information.

Although many educators talk about a writing process through which students learn to express their ideas, many professional writers interviewed by Gallo (1994) indicate that there really is no singular process for writing. However, all indicated that they employ some type of process in their writing. Most professional composition is non-fiction, while most student compositions are responses to fiction writing (Newkirk, 1990). Therefore, topics for student writing need to be expanded to allow them to write with authority about fiction and non-fiction topics that matter to them. The type of
writing called for in the Moreno Valley Unified School District framework permits students such expanded writing opportunities.

Additionally, most professional writers agree that publication was a turning point in their attitudes about writing (Calkins, 1994). When writing is published in some form, writers begin to make the connection between reading and writing. This allows students to imagine the reader and what form their text will take in order to effectively communicate with the reader.

From this, it seems clear that students need an opportunity to employ some kind of writing process in the classroom and some manner in which they may publish their work. Publication of student work has traditionally ranged from papers posted on the wall, to entries in literary magazines, yearbooks and newspapers. However, with the availability of computers and authoring software in the classroom, student publication now also includes hypercomposition as an alternative means for students to think, compose, and publish ideas and information.

Multimedia/Hypercomposition Defined

Multimedia is a relatively new concept that is frequently referred to as hypertext, hypermedia, and interactive multimedia (Tolhurst, 1995). However, each differs in slight degrees from the other although they share several common characteristics. Traditional text found in a book or written on paper, is considered linear text. The end-user, or reader, usually begins at the first word and reads only text straight through until arriving at the end of the text. Hypertext is computer text that is non-linear but contains static diagrams, charts or pictures. The text is non-linear because the end-user can make choices about
what set of information to read and in what sequence it will be read. The illustrations are
static just like those found in a book. Hypertext, however, literally means extra text and
allows the end-user to access additional information such as descriptions or definitions in
a nonsequential manner much like a reader of traditional text would decide when and if to
read the information in footnotes or glossaries (Nielsen, 1995). When the user clicks on
a linked word or phrase, the hypertext field appears on the computer screen to give
additional information about that word or phrase.

Authors differ on the definitions of multimedia, hypertext, and hypermedia. Figure
2.2 illustrates one possible definition of the terms and shows the similarities and
differences between them. Tolhurst defines multimedia as two or more media such as
text, still or animated graphics, movie clips, and sound and music to present information.
Tolhurst indicated that any combination of media would technically constitute a
multimedia presentation, such as a speaker using overhead transparencies. Vaughan
(1994) makes a greater case for the computer as an essential element in multimedia by
defining it as “any combination of text, graphic art, sound, animation and video delivered
to you by computer or other electronic means” (p.4). There is, however, some ambiguity
as to the necessity of using a computer. On the other hand, Murie (1993) clearly
identifies the computer as an essential component, “Multimedia is often defined simply
as the simultaneous use of more than one media type on a computer” (p. 8).

When multimedia can be controlled by the end-user it is called interactive
multimedia. Some authors contend that it is the interaction in multimedia that gives it
its greatest effectiveness with the audience (Paulissen & Frater, 1992). For example, if
Hypermedia includes all aspects of multimedia and allows user to navigate about the stack.

Multimedia combination of text, graphic art, sound, animation and video delivered by computer.

Hypertext computer generated text linked to extra text and may contain static diagrams, pictures or charts.

Hyper-Composition

Integrated Compositions

Linear text Compositions

Figure 2.2. Multimedia, hypermedia, and hypertext defined.
the end-user can first choose to play a movie by clicking on a button, and then listen to a musical clip by clicking on another button, the multimedia is interactive. However, when the end-user is also able to select the sequence in which the stack is to be explored, the multimedia is then considered hypermedia (Vaughan).

Integrated compositions are the combination of software vehicles, messages and content that are developed by students on a computer using multimedia, interactive multimedia or hypermedia elements (Hay et al, 1994). They may also be called multimedia or hypercomposition presentations or projects. For the purposes of this paper, student-developed integrated compositions will be referred to as hypercomposition.

Text

Text is used differently in hypercomposition than it is used in traditional written composition. Traditional compositions result in pages full of text. But, because reading from the computer screen is slower than reading from paper, screen text must be much shorter (Nielsen, 1995). In hypercomposition, moderate amounts of text can be contained in scrollable text boxes, typed across the screen over a graphic or used as accents to main points. Developers must strike a balance between too much or too little screen text. Additionally, fonts and point sizes affect the user's ability to read text on the screen. Colors can be added to words to draw attention to important information or to indicate that a word is hypertext that is linked to other information.

Sound

Sound is one of the most distinctive and important features of hypercomposition. It includes voices that have been recorded for narration and music clips used for special
effect and ambience. Most Macintosh computers on the market today, allow the user to
digitize sound from a microphone or from a CD-ROM playing internally on the computer.

Animation and Video

Animation adds to the visual impact of the hypercomposition. Essentially, it is a
series of bitmapped images or frames in which each frame depicts a slightly different
image played at a rapid rate to give the illusion of movement. Video is also considered
animation although it uses digitized images taken from a camera. In hypercomposition,
animation and video may be used throughout the entire presentation or it may be used
sporadically for impact or to illustrate key points.

Graphics

Graphics or still images may be one of the most important elements of the
hypercomposition. Images may be large or small, centered or placed at random, digitized
photographs, commercial clip art, or original computer generated or scanned art work.
They may include maps, charts, and diagrams, as well as, illustrations. Most authoring
tools allow students to manipulate the size, color, etc. to allow authors to modify art
work to suit their specific needs.

Hypercomposition

Hypercomposition, a term originated by the author of this project, is a form of
composing that uses several media, commonly known as multimedia, including text,
graphics, video, animation, and sounds. Unlike traditional compositions, authors can
compose multiple layers of information into a network that allows users to adapt their
search for information to their own needs.
Hypercompositions are generally constructed to be shared with a specific audience, either to present information or to persuade the audience on a point, etc. According to research conducted by Cohen & Riel (1989) most traditional writing assignments are directed to the teacher for a grade. Their study of two groups of students revealed that writing is better when students are writing to communicate with a real audience as is typical of hypercompositions. On average, when students were communicating with an audience their organization, content, and language use were superior to traditional compositions written to teachers.

Furthermore, hypercompositions created by students proved to be a powerful means for student creativity and expression (Hay et al, 1994). It allowed students to think about the same subject considered for traditional compositions through a different media. For example, in a high school English class two writing assignments were given, a biography and a “how to” document. One group of students were given traditional assignments called annotated text, while another group was given the assignment as a hypercomposition called an integrated composition (computer generated presentations that incorporated audio, video, text, and still and animated graphics.)

The results of this study indicated that the students who created hypercompositions constructed richer understandings of the concepts presented. One drawback to the research design was that the hypercomposition assignment was very unstructured, giving students little guidance in the creation of their projects. It was believed that had the students been given more specific structure and guidelines, they would have made more deliberate choices of media and topics. Since the writing for these
hypercompositions was given purpose and an audience, it was said to take on a “deep structure” (Toomey & Ketterer, p. 480). It took on a special meaning that enhanced the writing process and the learning of writing.

In a formal survey (Scheidler, 1993) conducted among high school students in English class, students who created hypercompositions felt they learned more and enjoyed the work more than when they wrote traditional research papers. These eleventh grade students enjoyed their work better even though they all agreed that they had worked harder than they did when they wrote traditional papers. The students felt that the demands of their projects drove them to conduct more research, write more clearly to present their ideas, and challenged them to be more creative.

Hypercomposition as an Assessment Tool

If American students are to reach the objectives of Goals 2000 and the California State Framework - to be competent in English and to use their minds well - they must be provided with challenging assignments in which they work harder, research deeper and become more creative. Hypercompositions appear to provide such an opportunity. Since students develop cognitive skills such as writing through frequent practice utilizing the writing process, they must be provided with as many opportunities to write as possible. Hypercompositions offer students an alternative tool for writing that incorporates the writing process. Students must use multiple resources such as electronic technology that interrelates listening, speaking, reading and writing. Further, writing must be stressed as an integral part of the general curriculum. Because hypercompositions can be done on any topic, they are conducive to encouraging writing across the curriculum. Finally, since the
California framework seeks to encourage a broad range of assessments, hypercompositions, which entail substantial amounts of writing and employ the writing process, must be included as a viable assessment of writing competency.

