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ABSTRACT

A brief overview is presented of the use of educational media by teachers and students, along with some opinions about use and misuse. Opinions are supported by results of a survey of 55 teachers from the Binghamton City School District (New York) and information from informal interviews of teachers, library media specialists, and students. Most teachers appear to use media to complement delivery of the curriculum. Some use it often, and others, seldom. Most videos in current use are more that 10 minutes in length, and there is interest among teachers in shorter versions for classroom use. Most teachers are interested in expanding their use of technology, and most would like more information about it. The use of videodisks is expanding as the use of conventional films is decreasing. Most teachers recognize that the nature of the media itself has an impact on the curriculum and that it can affect the intended message. Many teachers give students tasks to complete during media presentations, but most do not use presentation time for grading or planning themselves. Secondary school students seldom use media to fulfill course requirements, but most teachers are willing to accept such work, and some appear to encourage it. An appendix contains 3 tables and 14 bar graphs representing survey findings. (SLD)

Media Meets the Curriculum:

Uses, abuses, historic perspective, and the potential of emerging technologies

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For partial fulfillment of the requirements for
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Abstract

From the cave painting to computerized multimedia, humans have felt the need to express themselves in a variety of ways. As a result of our biological makeup, we employ different knowledge systems to acquire, store, and retrieve understanding. We use different performance systems to express what we know about the world. This implies that students need to encounter forms that express ideas in different ways and to have options when given the chance to express what they know.[1]

The basic media elements are text, human speech, other audio such as music, graphic art including photographs, and motion pictures including animation. These media elements can be used individually or in combination to express ideas. They can also be constructed for sequential and nonsequential access. Although traditional media like 16mm movies and audio tapes are designed for sequential access, nonsequential access, featured in many new media forms, has been around for a long time in the guise of the humble book. Although searching for information is often easier with modern systems, a well indexed book can also facilitate the search for specific information.

Over the years, teachers have used a variety of media, devices, and techniques to help with the delivery of their curriculum. Recently, students have increased their use of various media to express what they know as part of formal and informal learning and evaluation processes. In this paper I will provide a brief overview of the educational use of media by teachers and students along with opinions regarding effective use and misuse. To help support my opinions, I will present and analyze the results of an original survey given to 55 secondary teachers in the Binghamton City School District in Binghamton, New York. I will also draw on information gained from informal interviews with teachers, library media specialists, students, and members of my ED 602 seminar on Curriculum Theories, Designs, and Evaluation that was developed and facilitated by Professor Kenneth Teitelbaum. Finally, I will look at emerging technologies and provide some insight as to the potential they have to offer additional forms of expression for teachers and students.

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[1] Eisner, Elliot, *The Educational Imagination*, McMillian Co., NY, 1985 p. 154.

Introduction

Some images stick in the mind like a thistle to a pant leg.[2]

Whenever people of any age are gathered together in a room for instruction, it is often necessary to represent portions of the universe that cannot be brought into the classroom along with mental constructs that cannot be extracted as is from the human brain. When faced with this dilemma, teachers and students often resort to the use of a variety of representational media to act as stand-ins for reality. Some teachers use media in recognition of the fact that there are different modes of learning that are served by different teaching methodologies. Others use media for the sake of variety. Still others, as many suspect, use media as a substitute for lessons that would otherwise place a greater burden of planning and performance on the instructor.

All teachers, although they may not be aware of it, use a variety of media elements in order to deliver their curricula. The specific uses, media types, and methods, however, vary greatly. Some teachers may rely only on text and pictures from a textbook along with teacher directed classroom conversations while others bring in multiple media types daily and allow students to create media-based presentations to satisfy course requirements. Before I discuss my findings, I think that it is important to briefly establish why I believe that all teachers should strive to be more like the second teacher I described in this paragraph than the first.

It is clear that we are not all uniformly gifted. If you were to look at PET scans of a human brain while the processes of hearing words, seeing words, speaking words, and generating words were going on, for example, you would see that each of these activities is centered in different locations.[3] As many studies have demonstrated, most people are more talented at some tasks than at others. Research has also

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[2] Cuban, Larry, *Teachers and Machines, The Classroom Use of Technology Since 1920*, Teachers College Press, NY. 1986 p 1.

[3] Fischbach, Gerald D., Mind and Brain, Scientific American, September 1992, pp 54-55.

focused on the fact that there are different modes of learning and different ways to learn from the same medium.[4] Elliot Eisner repeats this theme throughout his recent study on qualitative educational research.

> Some visual systems depict visually, but appeal to our emotions-as in expressionism. Others depict visually, but appeal to our imagination-as in surrealism. Still others depict visually, but appeal to our optical experience...In fact, the form we select is constitutive of the understanding we acquire: the medium is part of the message.[5]
>
> Each type of representation emphasizes and makes accessible particular aspects of content. What can we convey through pictures or diagrams is often difficult or impossible to convey in words and vice versa.[6]

The issue of educational equity is also one that surfaces as one explores the use of media in instruction. Since students learn in different ways, it is only fair to use many different modes of instruction, which implies the use of multiple types of media elements. Failing to do so will provide an unfair advantage to those students who learn well while immersed in the dominant mode of instruction be it teacher talk or the repetitive use of moving videos. Eisner also makes this point as does Maxine Greene in a recent article in the Harvard Education Review.

> Educational equity is more likely if the forms of representation are diverse rather than restricted. If the forms are restricted, those whose aptitudes and interests are relevant to the form emphasized will have an advantage over those whose aptitudes are neglected.[7]
>
> The cannon, defined by a certain number of men in time past, must always be skeptically conceived and kept open to what has for generations, been ignored. My concern is not solely with enabling persons to engage authentically and adventurously with a range of work. I also have explorations of media in mind...Pluralities of persons can be helped to go in search of their own images, their own visions of things...They can be enabled to realize that one way of finding out what

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4 John-Steiner, Vera, *Notebooks of the Mind: Explorations of Thinking*, Harper and Row, NY. 1985.
5 Eisner, Elliot, *The Enlightened Eye*, Macmillan, NY. 1991, p 46.
6 Ibid. p 179
7 Ibid. p 179

> they are seeing, feeling, and imagining is to transmute it into some kind of content and to give that content form. Doing so, they may experience all sorts of sensuous openings. They may perceive patterns and structures they never knew existed in the surrounding world. They may discover all sorts of new perspectives as the curtains of inattentiveness pull apart. They may recognize some ways in which consciousness touch and refract and engage with one another, the ways in which particular consciousness reach out to grasp the appearance of things.[8]

As Greene points out, student learning can be enhanced if students are encouraged to use media as they try to find their own meanings of things. But these beliefs are not limited to the artistic community. A group that is widely recognized as a leader in the curriculum restructuring movement is the National Council of Teachers of Mathematics. In their 1993 yearbook on assessment, there are many references to new ways that teachers and students can use modern technology as part of the instructional and assessment process. The following quote provides an example of the authors' sentiments on the subject.

> A reason for optimism is that technological advances have introduced the possibility that alternative assessment methods will no longer be so cumbersome to implement. Computers, graphing calculators, videocassette and videodisk recorders and camcorders can be used in innovative ways for both instruction and assessment. Observation in the classroom becomes more feasible when one can record and later play back the work of a small group for analysis.[9]

This document also notes that student created productions designed to solve student created problems should be part of a broad-based assessment plan. This demonstrates how student produced media productions can contribute to the trend of using open-ended problems with more than one right answer as part of an instructional plan. Although you wouldn't expect the arts community represented by

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[8] Greene, Maxine, Harvard Education Review Vol. 61 No. 1 February 1991

[9] Webb, Norman L. and Coxford, Arthur F, *Assessment in the Mathematics Classroom 1993 Yearbook*, National Council of Teachers of Mathematics, Reston, VA. 1993, p 13.

Eisner and Greene to agree with the NCTM on all issues, when it comes to media use, the beliefs of these two vastly different communities overlap to a surprising degree.

Even Ralph Tyler's classic study on curriculum promotes the idea of using student created media to gather evidence about student behavior.[10] There may be arguments about how specific student behaviors should be, but it is clear that proponents across the educational spectrum acknowledge that we need to go beyond the criterion referenced test to let students demonstrate what they have learned.

As a science teacher and supervisor in the 1970's, I soon discovered the benefits of using media to help give my students a better chance at understanding the concepts that were part of the curriculum. My interest in student created media, however, began when I decided to make an audio tape to satisfy an assignment for a high school English class in 1964. Rather than write a paper on Irish folk music, it seemed that I could do a better job of making my points if I could submit a tape that contained my voice along with short samples of recorded music. Thanks to an understanding teacher, I was able to complete this assignment which I found took much more effort than if I had simply done a written report. I had to first create a script which itself could have been submitted. As I put the script together I had to identify and place the recorded samples I intended to use. Finally I had to record my project making sure that each section was acceptable before I went on due to the lack of any editing equipment. Although I was far from the star English student in the class, my teacher was very pleased with my work. I not only learned a great deal, but found that I was far more motivated than I had ever been in English class.

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[10] Tyler, Ralph W., *Basic Principals of Curriculum and Instruction*, The University of Chicago Press, 1949, pp 108-109.

