

Multimedia Product Development: What Educators Really Want

by Gail Hartman

Remember way back in 1984 when “multimedia” was synonymous with “floppy disk?” Today, of course, multimedia includes any and all applications that combine and integrate text, graphics, video, and sound. Delivery of multimedia in K-12 classrooms includes such formats as CD-ROMs, the Internet, CD/Web hybrids, videodiscs, laserdiscs, distance learning, video conferencing, and the ever-evolving handheld PDAs and e-books.

But no matter how it’s delivered, it’s still multimedia, and educators want and expect certain things when selecting it for their schools. So what makes an ideal multimedia product? What do educators *really* want and need? This article discusses some of the most common educational and technical elements that educators identify as essential in exemplary multimedia.

Educational Issues: Different Strokes

Every school district in every state buys multimedia for different reasons. Some want it only for remediation and others only for enrichment. Some want products that empower students to create their own multimedia, and others want only drill and practice. Some schools have computers in each classroom, others only in a lab or library.

There are as many different types of multimedia products on the K-12 market as there are educational philosophies and instructional methods, and schools choose those best suited to their own educational styles.

Addressing Different Learning and Teaching Styles

It’s a basic and generally accepted fact that every student learns differently and at a different pace. The best multimedia products therefore enable students to move through them at their own pace, providing both visual and auditory cues to address different learning modalities. Beyond self-paced features, however, the instructional approaches that are dominant in the classroom play a significant role in determining the most appropriate multimedia products. There are primarily two camps out there: those educators who support a traditional, teacher-centered approach, and those who support a student- or learner-centered approach.

Teacher-Centered Classrooms

In a teacher-centered classroom, the teacher disseminates all or most information through lecture, textbooks, workbooks, and/or software. Students work alone most of the time, sitting at desks or in front of computers. Subject areas are often taught separately, in assigned slots of time (i.e., 45 minutes of math, then 45 minutes of geography). Assessment is also traditional, relying primarily on pre- and post-tests scored on an A-F letter grade scale.

Teacher-centered classrooms often purchase drill-and-practice, subject-focused, and/or encyclopedia products. Multimedia that focuses on critical thinking and problem solving is often purchased only for use in students’ “free time” or with gifted students. Teacher-centered classrooms also purchase many “teacher tool” products to help teachers generate such things as crossword puzzles, worksheets and blackline masters, calendars, quizzes and tests, spreadsheets, slideshow presentations, report card templates, flash cards, and gradebooks.

Learner-Centered Classrooms

In the learner-centered classroom, the teacher’s role is more that of a facilitator or guide, steering students to construct their own knowledge and understanding of the world. Students in these “constructivist” classrooms often work collaboratively and are challenged to use “higher-order thinking” as they analyze and synthesize information. Content areas are blended as often as possible instead of being taught in isolation. Teachers may embrace alternative assessment tools (in place of, or in addition to traditional tests and grading systems), or holistic assessments (such as portfolio and performance assessments).

Learner-centered schools often purchase multimedia products that focus on critical thinking and problem solving (e.g., simulations), and that help students make connections to the real world through role-playing environments. They look for multimedia that provide real resources for research, reading, and writing (e.g., concept map tools, online databases, and geographic information systems). Since discovery, experimentation, and communication are key to learner-centered classrooms,

multimedia that encourages students to work together or that provides ways for them to communicate with peers and experts outside their classrooms is also highly desired. Such multimedia includes authoring tools, virtual field trips, online science “probeware,” Web site building tools, and server-based collaborative environments. Teachers in these classrooms also often purchase electronic portfolios to keep track of students’ academic, emotional, and social growth.

Content

It goes without saying that educators want all multimedia products to contain the highest quality content that will enrich, complement, and supplement their existing curricula. They expect highly motivating multimedia to increase student interest, attention, and retention.

Educators look for content without gender, ethnic, or racial biases. Many want multimedia built around common thematic units (e.g., colonial America or weather), or programs that provide opportunities for collaboration among students and/or that provide different views and perspectives on an issue so that students learn to approach subject matter in ways that are rarely found in textbooks.

Thus, content is much more than just factual and descriptive information. In order to be successful in the classroom, content must be based on a real understanding of schools’ curricular emphases, how children learn, and how classrooms really work. Educators are quick to dismiss content that fails in any of these respects. “When evaluating a multimedia product for my school,” notes one New York high school media specialist, “I can tell within the first minute of playing with it whether or not it was created by people who ever actually taught in a classroom.”

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ESL and Bilingual Education

More and more, teachers across the country are looking for multimedia that meets the needs of ESL or bilingual students. One California technology coordinator, who works with a large ESL student population, tells of a very popular student authoring tool that takes the first step toward being a true bilingual product but that leaves the task unfinished. “Students can toggle the menus to read them in Spanish,” she says, “but the Help screens are only in English, and the built-in word processor doesn’t even let the kids type accent marks or tildes! It’s as if the publisher started to create a real bilingual product and then just stopped mid-way.”