Cognitive Effects of Hypercomposition

Hypercomposition supports the writing process because it follows a sequence very similar to traditional written compositions. There are three primary stages in the development of hypercomposition: exploration, organization, and writing (McKnight, Dillon, & Richardson, 1991). The exploration stage is the general knowledge or fact-finding stage. Students use research skills to locate and organize data as with note cards. This is the stage where students can explore knowledge without any structural limitations. In the organizing stage, students move away from fact-finding and begin to structure and restructure the information they have amassed. As gaps in their knowledge surface, they begin fact-finding again. From this they develop a hierarchical structure in which the information is organized according to some kind of logical order: spacial, sequential, chronological or by order of importance, etc. After they arrange the data, they enter the development phase where they create the hypercomposition, then they edit and revise according to peer-, teacher-, and self-evaluation.

Hypercomposition is a means of communicating the ideas, information, observations, and thoughts of one person to another. It is usually directed to a specific group of users for a specific purpose. Typical classroom writing, however, generally lacks this specific audience. The writing is usually done to prove the student's competency and not within the context of its real use. But, when students are given the task of writing for
a real audience with real purpose, the quality of the writing can be significantly improved (Cohen and Riel, 1989). Audiences for student writing can be as close as students in the classroom, school publications, across local computer networks, or as broad as users of the Internet (Turner, 1992). The form of writing can range from traditional paper and pen compositions designed for classroom books and school publications to hypercompositions for the classroom presentations and CD-ROM publication (Nicol, 1990).

Hypercomposition supports the writing process because it encourages the student to consider the audience. Leher (1993) challenged students to develop hypercompositions to be used by their peers as a source of information not found in their textbooks. This form of authorship made the students aware of the multiple voices (sound, text, graphics, video) in their documents and they were, therefore, more likely to consider the audience as they designed their presentations. As a result, they were more likely to consider the information they wished to convey and revisions to improve the clarity of their presentation. Both activities promoted a deeper understanding of the content than was had by students who simply studied the text.

Research (Toomey & Ketterer, 1995) reveals that the development of hypercomposition encourages reflective thinking. Students, with the assistance and coaching of teachers and peers, reflect on the patterns uncovered while researching their topics. Further, students were more likely to develop related concepts as a result of questions raised after their first drafts were written. In each case, hypercomposition was used by the students as a tool that encouraged them to pursue their curiosities.
Current Applications of Hypercomposition

When hypercomposition and human creativity are combined, the educational potential is limitless (Lamb, 1995). There are a variety of authentic audiences for hypercompositions and numerous projects ranging from simple reports to Internet magazines, and CD-ROM yearbooks; all demonstrate that hypercomposition supports quality writing. In one school, students in reading classes wrote joint autobiographical projects that were produced on the school district's computer network. The projects combined video, audio, and text into on-air stories. Teachers felt that many of the projects would not have been completed if students had been assigned traditional paper and pen compositions.

Students at Palo Duro High School in Amarillo, Texas, are one of a dozen schools who use hypercomposition in their school newspaper published on CompuServe® (West, 1995). In the future there could be multiple links between K-12 schools across the globe via the Internet. This allows students access to an audience of millions. Because of the wide number of readers, the school is much more selective about the articles it publishes in its papers. Consequently, students must write at a higher level if their hypercompositions are to be selected for publication.

Hypercomposition allows students to preserve and present original information to other students. Several students at Carrollton High School in Carrollton, California, took a trip to Washington, D.C. While they were there, they collected a variety of memorabilia, postcards, photographs and video tape. When they returned to school, they developed a collaborative hypercomposition chronicling what they learned on their trip (Stinson,
The information was presented to other students who did not take the trip. These students had created their own electronic archive and provided an additional source of information to their peers.

Many teachers feel that multimedia can enrich student writing far beyond what can be achieved with traditional paper and pen writing (Parker, 1993 and Milone, 1994). Students in one fifth grade class created hypercomposition versions of folktales. Students wrote a first draft, edited on-screen, and then printed a preview, before adding other media elements. But, in addition to their basic hypercomposition, students recorded their own introductions to the folktales and featured a discussion of their adaptations within their hypercompositions.

Students are frequently asked to dramatize a scene from a book or write a new ending to a story. Through the use of hypercompositions, students can awaken and enhance an interest in books. They have been able to demonstrate their understanding of a book in a more enriched manner. D'Ignazio (1993) reported on students who created hypermedia illuminations of a published work. These illuminations include a student manuscript that is a variation of the published work, oral narration, digitized photos, drawings, art work, and video. This is combined with music, sounds, and animation to reveal effectively what the students understand about the stories.

It seems clear that there are a variety of opportunities, topics, and audiences for student created hypercompositions. They can reflect the constructed understandings of students from current events and local news as in the case of hypermedia newspapers and yearbooks, to illuminations of currently published literary works, to highly detailed
reports on topics researched by students. Regardless of the topic, students appear to be engaged and interested in the work that they do and seem to write at a higher level.

Cognitive Theory, Organization, and Cognitive Strategies

Students who create HC are active participants in the learning process rather than passive recipient of information (Saettler, 1990). These students select and modify what they learn, remember, and think. Saettler, as well as Gagne, Briggs, and Wager (1992) indicate that there at least three cognitive strategies that students use in developing HC: elaboration, organizational, and comprehension monitoring strategies.

1. Elaboration strategies - paraphrasing, summarizing, taking notes, developing questions to be answered.

2. Organizational strategies - outlining, mapping concepts, and storyboarding

3. Comprehension monitoring strategies - monitoring one's own progress based upon the personally selected goals.

Creating HC encourages the development of each of these cognitive strategies. When conducting research for their HC, students must use the elaboration strategies. Since they are gleaning information from a variety of sources they must paraphrase and summarize information. As students learn new concepts, questions frequently develop that cause students to engage in additional research as they seek additional answers.

When students are ready to develop their HC, they must organize information and media sources in some manner that will allow them to communicate effectively. Outlining, mapping, and storyboarding are effective organizing tools that allow students to create HC.
in a logical and effective manner. Creating HC also helps to develop a student's comprehension monitoring skills as they set goals for themselves. When they are aware, in advance of commencing the project, of what they are expected to accomplish, they are able to set their own goals and establish their own time and energy investment. When students can establish their own investment, set their own goals, they are placed in control of their own learning and thus are active learners.

The Role Of Instructional Design Within Hypercomposition

Students seem to require some kind of structure or direction to help them develop their hypercomposition projects. Without that direction they lack focus and invariably have to rework the composition more times than might have otherwise been done. Jonassen (1990) reports that the hardest part for students is getting started. They have difficulty selecting the media that hyperdocuments should contain and then determining how to link the document to the media. There are a variety of means by which the composition may be structured, but what seems clear is that students must be able to “record [their] ideas and progressively maneuver them into structures which are as clear as possible” (Martin, 1990. p.101).

Martin advocates a system termed an “idea processor” that allows the author to organize materials with note card similar to notes written for a traditional composition. From there envelopes or groups of ideas can be generated, and hierarchies or subdivisions of information developed. By arranging information in this manner the student can shuffle, reshuffle and arrange it as many times as necessary before beginning any work on the computer.
After the idea processing is completed, a process of mapping can be started. Mapping is beneficial because it serves as a blueprint for the entire document. According to Jonassen, mapping usually requires about an hour or two to create. The time spent, however, saves hours in arranging and rearranging the text and images since the map illustrates the arrangement of the student's ideas.

When students create hypercompositions, they start with some initial ideas, formulate and reformulate those ideas and wording, design and compose their projects and then publish them (Streitz & Hanneman, 1990). This process is similar to the writing process. However, it is distinguished by the knowledge transformation that results from merging the document's content space (computer screen) with the rhetorical space (information). Since hypercompositions contain less text than traditionally written composition, there is more of an emphasis on "including, excluding, sequencing and reformulating information" (p. 411).

The notion of instructional design in student-developed hypercompositions should be as important as in projects developed by teachers since the ultimate goal of the student project is to provide information that enhances the user's knowledge. The students should consider the same factors that teachers would in designing lessons: the specific objectives of the project, the audience, the instructional events to be delivered, the media to be used, and the sequencing of the learning activities (Gagne, Briggs & Wager, 1992).