Overview of the educational use of media

Media use by educators most likely dates back to the dawn of history when someone picked up a stick and drew a crude picture in the dirt to help explain something. Over the centuries graphic art advanced, and teachers no doubt took advantage of each improvement in human ability to represent reality via some medium. During the later half of the 19th century, however, a spate of inventions lead by Thomas Edison, Alexander Graham Bell, and George Eastman greatly increased our representational abilities. Although the invention of the light bulb, kinetograph, kinescope, and phonograph by Edison, the telephone by Bell, and paper backed film and box camera by Eastman were made possible by many previous discoveries, these inventions represent a true watershed in the history of media. The early discoveries that lead to the television were also made during this time.[11]

By the 1930's educators were starting to use improved versions of these new inventions, and researchers were starting to study the effectiveness of their use.[12] Studies since then have shown conflicting results. They indicate that simply using media, for example, is no guarantee that learners will be more efficient. In a summary of research for the Navy, however, Carpenter and Greenhill conclude that media can be effective if properly used.[13] They found that well-produced films, for example, can even be used as the sole means of teaching some skills and factual data and that teachers should tell students what to look for in a film and provide study guides. Follow up activities and discussions are also necessary to maximize the learning impact.

By 1945, television technology was at the point where it could begin its relentless mass market invasion. By 1960, many educators had hyped the

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11 Compton's Encyclopedia, Online Edition Downloaded from America Online, April 25, 1993

12 Rulon, P.J., *The Sound Motion Picture in Science Teaching*, Harvard University Press, Cambridge, MA. 1933.

13 Carpenter, C.R. & Greenhill, L.P. Instructional film reports, vol. 2, technical report 269-7-61. Port Washington, N.Y.: Special Devices Center, U.S. Navy, 1956.

instructional promise of television to the point where it was not possible for the new technology to meet everyone's expectations. That did not stop researchers from designing experiments intended to demonstrate the effectiveness of the medium.[14] Although experiments generally showed television to be effective, not all results were positive as Chu and Schramm point out in a major 1967 study. This same study also puts this issue into a perspective that I agree with.

> There can no longer be any doubt that children and adults can learn a great amount from instructional television, just as they do from any other experience that can be made to seem relevant to them-experiences as different as watching someone rotate a hula hoop or reading the encyclopedia. The effectiveness of television has now been demonstrated in well over 100 experiments, and several hundred separate comparisons performed in many parts of the world, in developing as well as industrialized countries, at every level from pre-school through adult education, and with a great variety of subject matter and method.[15]

By the mid 1970's, video tape technology had advanced to the point where VCR's and video tapes were starting to replace films and projectors. The ability to easily record television broadcasts also made television a more flexible instructional medium and in a sense, allowed films and television to merge into a single medium from the instructors viewpoint. With the exception of recent media intrusions like Chris Whittle's Channel 1, real-time television broadcasts are rarely used for classroom instruction.

In addition to full motion media, significant research has been done on the use of still pictures in projected and non-projected formats. Research findings of the value of still pictures suggest that still pictures can stimulate student interest, help readers remember content of accompanying verbal materials, and that sequences of still pictures can be more effective than films for some concepts. Line drawings can also

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[14] Wilkinson, Gene L, Media in Instruction, Perspective, Definition, and Limits, Association of Educational Communications and Technology, 1980, Eric Document 221159.

[15] Chu, G.C. and Schramm, W., Learning from Television: What the research says. Stanford, CA., Institute for Communication Research, 1967.

be more effective transmitters of information than shaded drawings or photographs that can flood the viewer with too much information. The use of color can stimulate student interest but also has the potential to obscure. It should also be noted that verbal cueing can clarify the message intended to be communicated by a still picture.[16]

Research on the use of audio is less abundant as it is seldom used in the absence of accompanying visual stimulus. Research on the use of multimedia, however, indicates that when information is received simultaneously from several sources, one source can degrade, accentuate, or bias other sources. The greatest gain can be realized when words are combined with related or relevant images.[17] Research also indicates that media of any kind is more effective if the learner has an opportunity to interact as people learn more when they participate rather than when they are passive.[18] This concept is used to support studies that include the use of computers to present and control media-based learning.

Although research on the use of media is abundant and tends to be positive, many studies suffer from deficient experimental design and a lack of significant findings. Even the studies that lack obvious flaws are idiosyncratic in nature. Just because a specific piece of media appears to enhance learning in a specific situation does nothing to prove that another piece of media will have a positive effect. The extent to which the use of media can enhance learning is a function of the quality of the media itself and the manner in which it is used in the specific educational setting. Thus, we rely on the artist and the artistic judgment of the teacher to assure effective media use.

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[16] Brown, J.W., Lewis, R.B., & Harcleroad, F.F. *AV instruction: Technology, media and methods* (5th ed.). New York: McGraw Hill, 1977.

[17] Severin, W. The effectiveness of relevant pictures in multiple-channel communications, AV Communications Review, Winter 1967, 15, pp 386-401.

[18] Copland Peter, Interaction and New Technologies, 1992 UnCover document 93116091353

It is within the perspective I have described thus far that I took the opportunity to conduct some research of the current media practices. For this paper I have limited my studies to my own school district with the hope that my current findings along with reactions to this document will provide direction for my continued research.

Description of Questionnaire

There are several areas of media use that I wished to explore, and each area is reflected by separate items in the questionnaire that I devised. In addition to the frequency of media use, I wanted to know what teachers considered to be the ideal length for moving videos, if they ever used a laser video disk, and what they thought of students creating media-based presentations to fulfill course requirements.

I was also interested in the misuse of media. To approach this issue in a tactful manner, I asked questions about how often people modified their curriculum to suit the media that was available and how often they used media presentations in order to expand their planning time. My experience led me to believe that these were two areas where the potential existed for the misuse of media presentations. Several questions were also directed at how teachers integrated media into their lessons. To this end I asked if media presentations were related to other classroom activities, if students were given activities to carry out during presentations, and if they were tested on the media content.

Ken Teitelbaum also suggested that I take the opportunity to determine which technologies the respondents were interested in learning more about. In addition to Dr. Teitelbaum, I would also like to thank Dr. Nathan Bell, the Associate Superintendent for Instruction at Binghamton City Schools for their assistance in constructing the instrument that I ultimately used.

Process for data collection

Once I finalized my instrument, I decided to limit its distribution, for practical reasons, to the teachers in the two middle schools and high school in Binghamton, NY where I work. I further restricted the distribution to teachers of English, Social Studies, Science, Math, and Health although surveys were also given to several reading and foreign language teachers at one of the middle schools. This would allow for a quick turn around that was necessitated by the time line for this work at the same time that it would generate a large enough number of responses to be useful for the purpose of what I consider to be an exploratory effort that I intend to use as the basis for the design of further studies.

Respondents were informed that the survey was voluntary and that they had the option of providing their name, school, subject, and grade levels taught. On April 2th, I personally delivered the surveys to each school and asked the principal if they could be placed in the designated teacher's mailboxes. I had also asked the president of the Binghamton Teacher's Association for permission to carry out the survey. Altogether, 112, surveys were distributed. The instructions on the survey requested that they be returned to the main office at each school by the end on the day on April 7th which marked the beginning of the spring recess. This gave each teacher only three schools days to complete the survey. My experience indicated that the less time you give people to do this type of task, the more likely they will do it. I felt that a short deadline increased the probability of a healthy response at the same time that it served the needs imposed by my time line. By April 7th, I received 55 responses which represents a 48% return rate. I consider this to be a successful response to a voluntary survey. To help corroborate my findings, I also conducted interviews with twelve teachers, library media specialists, and administrators and four students in the district.

Results

To analyze the results of my survey, I entered the responses for each individual into a Microsoft Excel 4.0 spreadsheet. This allowed me to quickly obtain frequency results for each question and to sort the responses in a variety of ways to look for patterns within subject areas, grades, or schools. I also produced a graphical representation of the results for each question. The next two pages contain the actual questionnaire along with the results for each question expressed as percents. The graphical representations along with a copy of the spreadsheet that contains the results for each individual are in the appendix to this paper.

Media use questionnaire - April 1993

I am doing research on the use of media in schools for a course I am taking at Binghamton University, and I need your help. This questionnaire is voluntary. If you wish, you may also leave any of the following information blank. Please place the completed survey in the attached envelope and leave it in the principals office by the close of school on **April 7th**. Thank you for your time. Doug Green

Name _____ School _____
Subject(s) _____ Grade(s) _____

For these questions, assume that media includes any combination of films, filmstrips, slides, photographs, graphic art, audio and video tapes, audio compact disks, records, laser disks, CD-ROMs, and computer software.

Circle the choice that best fits your teaching practices or matches your opinion. Some of these questions will require estimates. Just provide your best guess.

1) How often do classes that you teach involve the use of some type of media?

1) Never	2) 1% to 25%	3) 26% to 50%	4) 51% to 75%	5) 76% to 100%
0%	62%	24%	9%	5%

2) When you use moving videos, what is the average length in minutes?

1) Less than 5	2) 5 to 10	3) 10 to 20	4) 20 to 30	5) more than 30
6%	2%	31%	38%	23%

3) What do you consider the ideal length in minutes for instructional moving videos?

1) Less than 5	2) 5 to 10	3) 10 to 20	4) 20 to 30	5) more than 30
0%	6%	40%	48%	6%

4) Have you ever used a laser video disk to show pictures and/or short video clips?
1) Yes - 18% 2) No - 82%

5) If you answered "No" to question #4, please indicate why.
Access to Equipment-18% Appropriate media available-9% Don't know about-36%
Time-7% Don't use videos-4% Don't need-2% Habit-2% Need training-4%

6) Which technologies would you like to use more often with your classes? Circle all that apply

1) Laser Video Disks-37%
2) Telecommunications Services-24%
3) Computer Software-61%
4) CD-ROMs-26%
5) Library Automation Systems 28%
6) Video recorders-46%

7) How often do you modify your curriculum in order to use media that is available?