In addition to being educationally sound and free of cultural stereotypes, educators expect ESL and bilingual programs to include such things as true ESL/bilingual text and audio, spell checkers, help screens, menus, and built-in word processors.

Teacher’s Guide and Classroom Activities

Teachers want supplemental guides (in hard copy and/or PDF format) that include technical information—“... written by humans, not techies: we can tell the difference!” notes one Texas elementary school teacher—and suggested classroom activities that complement the electronic content, enabling students to work both on and away from the computer.

The best supplemental classroom activities are written so that teachers can adjust them to fit their own curricular requirements, their students’ skill levels, and class schedule constraints. Supplemental activities should also include interdisciplinary connections so that teachers can learn how to cross and blend content areas in natural ways.

Connections to the Web

Educators also want recommendations and/or live links to quality, pre-screened Web sites that help extend the product’s content and that will be around for a

while. Teachers just don't have the time to peruse the Net for "safe" sites that contain excellent content, written at the appropriate grade level. Teachers also expect multimedia publishers' Web sites to keep their links updated at all times.

Standards Alignment

Aligning multimedia and supplemental products to educational standards was once considered an added bonus; it is now considered mandatory if the product will be used in K-12 schools. All public schools adhere to state and/or national educational standards for language arts, math, science, and social studies. Most follow state (not national) standards for geography and for the arts (i.e., music, dance, theatre, and the visual arts). Additionally, most schools now seek to follow some set of technology standards. Although adherence is not mandatory, The *National Educational Technology Standards for Students* (NETS)¹ are being used quite frequently. Some school district technology coordinators are also crafting their own technology standards for their individual schools.

Assessment

The pendulum of educational pedagogy never fails to swing one way one year, and then the other way the next. The pendulum swung about as far as it could toward standards-based education. While some educators are cheering the testing frenzy that goes along with it, others fear that "...state tests are overshadowing the standards they were designed to measure and could be encouraging undesirable practices in schools."² This major controversy won't end any time soon, experts predict.

But whether or not a school lives and breathes standardized tests, all schools know that some form of regular and balanced assessment is critical to continuous measurement of students' growth and progress. Some multimedia has built-in assessment, or scoring/record-keeping functions, including such things as pre- and post-tests and the ability to track how long a student works at a task or how many attempts are made before getting the correct answer. Some multimedia products offer rubrics of learning objectives for teachers to print and complete off-line.

Since teacher- and learner-centered classrooms embrace different types of assessment as described above, many publishers, within their off-line supplemental materials, wisely try to address all variants by offering a wide range of suggestions for traditional and alternative assessment.

Training and Technical Support

The US Department of Education reports that almost "two-thirds of all teachers feel they are not at all prepared or only somewhat prepared to use technology in their teaching."³ And Merrill Lynch finds that, "almost two-thirds of teachers (65 percent) had never used a computer before being introduced to one in the classroom." The report goes on to say, "These teachers need basic technology training, especially those who are receiving computers and using the Internet in their classrooms for the first time."⁴ Many multimedia publishers are addressing this enormous lack of technology-trained teachers by offering training for their products. Some conduct a basic "how to" session for the technology coordinator who then trains the teachers. Others provide more lengthy, customized training, working alongside teachers "in the trenches" and helping them determine the best ways to integrate programs with their own curricula. On-line training, using "virtual workshops," is another option.

In addition to training, teachers also expect toll-free technical support from a staff that can really troubleshoot and fix problems. Far too often, teachers report long wait times on a long distance toll call that eventually leads to a conversation with an operator who has never used the product.

Technical Issues

If teachers acquire new multimedia that requires them and their students to focus on learning the technology instead of the content, they will consistently abandon the product.⁵

Educators want multimedia that is intuitive and easy for students, as well as adults, to learn and navigate through right out of the box or upon first landing on a Web site. They want computer environments that are easy to handle by first-time users and experienced users alike.

GUI Design

A product's graphical user interface (GUI) must contain the following types of elements to be deemed user-friendly in schools:

- Simple, uncluttered screens.
- Age-appropriate graphics that enhance the content, rather than interfering with it.
- Fonts, styles, sizes, and colors that are easy to read.
- Concise text that pays attention to grammar and punctuation and that avoids slang.
- Dialog boxes that have titles so the user knows what the box is meant for and that always offer a way out (i.e., a Cancel button).
- Background and foreground screen colors that aren't too bright or too dark.
- Menus (e.g., drop-down, cascading) that are grouped logically and structured so they make sense, even to the novice.
- Click-and-drag features with visual cues (e.g., a cursor that changes shape, icons that change appearance). While this is most critical for early learning programs, it is a design plus for all education users.
- Shortcut navigation keys.
- Icons that clearly represent what they're meant to represent!
- On-line help (hypertext) systems that actually help users to get answers to their questions easily.