Creating hypercompositions require several considerations beyond those needed to compose a linear document. Jonassen and Hannum (1987) indicated that hypercompositions should be designed with cognitive and behaviorist learning theory in
mind. Specifically, they indicated that the design must take stimulus material and learner response into account. Information must be structured in a manner that makes it easily understood. Use of media should stimulate the interest of the user.

The mouse and keyboard as input devices for learner feedback must be taken into consideration so as not to cause overuse of either. There are a variety of interactive approaches that students may take when creating their hypercompositions. They can be menu driven where viewers decide where they want to go by selecting from a menu. A test driven approach limits the viewers progress through the stack since users cannot proceed until they have successfully finished a test. Exercise driven interactivity requires that the viewer complete a set of exercises before they may continue. Combination interactivity uses all of these approaches at some time during the project.

Shneiderman and Kearsley (1989) composed a simple list of authoring principles that, if followed, can make creating hyperdocuments simple and effective. At the same time, these principles will allow student designers of hypercompositions to be more effective in reaching their audiences.

1. Chunking - organize the information to be presented into small units or chunks of information according to topic, theme, or idea.
2. Interrelationships - the hypercomposition should have links to other documents and media that clearly support the text.
3. Consistency in document names - keep a master list of documents. This makes linking documents simpler.
4. Master reference list - a central location for all sources to ensure correct and complete citations.

5. Simple navigation - navigation should be simple and consistent.

6. Screen design - screens should be grasped perceptually. Layout is very important.

7. Low cognitive load - do not require the user to remember things from screen to screen.

Anderson and Veljkov (1990) also provide some basic rules that can assist students in creating better hypercompositions.

1. Avoid simple page-turners - make sure the hypercomposition is interactive.

2. Keep the text simple - use graphics to help make a point. Graphics should be self-explanatory.

3. Use the 50 percent rule - cut out 50 percent of words. Limit screen text to 20 to 30 words.

4. Communicate clearly and concisely - use short phrases and simple verbs.

5. Use the active voice - talk directly to the viewer.

6. Use common consistent screen formats - use the same format for navigation.

    Place text and graphics in a consistent format.

7. Provide feedback - make sure viewers receive feedback when they respond to a question.

8. Make sure viewers knows what is expected of them - do not present a screen without direction. Provide a mechanism for the viewer to back up.
9. Provide help - provide on-line help when possible

According to Ann Woolfolk (1990), both lists of recommended design principles are in line with the cognitive and metacognitive theories of learning. For example, the use of color, sound, and animation is a cognitive tool to attract and maintain the user's attention. Likewise, using short words and phrases and adhering to the 50 percent rule are other tools to avoid requiring the user to remember too much information at one time. By focusing information into chunks or units, hypercomposition authors can use yet another cognitive tool to assist users in learning what they want them to know. This technique allows the user to recall more information by putting it into a group of data that can more readily be recalled. It seems clear that if students follow either of these lists of design principles, they will have done a good job of communicating effectively.

Authoring Tools

Authoring tools are software applications that allow students to create hypercomposition. This software allows students to combine text with graphics, sounds, Quicktime movies, and varying degrees of animation. There are a variety of authoring tools that students may use to create hypercompositions. Three will be reviewed because they are accessible to middle school students and are available for the Power Macintosh computer: Astound 2.0 by Gold Disk, Inc., Digital Chisel 1.2 by Pierian Springs Software, and HyperStudio 3.0 by Roger Wagner Publishing, Inc. Refer to Figure 2.3 for a comparison of features.

With Astound 2.0, students can create hypercomposition with a variety of transitions from slide to slide without scripting. Joseph Schorr (1996) rated Astound,
Figure 2.3. Comparison of authoring tools. Astound, Digital Chisel, and HyperStudio are three of the most readily available programs for students.
which allows students to create sophisticated presentations, with four stars.

The program comes with 19 preset actors for animations. Astound lets the user control the timing, path and transition for actors, graphics, text, sounds, and Quicktime movies.

One of the best features of Astound is that it allows students to check the spelling of their text, and it has a find and replace feature they may find handy. Drawing objects is more limited than in some of the other programs since there are only limited paint features. For that reason, students also will be unable to edit any graphics they want to import. Astound does allow, however, a limited amount of sound editing. One other helpful feature of Astound are the notation pens that allow students to make marks on the screen during the presentation.

The Extrude feature allows students to create 3-D objects and the Tween command creates morphlike animations. Students can import a variety of sound files, record their own sounds and then edit them.

Astound allows students much more control and flexibility in creating presentations than can be found in a program such as HyperStudio. However, it may take students longer to learn to use the variety, features, and controls that are build into it. They may find the templates and preformatted graphic, text, and movie areas helpful. Therefore, it is highly recommended that students have an ample amount of time to learn the program before presentation assignments are given. Compositions created on the Macintosh can be played on either Macintosh or IBM compatibles.
Digital Chisel is an authoring tool that was designed with students and teachers in mind. Thomas E. Suter (1995) evaluated this software and rated the program with the five stars. He gave it an A rating for ease of installation and product support and gave it an A for content and ease of use. On the other hand, Joseph Schorr (1995) rated it with three stars citing weak painting drawing and text tools. He did state, however, that Digital Chisel comes with built-in templates and an image and sound library that students may use in developing HC. It has a built-in testing feature that allows authors to create multiple choice, true/false, matching, picture pick, typed response and essay questions. One problem noted with this feature is that typed responses must exactly match the designated answer or negative feedback results. Digital Chisel also allows access to database information. With this program, authors can control laserdisc players audio CDs. The Speak feature allows the computer to speak the text in any one of the voices available from the computer's Speech Manager. As with Astound, some time should be allotted for students to learn the program before they attempt to create their presentations. However, learning time may be reduced if students view the available video tutorial. The original version of Digital Chisel runs very slowly on a Power Macintosh. Version 1.2 is accelerated for the Power Macintosh and runs faster. Digital Chisel comes with a CD-ROM full of graphic images and Quicktime movies that are school oriented. Student may find them very useful and easy to import into their hypercompositions.

If students are already familiar with Macintosh authoring tools, they will most likely have used HyperStudio. The newest version, HyperStudio 3.0, is very user friendly
and has a good array of draw tools that allow students to create their own graphic images or to edit imported graphics. HyperStudio allows users to edit graphics at the pixel level.

Like Digital Chisel, HyperStudio has a testing feature that allows students to create test questions in a variety of formats. Audio CD-ROMs and laserdisc players can also be controlled by HyperStudio. Additionally, students can import Quicktime movies. While they are able to record voices and music, they are not able to edit them once they are saved. There are a few preformatted templates that students may use when they create their hypercompositions, but the selection is limited.

All three of the authoring tools are relatively easy for students to use. Students who are developing more linear presentations might find Astound very useful. Students wishing to include more branching and want to take advantage of testing features might want to consider HyperStudio or Digital Chisel.
CHAPTER THREE

Purpose of the Project

Language Arts students at the middle and high school are required to demonstrate their proficiency in writing in a variety of styles. Additionally, students in all academic areas are being asked to demonstrate their understanding of the subject area curricula. Many teachers in the content areas want student writing to be relatively transparent so that they need only concern themselves with the student's understanding of the content area. In other words, they do not want the students' ability to communicate to interfere with the their ability to express their understanding of science or social studies concepts. Now, with the introduction and availability of computers and other technology in the classroom, and with the accessibility of authoring tools, teachers are looking to alternative means of assessing a student's ability to write and communicate what he or she knows about a subject.

One such means of alternative assessment is student-developed hypercompositions. These hypercompositions allow students to use sounds, animations, movies, text, and pictures to make clear the points and concepts relevant to their topics. These hypercompositions require that students have a working knowledge of authoring programs (such as HyperStudio), scanners, video cameras, laser disc players, text books, and graphic arts programs.

Students may be able to operate a video camera to film a skit, scan images created in their art classes, or operate the Macintosh audio CD player; but they seem to lack the knowledge and experience in putting all of these media elements together into one
hypercomposition. HyperStudio, itself, contains a tutorial which teaches students to use many of the elements of its program: making cards, buttons, adding sound, etc. But it, too, lacks the organizing tools to get students from the topic inquiry stage to the completed project stage.