1) Never	2) 1% to 25%	3) 26% to 50%	4) 51% to 75%	5) 76% to 100%
7%	65%	18%	5%	4%

Proceed to reverse side

8) Do you think that some teachers do this too often?
1) Yes - 39% 2) No - 61%

9) When students are viewing moving videos, how often do you take advantage of the time to expand your planning time for other things? (Like plan or grade papers while a movie runs for example?)

1) Never	2) 1% to 25%	3) 26% to 50%	4) 51% to 75%	5) 76% to 100%
48%	30%	9%	9%	4%

10) How often do you schedule media for the express purpose of expanding your planning time?

1) 0%	2) 1% to 25%	3) 26% to 50%	4) 51% to 75%	5) 76% to 100%
93%	5%	2%	0%	0%

11) Do you think some teachers schedule media too often for the express purpose of expanding their planning time?
1) Yes - 52% 2) No - 48%

12) How often do you give students one or more specific tasks to complete while they are viewing a media presentation?

1) Never	2) 1% to 25%	3) 26% to 50%	4) 51% to 75%	5) 76% to 100%
20%	26%	19%	17%	19%

13) How often do the activities you plan before and/or after a media presentation directly relate to it?

1) Never	2) 1% to 25%	3) 26% to 50%	4) 51% to 75%	5) 76% to 100%
0%	7%	2%	19%	72%

14) How often do you test your students on the content of the media you present?

1) Never	2) 1% to 25%	3) 26% to 50%	4) 51% to 75%	5) 76% to 100%
8%	16%	25%	29%	22%

15) How often do students create media-based presentations to fulfill course requirements?

1) Never	2) 1% to 25%	3) 26% to 50%	4) 51% to 75%	5) 76% to 100%
44%	46%	6%	4%	0%

16 Would you like to see your students create media-based presentations to fulfill course requirements more often?
1) Yes - 59% 2) No - 41%

17) What problems would you see if your students created media-based presentations to fulfill course requirements more often?
Time-36% Availability of equipment-27% Inflexible curriculum-4%
Maturity of students-2% Worth of product-2% Never considered-2%
Need training-%5 Deflect concentration from material-2% Novelty-2%

Thanks again for your help!

Analysis of results

Question 1 shows that some teachers from each subject area use media infrequently. It also shows that teachers of science, social studies, health, foreign language, and reading are more likely to be frequent users while teachers of English and math tend to rely on media use less often. Overall, only 38% of those responding use media in more than 25% of their lessons. If the English and math teachers are removed, however, this number jumps to 57%. For the English and math teachers, only 10% use media for more than 25% of their classes.

In the case of math teachers, this is due to the lack of available high quality media in addition to habits formed by math teachers that can be traced back to the style of instruction they experienced during their teacher training. When English teachers do use media, it often involves showing a long movie that is followed by analysis by the class. The people I interviewed indicated that they would like to use short video clips of selected scenes if they were available.

Questions 2 and 3 deal with the length of moving videos and what teachers consider the ideal length to be. Only 8% commonly use videos shorter than ten minutes in length while no one considers videos of 5 minutes or less to be ideal. When practice is compared with what teachers consider ideal, we find that 60% are satisfied with the length of videos they use while 31% would prefer common access to shorter videos and 8% would rather have more longer videos.

If I were to use this questionnaire again, I would modify these questions. What I wanted to obtain was some notion of the length of videos used and what the ideal length was. I also wanted to see if anyone felt that the type of short full-motion videos commonly available on laser video disks were more effective than longer videos. What I found out during my interviews is that quality is a more important attribute than length. A child's attention span can be rather long if the media or activity is

sufficiently captivating. A child can quickly lose interest in a poorly produced video while the same child can remain fully engaged in a captivating movie like Disney's "Beauty and the Beast" for almost two hours.

Questions 4, 5, and 6 deal with teacher's interests in learning more about various technologies along with specific questions about if they have ever used a laser video disk and if not, why not. Only 9% showed no interest in any of the six technologies listed while the average response indicated interest in 2.4 of the 6 items. Of the six items, interest in computer software was the leader with 61% followed by video recorders with 46%. All others varied from 24% to 37%.

The fact that so many teachers want to know more about computer software indicates that computers have made a sufficient impact in Binghamton so that a majority of teachers now desire to know more. This is due to a gradual increase in the use of computers in the district over the last decade. At first only a few brave souls showed an interest. Gradually, more teachers became interested as they witnessed their peers making effective use of this technology. As this survey shows, we are now at a point where the number of teachers who are afraid that they will be left behind outnumber those that think they can ignore this technology.

The high level of interest in video recorders is an indication that many teachers are interested in making videos to use in class. They also want to let their students use video technology as part of the learning and assessment process.

Although laser video disks have been available for over ten years, it is only recently that they have started to be used for instruction. My survey showed that 18% of the respondents have used a video disk at one time. Among the reasons given for not using this device, lack of knowledge was listed by 36% and access to equipment by 18%. These two reasons represented 66% of all reasons given. The only other reasons given by more than two teachers were lack of appropriate media at 9% and time at 7%.

As part of this project I made a short tape that contained several short videos that were taken from laser video disks. When I showed this tape to a group of teachers, I was able to convince them that high quality short video clips can be a very effective way to explain a point or engage students in a subject. Although this technology still has a way to go before it gains the critical mass of interest that computer software has, it seems to be on its way. The use of short videos should also be fostered as more computer programs make use of videos.

Questions 7 and 8 ask how often teachers modify their curriculum to suit media that is available and if they think some teachers do this too often. A large majority of the respondents, 73%, modify their curriculum for one fourth of the media they use or less. This leaves 27% who do so more often. When asked if they think some teachers do this too often, 39% answered yes. It should be noted that only 80% of the teachers answered this question. Conversations with selected teachers revealed that those who modify curriculum to suit media they have access to do not feel constrained by inflexible curriculum and that there is a strong feeling among some that a minority of teachers let available media direct curricular choices too often.

As a frequent user of media, I found that I spend a great deal of time previewing media in order to select what I use. I find that it is difficult to access media that fits exactly with my curriculum so I often use media that overlaps to a large extent with my planned curriculum. I would never use media that was totally unrelated, but it may not be possible to employ engaging media without having some aspect of it modify the curriculum plan to an extent.

Questions 9, 10, and 11 focus on how teachers make use of the time during which media presentations are given. I was surprised to find that 78% take advantage of this opportunity one fourth of the time or less while only 4% always do so. Only 7% admit to ever using media presentations to expand their planning time

while 52% think that some people do this too often. This would imply that there are few teachers who ever schedule media to plan but that this practice is known to many who do not approve. I might also assume that the vast majority of teachers feel that one should never engage in this practice. I tend to agree. Decisions regarding the use of media should be based on what is in the best interests of the students and not on expanding planning time. Like question 8 where I tried to tactfully ask teachers to inform on their colleagues, not all respondents were willing to answer this question. In this case the response rate was even lower at 76%. I feel, however, that these results coupled with my interviews and experience support the claim that a small percentage of teachers misuse media.

Questions 12, 13, and 14 deal with how teachers relate other classroom activities to media use. Most teachers, 79%, give students tasks to complete during some media presentations while 74% almost always relate media presentations to other classroom activities, and only a few admit to doing so rarely. Smaller numbers, 22%, always test on media content while only 8% never do so.

Although there is some research that indicates that note taking during video presentations is counter productive[19], there is wide agreement that media use should not be disconnected from other classroom experiences. These opinions agree to a large extent with current practice in Binghamton's secondary schools.

Questions 15, 16, and 17 focus on media created by students to satisfy course requirements. I was pleased to see that 56% of the teachers had allowed this behavior to some extent while the 10% who indicated that it occurred more than one fourth of the time appear to encourage this behavior. It was also encouraging to note that 59% felt that it should occur more often.

When we look at the potential problems that teachers see in promoting more media use by students, two stand out. The time factor is cited by 36% while

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[19] Carpenter and Greenhill, Op. Cit.

availability of equipment such as video recording and editing devices is mentioned by 27%. Together, these two problems represent 77% of all of the responses to this question. One surprise was that only 2 teachers mentioned inflexibility of their curriculum as a potential problem.

In addition to talking to students, I also looked at actual student media productions to see what students can accomplish when allowed to go beyond the written word and multiple choice tests to demonstrate what they have learned. I was able to obtain projects from Apple, IBM, and CEL done by students all over the country. I also obtained ten productions from Binghamton students.

While none of the productions had a totally polished professional look, many were impressive by virtue of their content, and none smacked of evidence that the students lost sight of their subject because they were distracted by the technology they were using. The projects included video tapes, portfolios of drawings, and computer productions. The computer productions were done with Apple's Hypercard and IBM's Linkway and contained a mixture of text, drawings, photographs, short video clips, voice, and music.

Several student projects were designed to access images on laser videodisks that were connected to the computer while the program was running. This is an area that I helped develop thanks to donations to our school district by IBM, Apple, and Optical Data Corporation. In 1986 I received a prototype of a product from Tim Walker at Optical Data that consisted of Hypercard Stacks and three Science laser disks. These disks contains 3,000 to 7,500 still images along with about 50 minutes of short full-motion video clips. It was Tim's hope that teachers and students could make their own productions based on his initial efforts. Since none of the students I was working with knew anything about Hypercard at the time, I turned the project over to Jeff Wynnyk, a 9th grader whose chief attribute was that he was a new worker in my office and, therefore, did not know enough about anything else we were

doing to be useful. In short order, Jeff had produced several cards that allowed for access to information on the disks in new ways.

Another project of note that I supervised involved Tony Smith-Grecco, an 8th grade student who was doing a project on the Civil War. Without much help, Tony created several interconnected Hypercard stacks that contained information on the people, weapons, and chronology of the war. My favorite portions of this work were newspaper stories Tony invented to describe each important battle in an engaging way. This project also included scanned photographs and maps along with sounds made by representative weapons and was introduced by a clip from Holst's "Mars the Bringer of War" from the Planets.

An example of a third type of project was a video production on the history of Ukraine submitted by Joe Zapach and Enzo Gentile. The production was an hour in length and used a variety of modalities from lecture to role playing to make their points.

Limitations and conclusions

Any educational research has its limitations. The limitations of this work obviously include the fact that most of my information was gathered from secondary teachers in a single school district. Since teachers are not a mobile population, cultures can develop within districts that make them idiosyncratic. In an attempt to generalize some of my results, I spent some time at the local BOCES educational communications center that serves as a media lending library for 15 school districts in South Central New York State. While there, I was able to determine that Binghamton's media use is typical of schools in the region. I was also able to determine that the use of laser disks is growing as BOCES adds laser disk titles to its holdings. At this time they represent about 4% of the total video collection that also contains 85% video tapes and 11% 16mm films. Within a few years the shrinking film collection should virtually vanish.

Other limitations are due to the nature of my survey and the manner in which it was administered. Ideally, I would individually administer each survey to a statistically significant random sample in order to more firmly establish the significance of my results and answer any questions about my intent. This would allow for more informal surveys that might help flush out important issues that the survey did not address. It would also be useful to expand the survey to other districts and regions in order to generate conclusions that could be generalized beyond Binghamton's secondary schools. Classroom observations are also called for as my informal surveys left me with the impression that the self-reporting nature of my study left room for further errors. This is compounded by the fact that many questions required teachers to approximate their average behaviors.

Regardless of the limitations that my research suffers, I believe that the size of my sample coupled with corroborating interviews warrant some general conclusions. Although I do not have evidence that these conclusions can be generalized beyond Binghamton, I believe they hold for the surrounding region if not for the nation as a whole.

1) Most teachers use media to complement the delivery of their curriculum. Some use it a great deal while others use it seldom, if ever.

2) Most moving videos in current use last for more than ten minutes. Many teachers would like access to shorter videos and when teachers see high quality video clips of under five minutes in duration, they tend to agree that such media can be very useful in the classroom.

3) Most teachers are interested in expanding their use of technology in the classroom. A majority now view computer software as something they would like to learn more about, and a large majority express an interest in some of the more common technologies that are currently enjoying increased use in the classroom.

4) The use of video disks is expanding at the same time the use of 16 mm films are decreasing.

5) Most teachers realize that any time they use media, the nature of the media itself will have an impact on their curriculum. While the media seldom represents the entire message, teachers recognize that it often affects their intended message. Many teachers will also intentionally modify their curriculum if they discover a piece of media that they judge to be important for their students to see. A significant minority believe that some teachers let available media control the curriculum too often which puts the question of what we teach in the hands of the people who produce media.

6) Many teachers plan during media presentations some of the time, but the image of the teacher always grading papers during presentations is not supported by my data. A surprising number claim to never plan during presentations. A slight majority of my sample believe that some teachers schedule media to plan too often. To better resolve this issue I believe that direct observation of teacher behavior is necessary.

7) Teachers commonly give students tasks to perform while viewing media presentations although some never do. Media presentations are generally related to other activities and students are often tested on the content.

8) Secondary students seldom produce media to fulfill course requirements, but most teachers are willing to accept such work, and some appear to encourage it. A majority of teachers would like to see this done more often, but they see time and equipment availability as potential problems.

The impact of emerging media technology

Against the historical background and current practice I have presented, I will now provide my current vision of the direction for media use. I will look at experimental work in progress and new products along with a new technologies and trends that have yet to impact formal instruction.

Current experimentation in media use includes increased use of computer networks and interactive media. Many districts nationwide, including Binghamton and 14 others in New York State, have extended computer networks throughout buildings.[20] This places multiple computers in each classroom which promotes center-based instructional plans and further integrates computer-based media into the classroom. The next step is to connect these networks to more media-rich resources such as CD-ROMs, library automation systems, and the Internet. This will allow for greater access to media at the same time that media use will become more student specific. Other educational trends like subject integration and cooperative grouping are also promoted by this model.[21]

Connection to the Internet will allow students to access a variety of media elements from diverse sources at the same time they communicate with students in other schools around the world. Our early experiments indicate that this capability motivates students to improve the quality of the work they send to other schools, but it is far too soon to determine the impact that this will have on curriculum and instruction.

Current networks have sufficient capacity for delivering media elements such as text, audio, and still images. In some cases they can also deliver compressed video clips. Such clips typically cover about 1/4th of the screen or less and are limited to

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[20] IBM/SED joint study project in progress involving 15 elementary schools in New York State. 1990-1996.

[21] Anyone interested in seeing this model in action should contact Mike Melamed at MacArthur Elementary School in Binghamton, NY. (607) 762-8377

about 10 frames per second. To deliver more and higher quality video, current networks will have to be upgraded in several ways. Not only will the speed that data moves over the network have to improve dramatically, but the storage capacity of file servers and the hardware in each classroom must also improve. As a result, any significant use of interactive video will be confined to individual workstations for the near future. This is also true for many other emerging technologies such as digital video editing and virtual reality.

Current experiments with this technology are ongoing in many school media centers and some classrooms. Products such as IBM's "Illustrated Books and Manuscripts" represent the current state of the art in this area. It includes laser disks and CD-ROMs filled with multiple media elements and a user interface that allows for easy browsing. The five documents included in this product all fit with the current high school curriculum. They are Ulysses, Hamlet, The Declaration of Independence, A Letter from A Birmingham Jail, and Black Elk Speaks. This product has been in use in Binghamton since June of 1992 when we received a pre-release version for experimentation. Thus far we have used it with several classes and individual students, and our early results are positive as far as teacher and student opinions are concerned.

As schools gain access to new technology, the nature of student projects is likely to change. While I do not anticipate that hand written reports and student drawings will disappear, there should be an increased use of word processing systems in the classroom and at homes along with technologies that allow students to digitize drawings and photographs to create multimedia productions. Early experiments indicate that even elementary students are capable of creating hypertext documents with buttons that allow the user to navigate from one media element to another in a nonsequential fashion. In addition to the electronic nature of such projects, this

technology should result in more photographs and illustrations in student projects. Some may even contain short full motion video clips that have been digitized.

If students are working on electronic projects in the classroom, the role of the teacher will certainly change. In most cases it will require the teachers and students to learn new technologies together. I have found this to be exciting and rewarding for students and teachers if teachers are not threatened when they find themselves in a situation where students know more than they do about something.[22] This also has the potential to effect student assessment. Several experiments are underway, including one by Theodore Seizer at Brown University, that are investigating how student portfolios that include media productions can be managed.

As we move forward, the issue of fairness must also be addressed. Teachers must make sure that when they accept media productions from students who own equipment, that they make school owned equipment available to those who do not. Although fairness is promoted by expanding the use of multiple media types and allowing students to use multiple modes of expression, this purpose can be defeated if students who lack technical access at home cannot expand their use of school owned equipment. Teachers also need to pay attention to the frequency and manner that women and minorities are portrayed in the media they select.

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[22] Green, Douglas W. The Story of Randy and Matt, or, Students Facilitate Career Change. *Interactive Media*, Gayeski & Williams Ed., Prentice Hall, Englewood Cliffs, NY 1985, pp 215-218.

Acknowledgments

To paraphrase Albert Einstein, I could not have seen what I needed to see for this paper without standing on the shoulders of others. The following people made many contributions to this effort for which I am grateful: Dr. Kenneth Teitelbaum for his advice and for encouraging me to critically reconsider my own beliefs; to Dr. Nathen Bell and Dr. James Lee for their advice, vision, and support; to the members of my ED 602 seminar for their insight and suggestions; to Kex CopySource for allowing me to use their color printer and copier at no cost to further the purpose of education; to the many teachers and students in the Binghamton City School District who provided data essential to this work; to Carol Oestrich and Cheryl Weeks, two library media experts who are always willing to serve; to the support staff at Binghamton Schools for their daily assistance; and to Denise Green, Contributing Editor for Reviews at InfoWorld for editorial assistance and for the countless other ways that she supports all of my efforts.