As a result, students and teachers may become frustrated and feel that they are spending more time on the project than necessary. The development of a multimedia presentation - a hypercomposition - seems to become the focus rather than the content. Students spend a great deal of time using trial and error to figure out what they should do and when; or they continually need to ask the teacher, “Now, what do I do?” This may make hypercompositions particularly difficult for the teacher who has 30 or more students in a class. In many cases, teachers have to keep all students at the same stage so they can all be guided in the development process; or the teacher has to repeat the same information 30 times to individual students. Neither situation is desirable.

The purpose of this project is to develop a HyperStudio stack, called HyperReport, that will act as a sequential guide for stack development. Just as many teachers want writing to be transparent, likewise, they want the development of hypercompositions to be transparent. This project will walk students through project development from the research stage of their project to acquiring appropriate media, and then step-by-step through the development of their stacks. Students will be able to use what they know about the various media and technologies in a systematic manner and thereby eliminate the haphazard and unsystematic manner in which many of them currently develop their hypercompositions. By using this stack, students can access guidance for any stage of the
development process as they approach it. Likewise, HyperReport allows the teacher to act as a facilitator to the hypercomposition development without having to repeat routine information to individual students.

The goal of this project is to facilitate the use of hypercompositions as an alternative means of assessment by making it easier for students to create it. Then, the focus of the hypercomposition will be that of an effective means of communication about a topic rather than how to make a multimedia presentation.
CHAPTER FOUR

This project, entitled HyperReport, is designed to help middle and high school students manage writing tasks and multimedia tools and to organize activities so they can effectively report information. The project will assist students in developing multimedia presentations that effectively report their ideas on or information about a specific topic as an alternative to the traditional written report. These multimedia-based reports, called hypercompositions, enhance research and writing skills.

Learners

This project is designed for middle and high school students in a regular 7-12 grade level classroom setting. Students must be able to read at the sixth grade level without assistance. Students reading below this level may successfully use HyperReport with the assistance of appropriate support personnel.

To develop a hypercomposition using HyperReport, the learners should already have basic computer skills and should know how to use a multimedia authoring program (e.g. HyperStudio, Digital Chisel, or Astound). Although any of these programs may be used, this master's project will be limited to HyperStudio. Students should know how to use a scanner and save the scanned images as PICT files; how to use the features of a word processing program such as ClarisWorks, WordPerfect, or Microsoft Word; and how to import, export, copy, and paste text between applications. Additionally, students must be able to import sound and video clips. In cases where students do not have these entry skills, they must be taught prior to or concurrently with the use of HyperReport.

As for prerequisite writing skills, students should be familiar with the steps required to complete a report of information (ROI) hypercomposition: reading, thinking,
planning, organizing, writing, revising, editing and then rewriting and publishing. These skills need to be taught prior to using this stack since no review of specific writing steps is provided by HyperReport.

To report information, students have to conduct research on a selected topic and then organize that information so that it can be presented to others in a knowledgeable and focused manner. When using HyperReport, they are expected to already know how to use a variety of sources: encyclopedias, textbooks, library books, maps, globes, charts, CD-ROM, laser disc, video tapes, clip art, and sounds. To process the specific and concrete information gathered, students must be able to paraphrase what they have read, analyze and synthesize the information, and communicate it effectively.

Procedural Analysis

HyperReport is an organizational tool and project manager. It is not designed to teach research, writing, or content area skills. Its purpose is to help students organize their information, skills, and tools so that they can communicate what they have learned to others. HyperReport is designed to help students streamline and manage the processing of information and the use of technology that will lead to developing a ROI.

The main procedural tasks that lead to the development of hypercomposition (HC) are researching, writing, and developing multimedia. These are presented in Figure 4.1. These procedural tasks must be done in the given sequence in order to produce HC. The first two procedures (Conducting Research and Writing Convincingly) are separated by a broken line from the last procedure (Developing Multimedia) to indicate that they are prerequisite tasks to developing a multimedia report of information.
Developing a Multimedia Report of Information

1. Conduct Research
2. Write Convincingly
3. Develop Multimedia

Figure 4.1. Hypercomposition task analysis. Hypercomposition can be broken down into three essential tasks. Research and writing are prerequisite tasks to developing a multimedia report of information.
Within each procedural task, subtasks are identified and represented in Figure 4.2 to Figure 4.4. By sequentially completing the subtasks, the students will accomplish each procedural task. The subtasks illustrated in Figure 4.2 and shaded in red represent the research tasks that must be done to develop HC. They include selecting and narrowing a topic; locating print, sound, and visual sources of information; preparing a bibliography; and taking notes. These tasks are reviewed within HyperReport because these are skills that students do not use on an on-going basis in class, and students tend to forget them.

Figure 4.3 illustrates the subtasks in the second procedure, Writing Convincingly. These skills include organizing notes, drafting, revising, and editing. These skills are an important part of developing HC and are reviewed in HyperReport. They are essentially the same as the skills involved in the writing process that is widely used in most language arts classes. They should be more easily recalled by students. Language Arts teachers may use a different set of steps when teaching the writing process, but the same output is expected of students.

Figure 4.4 represents the subtasks required in developing the multimedia ROI. These subtasks, identified in gold, constitute the bulk of the HyperReport program and are separated from the other prerequisite subtasks with a dotted line. The first three subtasks identified as 3.1 to 3.3 must be done in the sequence given if students are to establish a logical and methodical procedure for developing HC and thereby increase their efficiency. Tasks 3.4 - 3.6 may be done in any order. For example, HyperReport suggests that students import their graphics before they import text. However, some students may find that they work more efficiently if they import text and then import their graphic clips.
Developing a Multimedia Report of Information

1. Conduct Research
   1.1 select a topic
   1.2 locate source material
   1.3 prepare bibliography cards
   1.4 take notes

2. Write Convincingly
   1.11 narrow the topic
   1.21 books, periodicals, reference

3. Develop Multimedia
   1.22 audio, video, graphic sources

Figure 4.2. HyperReport procedural analysis (conducting research). Cards in HyperReport review the highlighted research procedures, a prerequisite to developing multimedia.
Developing a Multimedia Report of Information

1. Conduct Research

2. Write Convincingly
   - 2.1 organize notes
   - 2.2 type rough draft
   - 2.3 revise draft
   - 2.4 edit draft

3. Develop Multimedia
   - 2.11 create outline
   - 2.21 present information clearly
   - 2.31 check content & organization
   - 2.41 check grammar & spelling

Figure 4.3. HyperReport procedural analysis (write convincingly). Subtasks for writing must be completed by students, but are not addressed by HyperReport.
Developing a Multimedia Report of Information

1. Conduct Research
   - 3.12 create storyboard
   - 3.22 save images to disk
   - 3.32 scan charts, pictures
   - 3.52 record narration
   - 3.62 check all navigation buttons

2. Write Convincingly
   - 3.11 screen design
   - 3.21 scan & digitize images, clips
   - 3.31 use existing clip
   - 3.41 bullet main points
   - 3.61 check spelling, sounds

3. Develop Multimedia
   - 3.1 project map
   - 3.2 locate all media
   - 3.3 import graphic images
   - 3.4 import text & headings
   - 3.5 import sounds, music, narration
   - 3.6 finalize the project

Figure 4.4. HyperReport procedural analysis (develop multimedia). Highlighted tasks represent the bulk of the HyperReport project cards.
What must be stressed, however, is that students must adopt some kind of sequence that works for them and then use that sequence consistently.

Project Structure and Development

To assist both the teacher and students carry out the steps to developing a hypercomposition, a multimedia tutorial called HyperReport was designed and developed. HyperReport features three main sections preceded by an introduction and table of contents. The sections include chapters called “What is a HyperReport?,” “Research Review,” and “Developing the Project.” Each section is described below.

Introduction

HyperReport opens with a multi-card animation of a shooting star racing across the dark sky over a medieval castle (refer to Figure 4.5). The animation was used to draw the attention of students to the program. The medieval castle was chosen because medieval history is part of the 7th grade curriculum, and students tend to have an interest in knights and castles. The castle can also be seen as a symbol of the medieval period and serves as a metaphor for the ending of the “dark age” of traditional report writing and the emergence of the multimedia report. Narration tells students of the benefits of using multimedia. Then a match, set against a black background, erupts into flame; and students are told that they, too, can ignite their audiences with multimedia. A navigational help message is provided so students can bypass the introduction on future launches by clicking on the shield at the end of the opening.