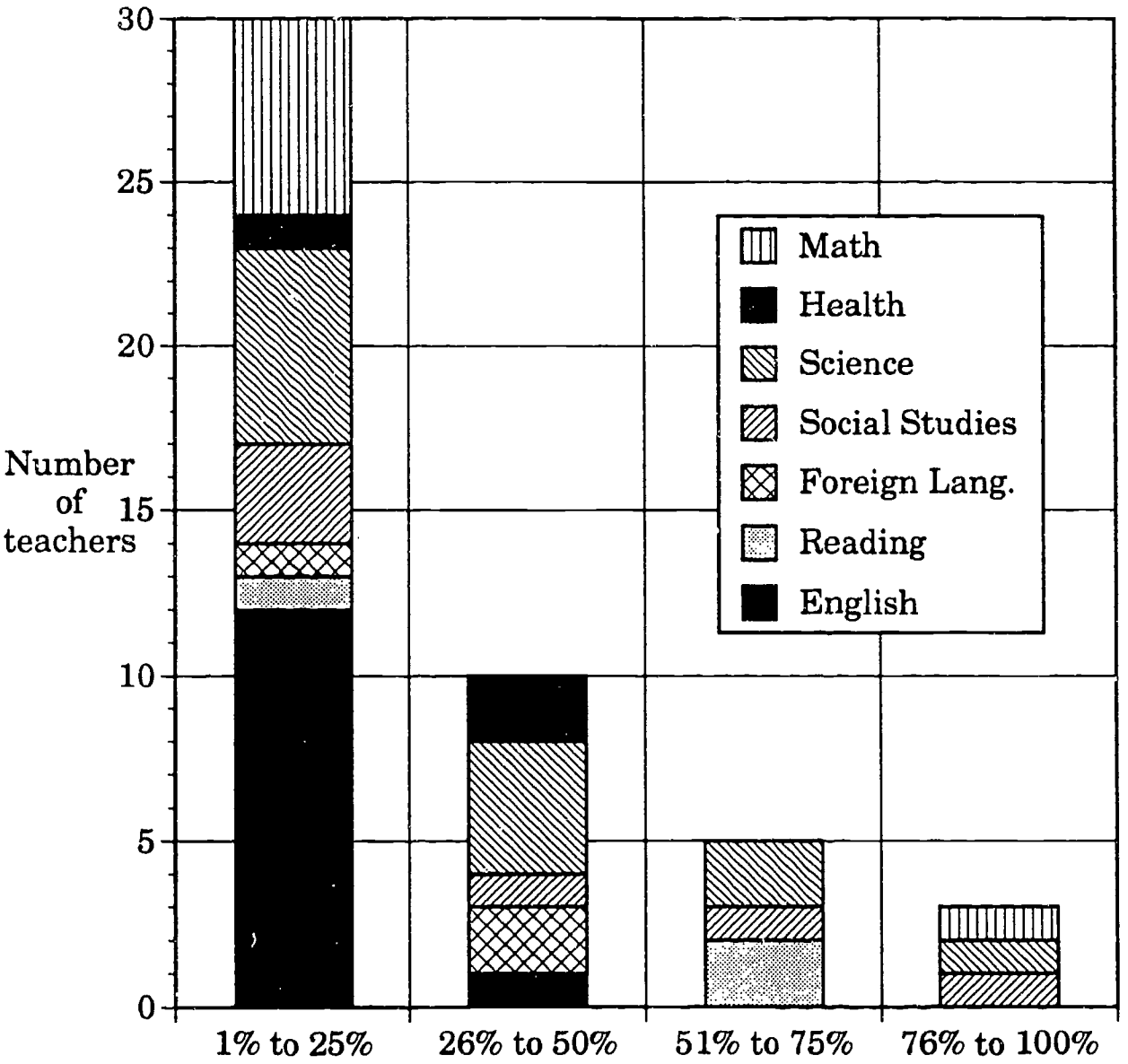
Appendix

Compiled data and
graphical representation of
media use survey

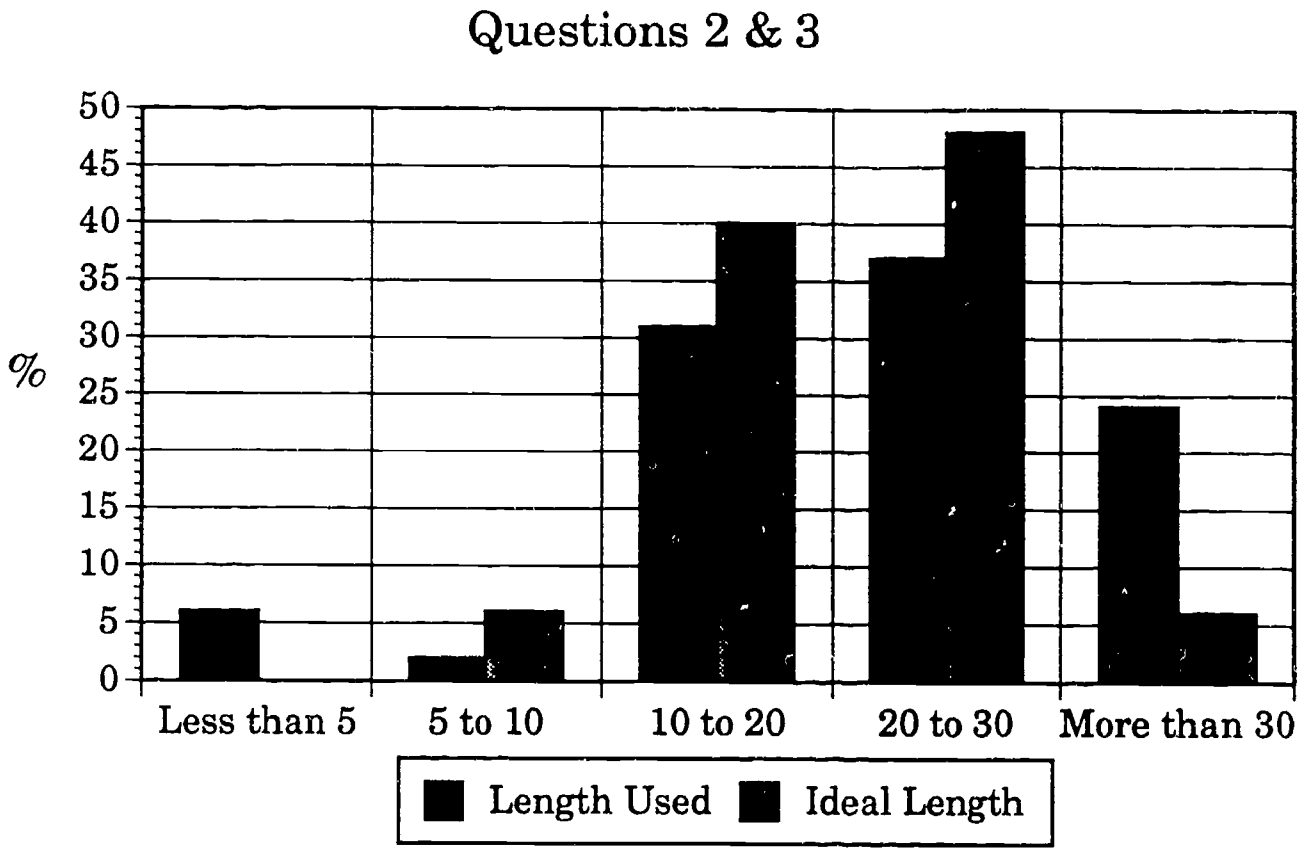
Name	Sub	Sch	Low Gr	High Gr	Q1	Q2	Q3	Q4	Q61	Q62	Q63	Q64	Q65	Q66	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q5
K FORDHAM	E	17	7	7	2	4		2							2		1	1		5	5	5	3	1	TIME ELEMENT	NOT FAMILIAR
R SAAR	E	17	8	8	2	5	3	2							2	2	1	1	2	1	5	2	1	2		NOT AWARE
E BERNARD	E	17	8	8	2	1		2	Y		Y				1		5	1		2	5	1	2	2		DIDN'T KNOW WE HAD ANY
J YOUNG	E	18	6	6	2	3	3	2	Y	Y	Y	Y	Y	Y	2		1	1		1	5	3	2	1		
DENSON	E	18	7	7	2	4	5	2	Y		Y		Y	Y	2		2	3	2	1	5	3	4	1	TIME	NEVER LOOKED INTO IT
STILL	E	18	7	7	2	5	4	2			Y	Y			2	1	1	1	2	3	5	4	2	1	EQUIP. TIME TOO LONG	NOT AVAILABLE IN CLASSROOM
ZUWIYYA	E	19	9	12	3	5	4	1	Y	Y	Y	Y	Y	Y	4	2	2	1		5	5		1	1	ACCESS TO EQUIP	NO TIME TO LEARN/INTEGRATE
J WOLFER	E	19	9	12	2	4	4	2							1	1	1	1		3	5	3	2	2		WHAT IS IT?
W GLASGOW	E	19	9	12	2	5	4	2		Y				Y	2	1	1	1	1	2	4	3	1	1	REQUIRE MACHINES/MATURITY	NEVER HEARD OF IT
FELTHAM	E	19	10	10	2	5	5	1						Y	2	1	2	1	1	2	5	3	2	1	AVAILABILITY OF EQ	
A JACKSON	E	19	11	12	2	5	3	2			Y	Y		Y	2	1	3	1	1	4	5	5	2	1	NONE	AVAILABLE MEDIA NOT RELATED
M DAVIS	E	19	11	12	2	5	5	2	Y	Y	Y	Y	Y	Y	2	1	1	1	2	5	5	5	3	1	TIME/AVAILABILITY	DON'T HAVE ONE
D LORD	E	19	11	12	2	4	4	1			Y				2		2	1		5	5	3	2	1	EQUIPMENT FOR STUDENTS, TIME	
HUNKOVIC	FL	17	7	8	3	5	4	2				Y		Y	2	2	2	1	2	3	3	4	2	2		NO MATERIAL
J MOAHAN	FL	17	7	8	3	5	4	2			Y			Y	3	2	1	1	2	4	5	2	2	1	GETTING EQUIPMENT	HARD TO GET
CORNELL	FL	17	7	8	3	5	4	2	Y		Y				2	1	2	1	1	1	4	3	1	1	TIME, ACCESS TO EQUIP.	DON'T KNOW WHAT IS AVAILABLE
M PURDY	M	19	9	11	5			2							4	1		1	1					1		DO NOT USE VIDEOS
W MCGOWEN	M	19	9	12	2	4	3	2			Y				2		1	1		5	5	2	1	2		LACK OF APPROPRAITE MATERIAL
F BERTONI	M	19	9	12	2	3	3	2		Y	Y	Y			1	2	1	1	1	1	2	1	2	1	TIME ELEMENT	
	M	19	9	12	2		3	2			Y				2	2	1	1	2	1	5	5	1	2		DON'T HAVE TO USE ONE
D SMITH	M	19	10	12	2		4	2			Y				2		1	1		5	5		1	2	TIME, PRODUCT OF LITTLE WORTH	I DON'T KNOW ABOUT THEM
	M		9	9	2	2	2	2			Y				2	2	1	1	1	2	4	4	1	2		
S HATFIELD	M	18	7	7	2	3	3	2			Y				2		1	1	1	1	5		1	2	TIME ELEMENT	NEVER LOOKED INTO IT
BORGNA	R	17	7	7	4	4	4	2					Y		5	2	2	1	2	1	5	3	2	1	TIME	NOT FAMILIAR
S MARINO	R	17	8	8	2	1	4	2			Y		Y	Y	2	1	2	1	2	2	2	2	1	1	TIME ELEMENT	NOT FAMILIAR
G SINCLAIR	R	18	7	8	4	4	3	2				Y	Y		2		4	1	1	4	5	2	1			DON'T KNOW WHAT IS AVAILABLE
I SWENSON	S	17	7	7	4	3	3	1	Y	Y	Y	Y			4	2	2	2		4	5	4	1	1	TIME ELEMENT	
R BOSTRAM	S	18	7	7	4	1	2	1	Y		Y				3	1	1	1		2	5	4	1		NEVER CONSIDERED IT	
CLIFFORD	S	18	8	8	2	3	3	2	Y	Y			Y		2	1	1	1	1	1	4	1	2	1	TIME AND ACCESS TO EQUIP	NO TIME TO PREVIEW
T MARSHALL	S	18	8	8	2	4	4	2						Y	2	1	3	1	1	2	5	4	2	2	TIME ELEMENT	GOOD ENOUGH AS IS
N HARVEY	S	18	8	8	2	3	3	1	Y						3	2	1	1	1	2	4	4	2		TIME	
P LEE	S	19	10	12	2	3	3	2	Y		Y				2		1	1	1	3	5	4	2		REGENTS REQUIREMENTS	NO TIME TO PREVIEW, AVAILABILITY
K DUDAK	S	19	8	8	3	4	3	1		Y				Y	1		4	1		4	5	3	1	2	TIME ELEMENT	
G HENDERSON	S	19	9	9	3	3	2	1	Y					Y	3	2	1	1	2	3	5	5	1	1	LET'S TRY IT	
WALIKIS	S	19	10	12	2	4	3	2			Y				2	2	4	1	2	2	5	1	1	2		NOT AWARE THAT WE HAVE
HOOVER	S	19	10	12	2	3	4	2			Y		Y		2	2	3	1	2	3	5	3	2	1	USE OF EQUIPMENT	TIME TO PREVIEW, SIGN UP, LEARN
FISHER	S	19	10	10	3	4	4	2							2	2	4	1	1	1	5	5	1	2		HABIT
A PENNA	S	19	10	12	3	4	4	2	Y	Y	Y	Y	Y	Y	2	2	3	1	1	3	4	4	2	1	TIME AWAY FROM LESSON	NOT AVIALABLE AT THE TIME
P MARTIN	SH	17	7	7	3	4	4	1			Y			Y	3	2	1	1	2	5	5	5	2	1	NO EQUIPMENT	
M EVAN	SH	18	7	8	3	4	4	2		Y	Y		Y	Y	3	1	2	1	2	1	5	4	2	2	MANDATED REQUIREMENTS	NONE AVAILABLE
T REGALIS	SH	19	9	12	5	5	4	2	Y					Y	5	2	5	1		5	5	4	1	1	I NEED TO LEARN FIRST	LACK OF KNOWLEDGE
J GRACE	SH	19	9	12	2	4	4	2						Y	2	1	2	1	1	3	5	4	1	1	AVAILABILITY, TIME, KNOWLEDGE	HAVE NOT SEEN USEFUL PROGRAMS
A MURPHY	SS	17	7	7	2	3	3	2	Y		Y	Y	Y	Y	2	2	2	1	1	4	5	5	4	1	NONE!	NONE AVAILABLE
R BERNARD	SS	17	8	8	4	3		2					Y	Y	3	2	3	1	2	5	5	5	1	1	EQUIPMENT AVAILABILITY, TIME	DON'T KNOW IF AVAILABLE
G GADDIS	SS	18	8	8	5	3	3	1	Y		Y	Y			2	2	1	1	1	4	5	3	2	1	SCHEDULING EQUIPMENT	
C MACLAIN	SS	18	8	8	2	4		2	Y					Y	2	1	1	1	1	2	4	4	2	1	INGORANCE OF TEACHER	NOT COMFORTABLE,WHAT'S AVAIL?
D ZAHKA	SS	18	7	7	3	4	4	2	Y	Y				Y	2	2	2	1	1	4	4	4	3	1	NOVELTY WILL WEAR OFF	NOT FAMILIAR
G WILSON	SS	19	9	12	2	3	3	2		Y	Y	Y			2	1	1	1	2	4	5	5	1	1	CONCENTRATION ON MATERIAL	MATERIALS, TRAINING
T TALBOT	SS	19	9	12	2	4	4	2							1	2	2	1	2	2	5	5	2	2		NOT AVIALABLE
		17	8	8	2	5	4	2					Y		2	2	2	1	2	2	2	2	2	2		DON'T KNOW WHAT'S AVAILABLE
		18	7	7	3	3	3	2			Y		Y	Y	3	2	1	1	2	3	5	4	2	2		NOT AVAILABLE
		18			2	4	4	2			Y				2	2	1	1	1	2	2	2	2	2	TIME	NOT FAMILIAR
					2	3	3	2	Y		Y			Y	2	2	1	1		3	4	3	1	2		NONE AVAILABLE
					3	4	4	2	Y		Y	Y		Y	3	1	2	2	2	2	4	2	1	2		DO NOT KNOW HOW TO USE
					3	3	3	2			Y				2	2	4	2	1	5	5	3	1	2	LOGISTICS	NEVER LOOKED INTO IT
					Q1	Q2	Q3	Q4	Q61	Q62	Q63	Q64	Q65	Q66	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q5
		Total Responses			55	52	50	55	54	54	54	54	54	54	55	44	54	55	42	54	54	51	54	51		
		Frequencies		1's	0%	6%	0%	18%	37%	24%	61%	28%	28%	46%	7%	39%	48%	93%	52%	20%	0%	8%	44%	59%		
		as %'s		2's	62%	2%	6%	82%							65%	61%	30%	5%	48%	26%	7%	16%	48%	41%		
				3's	24%	31%	40%	0%							18%	0%	9%	2%	0%	19%	2%	25%	6%	0%		
				4's	9%	38%	46%	0%							5%	0%	9%	0%	0%	17%	19%	29%	4%	0%		
				5's	5%	23%	6%	0%							4%	0%	4%	0%	0%	19%	72%	22%	0%	0%		

Frequency of Media Use by Subject During 6-12th Grade Classes Binghamton City Schools - April 1993