When students click the hand icon to begin the remainder of the introduction, they see a screen with a white sheet of paper with the heading of a traditional report on dragons. The narration tells students that they, too, can go from writing traditional reports
Figure 4.5. Opening card in HyperReport. This is part of an animated sequence designed to attract students' attention to the program.
When students click the hand icon to begin the remainder of the introduction, they see a screen with a white sheet of paper with the heading of a traditional report on dragons. The narration tells students that they, too, can go from writing traditional reports to creating multimedia reports as the card dissolves into another card that depicts a vibrant green dragon set against a dramatic black background (See Figure 4.6). The dragon roars and spits fire as a student narrates the introduction to her dragon hypercomposition. This sequence is designed to stimulate the students' interest in creating a hypercomposition while serving as a model of what students can do.

Table of Contents

In order to facilitate navigation through the program, a Table of Contents was created. Content items are linked to various parts of the stack. Figure 4.7 shows the Table of Contents page as it appears in the stack. The background graphic (an open book) was chosen because it can be readily associated with the printed table of contents that is quite familiar to students.

The contents of HyperReport are broken down into three primary parts: What Is a HyperReport?, Research Review, and Developing the Project. Quit and Contents buttons are part of the Table of Contents screen. The Quit button allows the students to quit the program at any time. It is always displayed in the lower left corner of the screen.
Figure 4.6. Model hypercomposition title card. This student-created card models a new way to make a title page with animation, text, graphics, and narration.
**Table of Contents**

Chapter One - What Is a HyperReport?
1. The Assignment
2. What Goes In It?
3. Evaluation Rubric

Chapter Two - Research Review
1. Selecting a Topic
2. Selecting Sources
3. Bibliography Review

Chapter Three - Developing the Project
1. Project Map
2. Screen Design
3. Storyboard
4. Acquire Media
5. Importing Graphics, Video and Animation
6. Adding Text
7. Using Sound, Narration, and Music
8. Finalizing Your Project

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**Figure 4.7.** Table of contents card features hypertext. This card serves as a navigational and organizational tool that allows students to access exactly what they need and bypass the rest.
The Contents button is to the right of the Quit button but is not active on this card. It serves to familiarize and get the students to remember its location. On cards where the Contents button is active, it brings students back to the Table of Contents page.

Chapter One: "What Is a HyperReport?"

The first section of HyperReport, "What Is A HyperReport?" explains what the Report of Information hypercomposition should contain and how it will be evaluated. In this section of HyperReport is the assignment screen that features a knight in armor proclaiming the assignment on a banner (Figure 4.8). It is open ended enough to allow the teacher to decide on the number of cards or amount of research that students will do.

"What is a HyperReport?" presents a slide show of cards that tells students that research, observations, and experiences may be combined into a report of information hypercomposition. Each card has a graphic clip art and a caption boldly set against a black background. A magic button makes each card transition to the next card in a linear manner to efficiently and succinctly give students a general idea of what kind of information can be used in their hypercomposition assignment.

The last segment of "What is a HyperReport?" shows students the criteria by which their hypercompositions will be judged. Their HC is evaluated based upon the holistic rubric for ROI writing according to the 1996 Moreno Valley Unified School District writing proficiency standards. Students see a graphic of a postage scale with values from 1 to 6 (refer to Figure 4.9). These numbers correspond to the holistic grading rubric. The teacher clip art serves as an on-line help feature and tells students to click on a rubric value to find out what they need to do to achieve the corresponding score on their HC. This not only provides the teacher with a standard by which the hypercompositions
Figure 4.8. Hypercomposition assignment card. When students view this card in HyperReport, they get a general idea of what they must do to create a hypercomposition.
Figure 4.9. Evaluating hypercomposition card features on-line support. Students click the teacher icon to get additional information.
maybe evaluated; but it also offers students a metacognitive tool. If they know what is expected of them, the students will be better able to develop effective hypercompositions.

Chapter Two: “Research Review”

The second section of HyperReport reviews the research activities that must be done prior to developing a hypercomposition. The review follows the guidelines generally accepted for middle and high school research. “The report should be based on information found in books, magazines articles, encyclopedias, and other reference sources,” (Forlini, 1990, p. 497). HyperReport brings together all of the information that students have found in reading about a single topic. In addition to selecting and narrowing a topic, locating sources, making bibliography note cards, and taking notes from sources, students also select sources for audio, video, and graphic art clips to be used in their hypercompositions. The sources of all materials including audio-visuals, must be cited in their bibliography.

To guide students through the Research Review, HyperReport starts with a Topic Activity screen to assist them in selecting and narrowing a topic. Through the use of animation and interaction, students are presented with sample sources and are asked to identify the necessary information needed to complete a bibliography card.

First, student are given a page of notes on a “notebook” card that reminds them to narrow their topics (see Figure 4.10). The page also models the instructions with a sample of the broad topic of rodeos and shows how it can be narrowed to one of several topics such as barrel racing and bronco riding. Then students are instructed to complete an interactive topic activity. If they need topic ideas before they proceed, they may choose
Preparing to do research

Limit your topic:
1. amount of available information
2. length of the project

Activity
Select a topic
1. narrow the topic
2. identify the audience
3. write out a list of 5 - 10 questions you have about the topic

Figure 4.10. Narrowing a topic based on information and length of project. HyperReport's topic review includes an assignment that gives students criteria for narrowing their research topics.
the teacher icon who serves as their on-line support. When this icon is clicked students are presented with an entire card of topic ideas they may use for this activity.

The Topic Activity is presented on a “notebook” card with interactive text fields where students can input a general topic idea (see Figure 4.11). Then, students must answer a series of questions designed to help them narrow their topics. Students input their answers directly on the screen. When students have finished typing in their responses to the questions, they are instructed to print their answers. The mounted knight in the lower left corner will allow students to repeat the instructions on narrowing a topic. The mounted knight in the lower right allows student to move on when they have completed and printed the activity. If students need assistance in creating a practice topic, the teacher icon takes students to a screen where sample topics can be found.

After students have practiced narrowing a topic, they practice recording bibliographic information in two practice sessions. In the first interactive practice session, students see the scanned image of an audio CD. Through on-screen text they are asked to click on the areas of the CD that contain information they should include in their bibliography. If they click on the correct areas, they receive immediate feedback when the screen displays a bibliography card with the information correctly cited. If they choose the incorrect card, they receive no response at all and must try again. When students have completed the on-line bibliography card they are ready to move to the next practice.

In the second practice, HyperReport, displays the sample image of the Microsoft Encarta CD-ROM disc. An article from the encyclopedia is then superimposed over the CD. The copyright information typically found at the end of an article appears at the
<table>
<thead>
<tr>
<th>Name</th>
<th>Topic</th>
<th>Activity</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What is your general topic?</td>
<td>Write 5 - 10 questions you have about the topic.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This general topic can be narrowed to these specific topics:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Which one did you choose?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Print this page when you have completed this activity.

**Figure 4.11.** Interactive topic activity has input fields and on-line help. When students use this screen in HyperReport, they practice what they have learned about narrowing a topic.
bottom left of the screen. Students are instructed to identify the information that should be included in their bibliography (Refer to Figure 4.12). When students click anywhere on the card they are presented with a correct and an incorrect index cards containing bibliographic information. With text, students are instructed to select the correct card. If they choose the incorrect card, narration provides immediate feedback, instructing them to try again. Only after they have chosen the correct card are they given immediate positive feedback and permitted to continue throughout the stack.

There are many different styles for citing and referencing materials used in a report. Two of the most commonly used styles are American Psychological Association (APA) and Modern Language Association (MLA). HyperReport will be used to help students develop their History Day projects which use the MLA style. Therefore, it is the style used within this instructional strategy and for the bibliography review. Certainly, other styles may be substituted by the teacher.

Chapter Three: “Developing the Hypercomposition Project”

In the third section of HyperReport, students are guided, step-by-step in the planning and development of their multimedia ROI projects. This section of HyperReport requires that students view information regarding a step in HC development, complete work away from the computer, and then return to HyperReport for information on completing the next step of hypercomposition development.

First, students must plan what is to be included in the HC and the order in which this information will be presented. To efficiently develop the project, they must create a project map, develop the basic screen design, and complete a storyboard. These planning steps are explained and modeled for students in HyperReport.
How do you cite that article you found on CD-ROM?

The copyright prints at the end of the article. What do you include in the bibliography?

"Castle," Microsoft (R) Encarta. Copyright (c) 1994 Microsoft Corporation. Copyright (c) 1994 Funk & Wagnalls Corporation.

Permission granted by Microsoft for non-commercial use.

Figure 4.12. Citing bibliographic sources using Microsoft Encarta. Part of an animated sequence, this card provides information students need to record bibliographic information in an interactive activity.
For example, through multiple-card animation, HyperReport tells what the project map is and shows how to complete it. HyperReport begins with a blank replica of the project map worksheet. Through computer animation, the main ideas of a sample ROI are added in red. Then the supporting details appear in blue (see Figure 4.13). The on-screen text tells students to complete their own project map worksheet following the same strategy. HyperReport, models the screen design and storyboard the same way and then prompts students to complete the printed student worksheets (refer to Appendices A, B, C). Without using the computers, students determine what information, text, sounds, video, and animation will be used on each screen of their ROI presentation. They identify these components on the project map and storyboard worksheet following the model given in HyperReport.

After students have completed their planning they must acquire, save, and organize their media on a disc. HyperReport uses animation to prompt students that they should, at this point, scan images, digitize sounds and video, and save sound clips to a folder on the hard drive or external storage device such as a zip disk. Figure 4.14 illustrates a portion of the animation. It features a cartoon character at the scanner, dancing musical instruments, a CD-ROM, and a video tape that ultimately float across the screen and into a file folder that dissolves into a zip disk. At this point students exit HyperReport, acquire their media which they save onto a disk, and then return to HyperReport for the next step in the development of their projects.

Once the students have acquired and stored their media, they are ready to begin developing the HC. They return to HyperReport where they are prompted to import graphics, video, and animation. HyperReport uses a slide show of cards as an
1. **1st, indicate the main points to be covered**

- **Name(s):** Erika Johnson, Monica Howard, Paul Gonzales
- **Period:** 
- **Topic:** Knights & the age of chivalry

HyperReport Project Map

Complete this project map to show the main points you intend to cover in your HyperReport.

![Diagram]

- **A.** Chivalry
  - Castles
  - Fealty
  - Weapons
- **B.** Becoming a knight
  - Noble birth
  - Page
  - Squire
- **C.** Daily life
  - Military order
  - Heraldry
  - Tournaments
- **D.** Chain mail & plate armor
  - Cost of armor
  - Weight
  - Knight's horse
- **E.** The end of knighthood
  - Clumsy & helpless
  - Battle of Crecy
  - Firearms appeared

2. **Then show the details you plan to use**

*Figure 4.13.* Creating a project map. Using animation, cards in this sequence model a tool that helps students easily organize their information and develop their hypercomposition projects.
Figure 4.14. Acquire all media. This card, from an animated sequence, instructs students to gather, scan, digitize, and then save all of their media in one file on a storage device.
instructional tool for this step. The first card in the animation has a picture of the completed project map. The second card superimposes the storyboard of the model hypercomposition over the project map. Text tells students to use both pages to recall the preselected and previously saved media clips for each card of their HC. HyperReport models this process with a completed card that has a picture of a medieval battle placed on a blue background with a red and gray border. A red arrow models the placement of a navigation button. Screen text instructs students to create their own stack in HyperStudio and import graphics, video and animation as modeled by HyperReport. HyperReport uses narration, graphics, and animation to help students understand the steps they need to follow to complete their projects. These steps correspond to the multiple steps presented in the procedural analysis in Figure 4.4.

When students have created their cards and imported graphics, video and animation, they return to HyperReport for the next step, “Using Sound, Narration, and Music.” HyperReport starts with a card that shows a completed storyboard. Through animation, a red circle highlights the information and audio clips on the storyboard that are to be recorded or imported into the project. A card with a graphic of knights and text headings already in place serve as a model for a student project. Over the model card the HyperStudio tape deck appears to prompt students to make their own recordings throughout their multimedia stacks based on the information in their storyboards (refer to Figure 4.15).

After the students have imported all media components, they are guided with screen text to finalize their ROI projects. Figure 4.16 is the next to last card in the stack and the last multiple card animation of the project. It features a little red ant set against a
Figure 4.15. Input all sounds. This card guides students to digitize and import all sounds. The image of the HyperStudio screen reminds students that they may access the built-in recorder to digitize their narrations.
Figure 4.16. Check for bugs. This is the last animated sequence in HyperReport. Students are guided to finalize their projects by checking buttons, sounds, animations, and QuickTime movies.
black background who is coming toward the viewer from the upper left corner of the screen and moving into the center. As he gets nearer, the image of a computer chip in his jaws becomes clear. Text appears on screen reminding students to “check for bugs” in their stacks. Screen text tells students to navigate through the entire stack to ensure that everything works the way they want it to work. They are told to check all buttons, sounds, and card-to-card transitions.

HyperReport started with an animated shooting star to capture the attention of the audience and ends with an animated ant that again captures students attention and serves as a model to help them see what they may use in their hypercompositions.

Program Design

The ultimate design of HyperReport had to balance two primary considerations. First, it was important to deliver the desired information to students in a way they will find interesting, visually appealing, and informative. Second, because HyperReport itself is a hypercomposition, it serves as a model of what students might be able to do as they create their own ROI projects. For these reasons, HyperReport uses animation, narration, text, graphics, and audio and video clips. These are the exact same elements students are being asked to include in their own hypercompositions.

Animation

Several multiple-card animations are used in HyperReport. They serve, primarily, to attract the attention of students, as in the case of the opening title sequence that features the shooting star and the title rising out of the water. The intention was purely to motivate the students to wonder how the sequence was done or to make them think it was “cool.” If either occurred, students might then be prompted to take a look at their
own title pages with an eye toward creativity and originality. For this reason, HyperReport begins and ends with animation.

Animation is also used to present information in a simple and systematic way. For example. The Encarta CD, which is immediately recognizable to many students, appears. If used as a reference, students are asked what information about the CD should be included in their bibliography. Then a picture of an actual article from the CD appears, followed by the copyright information. Through animation, all of this information is presented within a few seconds. Because of the graphics, the student’s attention is focused on the task that they have to do - citing bibliographic information.

On-Line Support

Built into the design of HyperReport is on-line instructional and navigational support that allows students to access additional information with the click of a button. Instructional support is provided by clicking on the teacher icon. For example, students can access a list of topics for the Topic Activity screen if they are needed. Information is only accessed when and if students need it by clicking the teacher icon. This on-line support reinforces students’ metacognitive skills by putting them in control of their learning, as they access only that information they deem pertinent to the task at hand.

Navigational on-line support is also used. For example, a message appears at the end of the HyperReport introduction and tells users that they may bypass the entire introduction if they click the shield icon that appears at the end of the title.

Navigation

The composite navigation as recommended by Vaughn (1994), is used in this stack. Composite navigation allows users to navigate freely throughout most of the stack.
but occasionally forces the user to follow a linear path when information is considered critical or when it is needed to maintain the logical organization of the material. The user navigates through the stack by means of buttons and/or Hypertext features. Stack navigational buttons are consistently located at the bottom of the screen. The Quit and Contents buttons allow the user to immediately exit HyperReport or return to the Table of Contents. To move forward or back, an icon of a mounted knight is located in the lower left or right corner. The knight in the left corner takes the user back one page and the knight in the right corner takes the user forward one page. When the user is confined to linear presentations, no buttons are available on the screen.

The Table of Contents card serves as a significant navigational tool for the user. Just like a table on contents in a traditional text book, this page shows the user exactly what is covered in HyperReport. It also serves as a visual organizing tool since it lists every section of the project (except for the stack opening and introduction). The entire page is a series of hypertext buttons that takes the user to specific areas of the program. This gives the user control over where in HyperReport they go and in what order.