Question #1

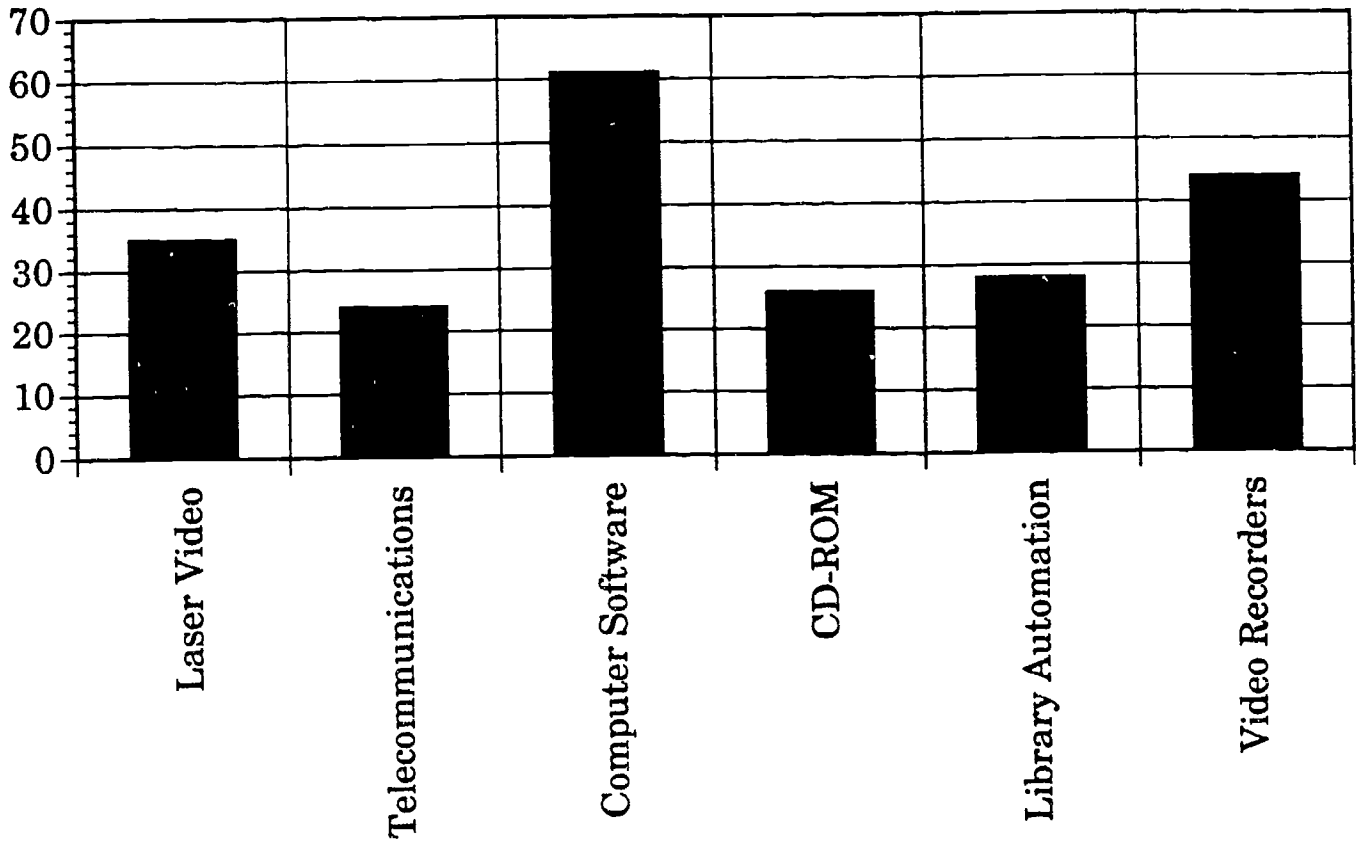


Length of moving videos used compared to ideal length for a moving video in minutes



Percentage of teachers surveyed who expressed an interest in using specific technologies more often

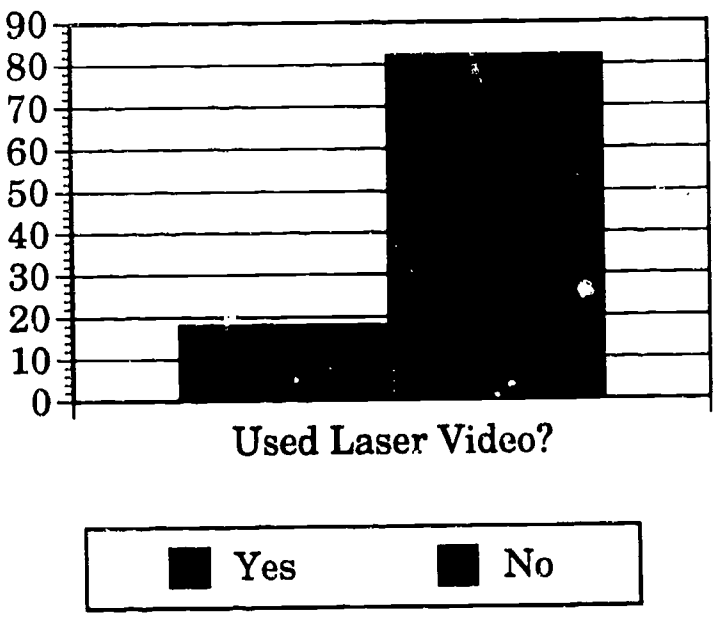
Question 6



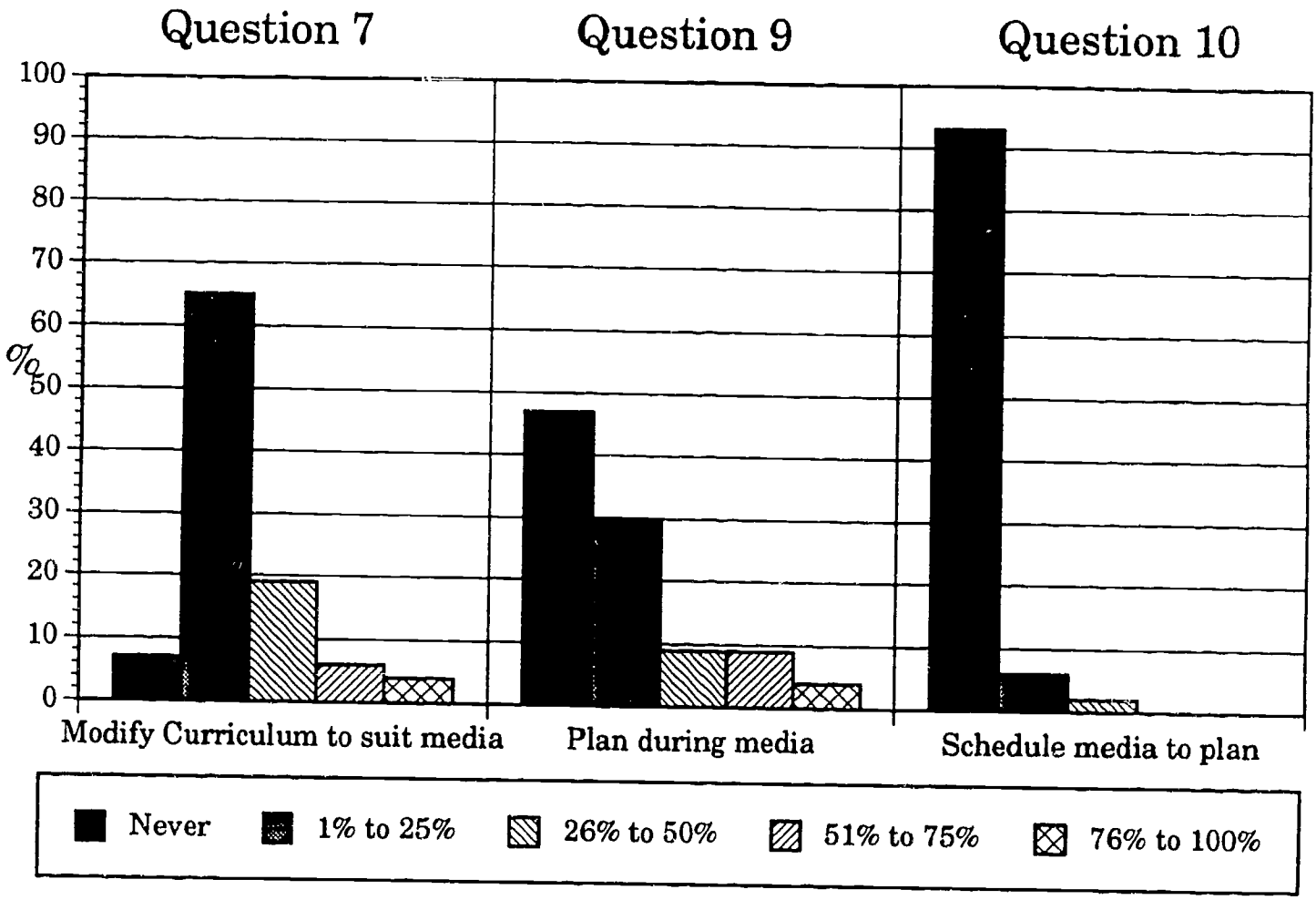
Question 5

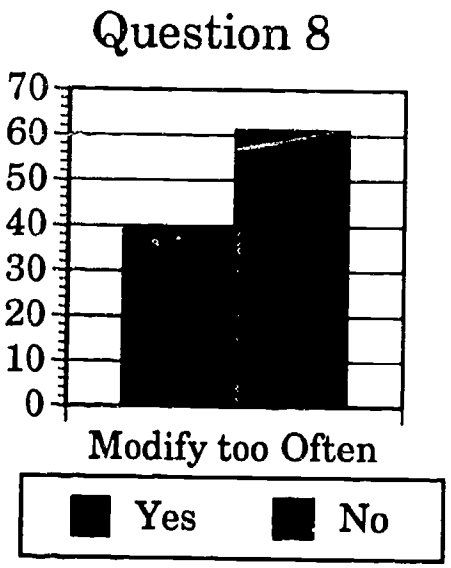
Reasons for not using	%
Access to Equipment	18
Appropriate Media	9
Do not know about	36
Time	7
Don't use videos	4
Don't need	2
Habit	2
Need training	4

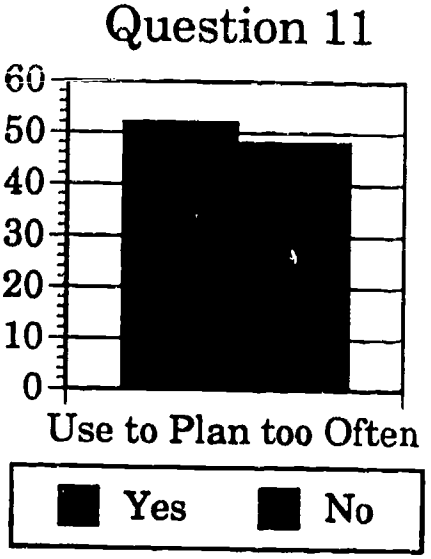
Question 4



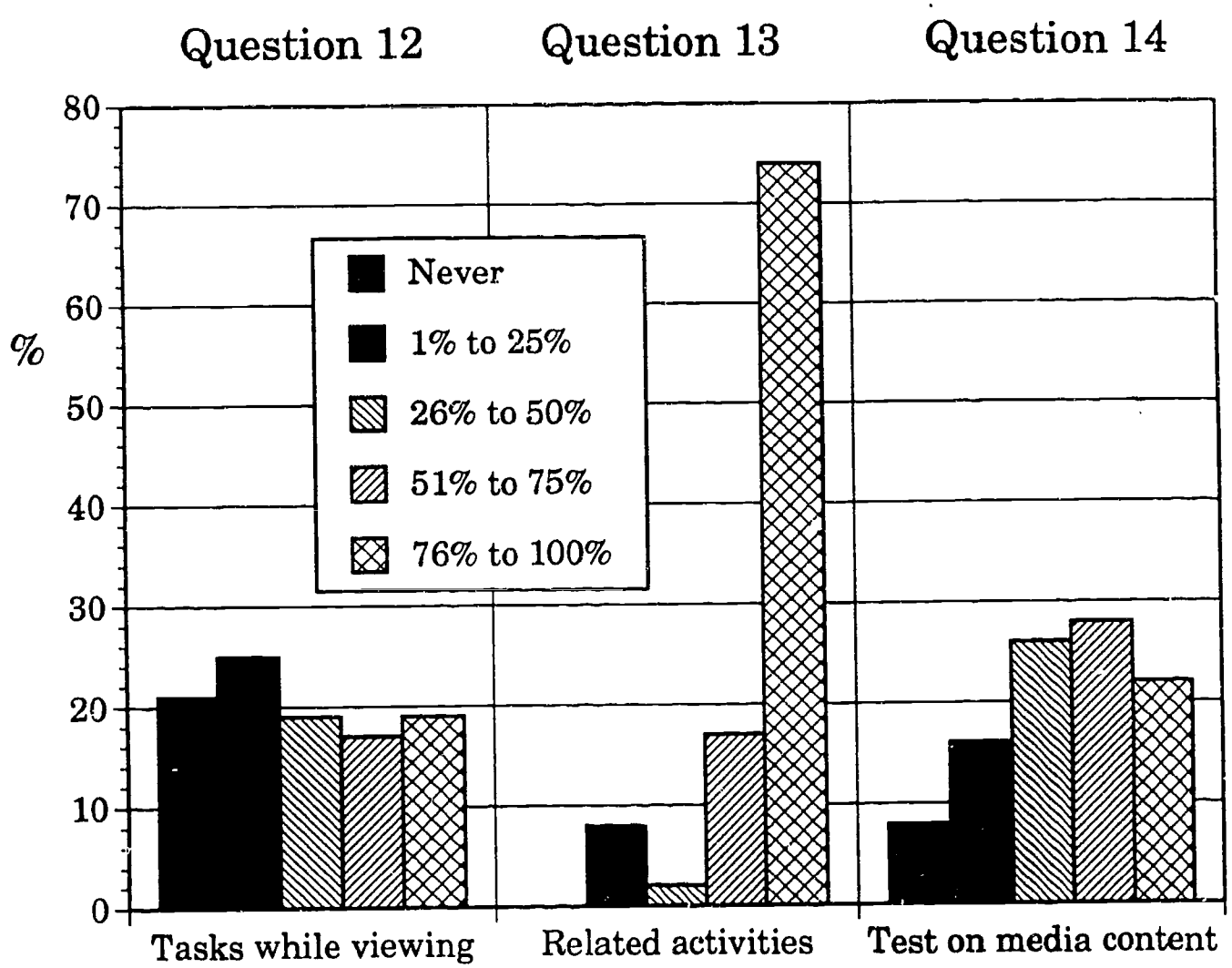
Frequency of curriculum modification to suit media, planning during media presentations, and scheduling media to increase planning





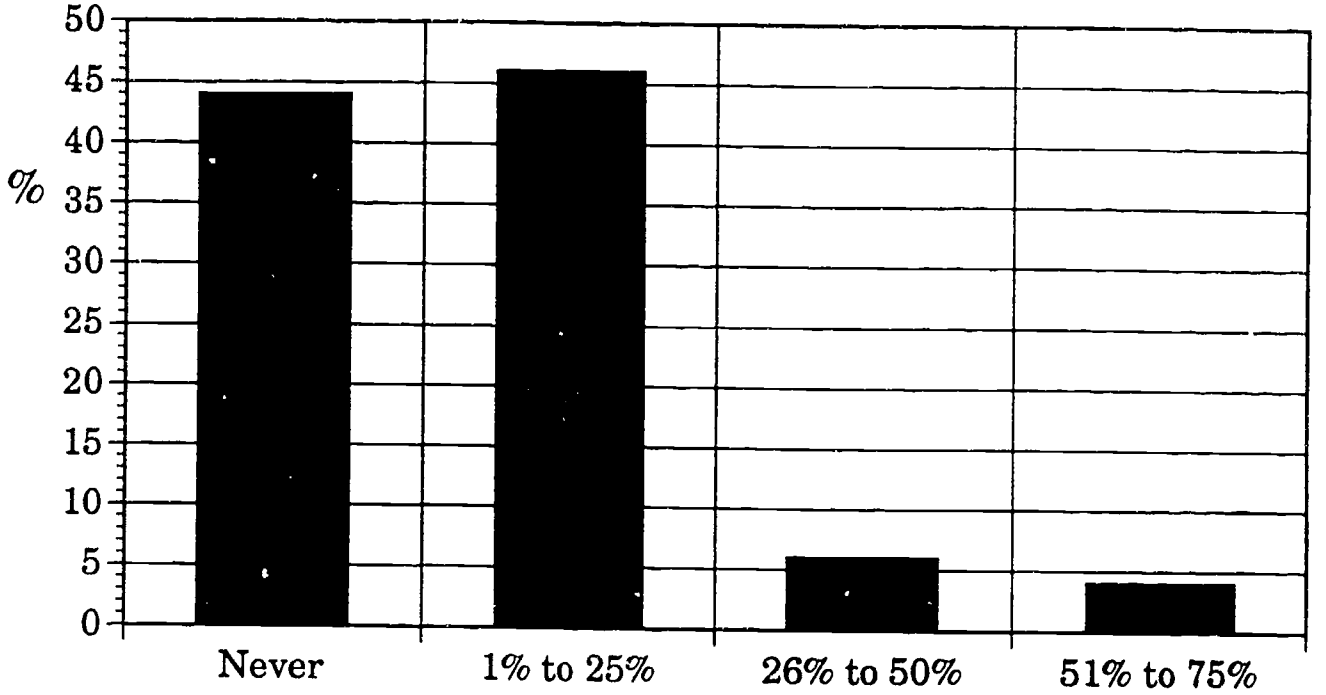


Frequency that teachers relate other classroom activities to media presentations

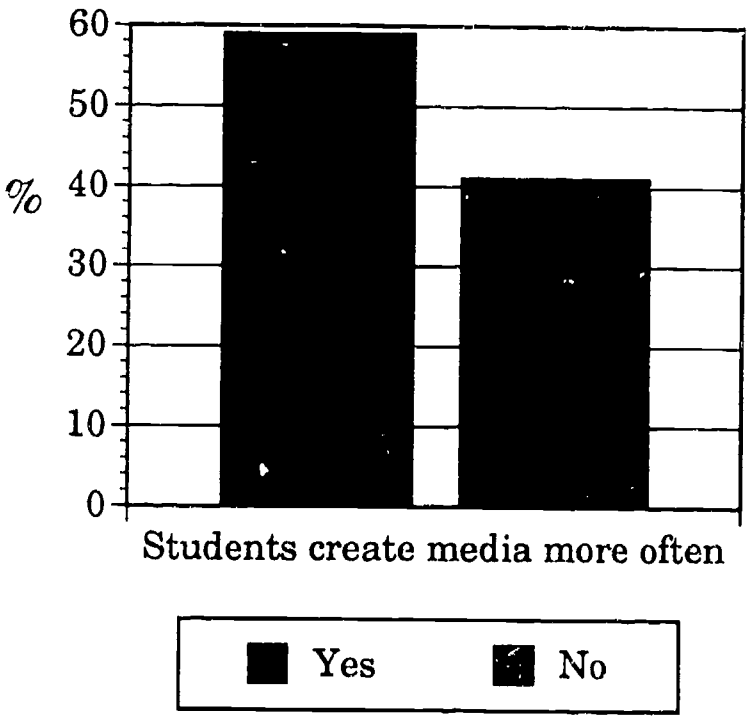


Student use of media to fulfill course requirements

Question 15



Question 16



Question 17

Problems with student created media	%
Time	36
Availability of equipment	27
Inflexible curriculum	4
Maturity of students	2
Worth of product	2
Never considered	2
Need training	4
Deflect concentration from material	2
Novelty	2