One reason for developing HyperReport was to give students the specific information they want when they need it. By taking students directly to the Table of Contents, HyperReport allows them to bypass information they have already used or already know and to get right to the new information they need. When students click the shield icon at the end of the opening title they are taken to the Table of Contents page. From here they navigate as they need to. This navigation feature is important because students must be able to stop and start this program when they need to.
Text

Creme, a sans serif Macintosh text font, is used for text fields while Percival, a bold serif Macintosh font, is used for headlines. Since it is recommended that no more than two to three fonts be used per screen, text variations are accomplished with bold and italic styles and with color. Size of fonts vary according to the importance of the message with bigger text fonts being used for emphasis or titles. Colors, placement, and background are used to make the text stand out. A gray background with black text is used on cards that have substantial amounts of text. To create a dramatic effect that may be visually stimulating to students, a black background is used whenever possible with a contrasting text color, generally bright yellow, to afford maximum legibility (Heinich, Molenda, Russell, & Smaldino, 1996). The amount of text on any one page is limited to less than a paragraph, since more than that becomes difficult and tiring to read (Vaughan, 1994).

Creme and Percival are PrintShop aftermarket fonts (Broderbund, 1994) installed on the computer that was used to develop HyperReport. Since it cannot be assumed that all Macintosh computers that play this stack will have the fonts, these text was saved as PICT files on all cards. This makes the stack larger than it would have been if the fonts remained as text files. This added stack size is not an issue since this project is stored on a CD-ROM.

Sound

Sound is used for narration, background, and special effects. In the opening title's animation, a musical clip plays in the background as the animation unfolds, giving students something to see, read, and hear. Within the stack, special audio effects are used
to explain what a hypercomposition is. For example, one series of cards in the section "What is a HyperReport" models how sound is used to convey information. In the beginning of the sequence a screen appears with a computer monitor that shows a graphic of a medieval community. There are farm animals and nobles riding by on horses. Sounds of horses, cows, and chickens serve as special effects to draw the user's attention. Narration provides additional information and fleshes out details presented on the screen. Although sounds are perhaps the most attention-getting medium in multimedia, they can also be distracting. Therefore, it is used selectively in this stack. Because this project will be used in the classroom, care was taken to ensure that sounds are not overused and disruptive to the class and annoying to students. A royalty-free medieval sound clip from the Kaboom CD (1994) serves as a musical introduction to the stack. It plays as the shooting star travels across the sky over a medieval castle. Another sound clip serves as a musical bridge when students click the button to continue the introduction or when they click the button that takes them to the Table of Contents.

Graphics

Graphics, in the form of color, contrast, space, art, photos, and pictures are used to illustrate concepts and provide examples of how students use these media in their presentations. Screens are simple and clean. Visuals and text are consistently placed on the screen to add to readability (Heinich, Molenda, Russell, & Smaldino, 1996). Where possible, black is used as a background for scanned pictures and clip art. This provides a dramatic contrast and focuses the student's attention on the graphic images.
Copyright Issues

Original media or media for which limited use rights have been granted was used to create the bulk of this project. For example, both Kaboom (1994) and Corel GALLERY (1995) specifically state in their license agreements that users have the right to modify, publish, and distribute the images and sounds. Microsoft grants permission to use images from Encarta as long as they are not sold (Refer to Appendix D).

Photographic releases were obtained from parents and students whose pictures were used to create HyperReport. The signed copies are on file. A sample photographic release is found in Appendix E.

Using This Program

In order for teachers to effectively use this program, they themselves need to possess multimedia skills. Teachers need to be familiar with HyperStudio (or another authoring tool) and must be able to import graphic and text from third-party sources. They must be able to digitize video and sound. Additionally, teachers need to have taught these skills to students prior to or in conjunction with the use of HyperReport.

In order to use HyperReport, a Macintosh computer with 8 megabytes of RAM and a CD-ROM drive are required. HyperStudio player needs to be provided on the disk that stores the finished project so that students and teachers who do not have HyperStudio 3.0 will still be able to use the program. HyperStudio or the Player should to be set to 5 megabytes of RAM. Students will need access to a scanner, audio and video recording equipment or access to prerecorded sound effects, music, and QuickTime movies.

Prior to teaching with HyperReport, teachers need to duplicate adequate copies of the Project Map Sheets, Project Planning Sheets, and Storyboard pages. Once these
materials are assembled and the students have identified and researched a particular topic, they are ready to develop their HC projects using HyperReport.

Formative Evaluation

HyperReport was previewed by three students and two teachers. All of the students and teachers were given and signed the Institutional Review Board (IRB) consent form. Parent signatures were obtained as well as the students' signatures. The original forms are on file. Copies of the IRB Informed Consent and the briefing statement are contained in the Appendix as items F and G.

The students and teachers who evaluated this program were already familiar with HyperStudio and had created at least one stack at some point during the school year. All were given the opportunity to review the program in its entirety and were interviewed regarding their evaluation of HyperReport's potential effectiveness.

Student Feedback and Evaluation

A total of four students (three 7th grade students and one 8th grader) evaluated the program. One 7th grade student was identified in the Gifted and Talented Education (GATE) program. The other two 7th grade students were regular education students, one of whom had been retained in the 7th grade. The other evaluator was an 8th grade GATE student. Students who previewed the program gave very positive feedback about HyperReport. They found it to be helpful. They commented that it was entertaining and held their interest. All felt that it would help them organize their research information and that creating a hypercomposition would be easier with HyperReport. The students thought that they would not need to ask as many procedural and technical questions of their teachers and would only have to go to their teachers for help on issues related to the
study of their topics. They felt it was particularly helpful that they could go to the program whenever they needed to find out what they had to do next.

Two students were left alone as they reviewed the program together. They were overheard commenting to each other that they wished they had had this program when they were developing their stacks. They said that it would have been easier and would not have taken them as long as it did to complete their projects.

Some of the features that students found most helpful were the Project Map and the Storyboard. One student liked having the Table of Contents with the book metaphor. The book was a familiar image to them and the navigation was easy. One student instinctively clicked on an item of interest and was taken directly to that section.

During the interviews, students stated that all of the sections were valuable and equally important. One student said that the Project Map was not helpful for her and she would rather not use it. Instead she would go straight to the Storyboard. However, she thought that other students might find the Project Map useful and stated that it should not be removed from the program. One student thought the quality of the audio playback could be improved.

The student who had been retained was pleased with the animations. She said HyperReport was entertaining and held her attention. She thought she learned a great deal from the project and confided that she reviewed the stack a second time because it was interesting and fun.

Based upon the students’ and teachers’ comments only a few modifications were made to the stack. However, computer memory problems were reported. Students indicated that they received error messages indicating that changes could not be saved due
to low memory. Increasing the memory allocation on the Player to 5 megabytes seemed to eliminate these error messages. Two buttons failed to take students to the correct card and those have been corrected. There was no button to allow students to print the Topics Activity page. One was added.

Students thought the program could be improved if it included information on how to scan and save graphic images, and how to digitize sounds and video. However, these areas are beyond the scope of the project.

Teacher Evaluation and Recommendations

Two teachers reviewed the program. One, a teacher of 7th and 8th grade severely emotionally disturbed children, had developed a rather large stack herself. She felt her students would benefit from the program. During her interview, she indicated that she would have to sit through the program with the students as they worked their way through it. HyperReport contained the type of step by step procedures her students needed. Another teacher, a 7th grade science teacher said he could use the program effectively in his science class when students work on their science fair projects. It was his opinion that the program could be easily used for a variety of cross-curricular activities. He, like some of the students, felt that the program would be more effective if it contained information on how to scan graphic images and if it had instructions on how to digitize sound and video. No modifications were suggested by the teacher evaluators.

Program Strengths and Limitations

HyperReport is founded on good task analysis. The extensive consideration of what steps are involved in the development of a multimedia report resulted in a project that provides good guidance for students. Undergoing a comprehensive task analysis of
hypercomposition allows one to see the entire process from start to finish and, therefore, develop a logical manner in which students could efficiently be guided through it. Teachers and students alike commented that the thing they liked the most was that it was very easy to follow and that it was well-organized.

Metaphors played an important part in creating a project with which students could easily identify. The use of the open book graphic and table of contents format was an extremely appropriate choice. It allowed students to navigate instinctively because the metaphors used were quite familiar to them.

HyperReport is easy to use because of the Table of Contents card. It allows students to see at a glance all of the areas that HyperReport covers and lets them access the topic of their choice without having to repeat a topic they have already covered or do not need. The teacher icon seemed to be an equally good choice for on-line support. Students easily recognized the woman in the clip art to be a teacher and readily clicked the icon when they needed assistance.

Another HyperReport strength is that it serves as a model for students. When students are only somewhat familiar with hypercomposition, they may not fully understand how the various media can be used to effectively communicate. For example, students tend to use too many words on the screen because they are used to writing traditional compositions. With HyperReport, students see how they can minimize the words on the screen and add video, graphics, and/or narration to make their point. They see the impact that animation can have on their audience, because they know the impact HyperReport animations had on them. Consequently, students learn not just how to develop their projects, but they may get ideas to use in them, as well.
Perhaps the major limitation of this program was its concentration on the multimedia procedures instead of all three procedures: research, writing, and multimedia. It is recommended that the project be expanded in the future to include a chapter that also reviews the writing process since students and teachers thought the research review was helpful. An additional section on scanning graphics and digitizing video and sound are also recommended. Although these areas were outside the scope of the original project, they will be considered in future revisions of HyperReport. HyperReport is available on CD-ROM (refer to Appendix H.)
Complete this project map to show the main points you intend to cover in your HyperReport.
APPENDIX B

Screen Design Reproducible Worksheet

Name(s) ___________________________                  Period __________

______________________________  Topic __________________________

HyperReport Stack Planning Sheet

Draw your basic screen design and show where your navigation button will go.

Background color ______________
Border color ______________
Title font and color ____________
Text font and color ____________
APPENDIX C
Reproducible Storyboard For Student Use
Complete storyboard frames for each screen you intend to create in your HyperReport.

<table>
<thead>
<tr>
<th>Visual images</th>
<th>Text/narration</th>
<th>Visual images</th>
<th>Text/narration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production notes:</td>
<td></td>
<td>Production notes:</td>
<td></td>
</tr>
<tr>
<td>Visual images</td>
<td>Text/narration</td>
<td>Visual images</td>
<td>Text/narration</td>
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<td></td>
</tr>
<tr>
<td>Production notes:</td>
<td></td>
<td>Production notes:</td>
<td></td>
</tr>
</tbody>
</table>
**APPENDIX D**

Copyright notice from Microsoft Encarta '95 "Castle"

**Castle** (Latin castellum, “small fortified place”), fortified residence of a feudal lord or monarch. Derived from the walled cities of ancient Rome and the fortified palaces of Byzantium, the castle became virtually ubiquitous in western Europe during the wars of the late Middle Ages.

At first the castle consisted of a simple wooden structure on top of a mound, surrounded by a ditch. If a lord’s domains were flat, he constructed an artificial mound, or motte. As medieval siegcraft developed, a wall or series of walls or palisades was raised around the motte and at a distance from it; the open area within these walls became known as the bailey. By the 11th century the motte-and-bailey form of castle was widely prevalent. Outer walls gradually became thicker and were topped with wide battlemented parapets.

The next step in the development of the castle was the addition by the Normans of a towering masonry keep, or donjon, within the bailey. The keep, often some 12 to 15 m (some 40 to 50 ft) high, had thick walls and small windows. The White Tower within the Tower of London is an example of a Norman keep. Wide, deep moats replaced the crude ditches; ideally filled with water but often dry, these moats were crossed by drawbridges that could be raised from within the castle. At the castle end of the drawbridge was an opening in the wall, containing a portcullis, a thick, iron-plated wooden door that could be raised to clear the entrance. Within the Norman keep were private apartments, a well for water, and everything else necessary to sustain the inhabitants of the castle through a long siege. At first the keep was rectangular; later, it was learned that a round keep was easier to defend. In the 13th century the castle became increasingly sophisticated. Living and administrative quarters were moved from the keep into new buildings raised within the bailey. The keep, made smaller and stronger, became the final defensive position within a series of battlements.

A castle was often built on the edge of an impregnable cliff, ideally at a bend in the river where it could command a view of the surrounding countryside. The Château Gaillard, built by Richard I, King of England, in Les Andelys, France, is an example of a strategically located castle. The use of gunpowder in projectiles brought to an end the impregnability of the medieval castle. After 1500 the construction of castles was no longer feasible, and castle became a term for an imposing residence. See also Fortification and Siege Warfare.

Further Reading

"Castle," Microsoft (R) Encarta. Copyright (c) 1994 Microsoft Corporation. Copyright (c) 1994 Funk & Wagnall’s Corporation.

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APPENDIX E

Informed Consent/Photographic Release

Stephanie D'Antignac Reeves
Master's Project
California State University San Bernardino

Project Description

The purpose of this project is to develop a computer-based tutorial program as part of the master's project in Instructional Technology. Specifically, the project will assist students in organizing their materials and media in the development of their computer-based hypercomposition.

1. I agree to permit Stephanie Reeves to use the photographic likeness of my child in the computer-based project entitled HyperReport.

2. This program is being conducted by Stephanie Reeves, a master's candidate at California State University San Bernardino. She is the contact person regarding questions about my rights.

Parent Signature

Student Signature

Date
APPENDIX F

Informed Consent/Briefing Statement

The purpose of this study is to determine the effectiveness of a computer-based tutorial program developed as part of the master's project in Instructional Technology. Specifically, the study will investigate whether 12 - 16 year old students are better able to organize their materials and media in the development of their computer-based hypercomposition as a result of following the HyperReport program.

1. I agree to participate in the research entitled "A Formative Evaluation of the Effectiveness of HyperReport.

2. This survey is being conducted by Stephanie Reeves, a master's candidate at California State University San Bernardino. She is the contact person regarding questions about my rights or any injuries.

3. It has been explained to me that the reason for the research is to evaluate the effectiveness and user-friendliness of HyperReport. The procedure I will be involved in includes reviewing the software, developing a HyperStudio stack and answering a survey, under the supervision of my teacher. The benefit I may expect from participating is that I will learn more about developing multimedia presentations for school assignments.

4. I understand that this participation is entirely voluntary; I can withdraw my consent at anytime without penalty and I can have the results of the participation, to the extent that it can be identified as mine, returned to me, removed from the experimental records, or destroyed.

5. It has been explained to me that the results of this participation will remain confidential, and will not be released in any individually identifiable form without my prior consent, unless required by law. The only personal information I need to supply the investigator are age, gender, year in school, primary language, and ethnic background. Any other information will be given on a voluntary basis.

6. It has been explained to me that this participation will not in any way affect how I am evaluated in my regular class and will involve no risks of any kind.

_________________________  _______________________
Parent Signature                      Student Signature
APPENDIX G

IRB

Stephanie D’Antignac Reeves
Master’s Project
California State University San Bernardino

Project Description

The purpose of this study is to determine the effectiveness of a computer based tutorial program developed as part of the master’s project in Instructional Technology. Specifically, the study will investigate whether 12 - 16 year old students are better able to organize their materials and media in the development of their computer based hypercomposition as a result of following the HyperReport program.

The subjects of this study will be public school students (ages 12 to 16), from Moreno Valley, CA. Data will be collected using a survey questionnaire developed by this applicant. Data will be analyzed using appropriate descriptive statistical procedures.

Informed Consent

Request for waiver of written consent is being made because the nature of the study requires only responses to a survey questionnaire that indicates personal evaluation of regular items related to computer skills, knowledge, impressions, attitude and experiences. It is believed that these items do not in any way put respondents in physiologically or psychologically sensitive situations.

The test of the statement for the oral consent would be as follows:

1. I agree to participate in the research entitled "A Formative Evaluation of the Effectiveness of HyperReport.

2. This survey is being conducted by Stephanie Reeves, a master's candidate at California State University San Bernardino. She is the contact person regarding questions about my rights or any injuries.

3. It has been explained to me that the reason for the research is to evaluate the effectiveness and user-friendliness of HyperReport. The procedure I will be involved in includes reviewing the software, developing a HyperStudio stack and answering a survey, under the supervision of my teacher. The benefit I may expect from participating is that I will learn more about developing multimedia presentations for school assignments.
4. I understand that this participation is entirely voluntary; I can withdraw my consent at anytime without penalty and I can have the results of the participation, to the extent that it can be identified as mine, returned to me, removed from the experimental records, or destroyed.

5. It has been explained to me that the results of this participation will remain confidential, and will not be released in any individually identifiable form without my prior consent, unless required by law. The only personal information I need to supply the investigator are age, gender, year in school, primary language, and ethnic background. Any other information will be given on a voluntary basis.

6. It has been explained to me that this participation will not in any way affect how I am evaluated in my regular class and will involve no risks of any kind.
APPENDIX H

HyperReport: A Multimedia Management Tool
REFERENCES