Navigation

Navigation should be seamless. On CDs, for instance, there should be more than one way to move around (e.g., via icons and menus). Web sites should be easy to navigate from any page. All links within and outside the site should work smoothly, all the time. Outside links should open within the site, within a new browser window, or enable students to easily jump back to the page they left, using the browser's Back button or Home page icons/links.

Audio

Audio must sound crisp and clear and must serve to enhance learning. Narrated text should be spoken clearly and slowly enough so that the user can understand what is being said. Often, developers of early learning programs hire children as their audio talent. While this can

significantly enhance the product, giving it a fun "kid" feel, it can also hurt the product if the children's speech is slurred or spoken too quickly.

Volume control (as well as the ability to turn off audio completely) is a crucial feature that some multimedia developers overlook. The result is that in some schools, excellent products remain untouched because the schools' computers have no headphones and are located in a central area, like the library. Without volume controls, students can't use the product without disturbing others.

Video

Video clips can make a product come alive, but they must play smoothly, each and every time. Students should be able to pause or stop the video in mid-play without causing the program to crash. Historical video clips are hugely popular because they are one way to bring primary sources into the classroom, but some publishers' Web sites link to other sites that have very slow servers, making the clips virtually useless. If a Web site contains a video, there must be a link to get the free browser plug-in to run it, if one is necessary.

User-controlled

Excellent multimedia enables users to take control of the learning experience—to stop mid-way, bookmark a place, quit at any time (and return later to the exact place they left off), and easily "Undo" a decision.

Non-breakable

Multimedia is given quite a workout in K-12 schools and needs to withstand incorrect mouse clicks and repeated pounding on the keyboard. Anyone who has ever watched children at a computer knows that they will boldly click one button after another, without pausing, or will repeatedly click on any part of the screen or a Web site page, at any time, just to see what will happen.

One multimedia publisher tells of using students from a local school to test the durability of each of its products. "A product can be carefully tested for weeks in our QA Department and we'll find a handful of things to fix," an engineer notes, "but once those 10 year-olds get hold of it, we can identify problems that we never even dreamed could have existed!"

Any multimedia product that expects to be used in schools must stand up to each and every click without so much as a hiccup.

Feedback and Reinforcement

When students make an incorrect choice, how does the computer respond? Many teachers balk at feedback that seems punitive (e.g., “Wrong answer!”) and look for multimedia that provides only helpful, positive feedback (e.g., “ Good try ... try again.”) so students will feel safe in making repeated attempts.

Teachers also look for positive reinforcement that subtly guides students to the correct solutions by having them re-think facts or situations. For example, if an incorrect path is taken, the program’s response might be a pop-up dialog box or audio clip with a question to spur thinking and help guide students back to the correct path without directly pointing them to the answer.

Customization

Educators need and expect options to customize certain parts of multimedia. Most often, products enable the teacher (or student) to turn some features on or off (e.g., printing or audio), toggle between languages, or change skill levels, data displays, RAM configurations, scoring parameters, or the number of exercises a student must work through in each activity. When teachers are given these types of options, they feel that they can better address the needs of individual students.

Repeat Play

If a product is deemed “done” after one play, it inevitably lands in the closet to gather dust. Schools expect products that can be replayed over and over again, so that students are challenged and can learn something new each time the product is used.

Repeat-play school products often cross over into the home (and homeschool) market. Parents who are enthusiastic about extending their children’s learning at home will often look to schools to recommend educational and “long lasting” products for them to purchase.

Conclusion

Creating exemplary K-12 multimedia is no easy task. Educational and technical issues must be weighed and balanced to create a product that is engaging, meaningful and relevant, and well-adapted to different learning styles, as well as being technically fit for classroom use.

But when it is done right, the power of well-designed multimedia in the classroom can’t be denied. Integrated seamlessly and authentically into a class curriculum, multimedia can meet diverse learner needs and abilities, create multidimensional and multidisciplinary learning opportunities that break down the classroom walls, and motivate students of all ages.

¹ International Society for Technology in Education (ISTE) Accreditation and Standards Committee. National Educational Technology Standards for Students—Connecting Curriculum and Technology. International Society for Technology in Education, 1998.

² Education Week. “Quality Counts 2001: Seeking Stability For Standards-Based Education,” Editorial Projects in Education, 2001 Vol. 20, No. 17, pp. 8,9.

³ United States Department of Education, National Center for Education Statistics (1999). Fast Response Survey System, Public School Teachers Use of Computers and the Internet, FRSS 70, Washington, D.C., 1999.

⁴ Moe, Michael and Blodgett, Henry. *The Knowledge Web*. p. 104. Merrill Lynch & Co., Global Securities Research & Economics Group, Global Fundamental Equity Research Department, 2000.

⁵ Trotter, Andrew. “Preparing Teachers For the Digital Age.” *Education Week On the Web, 1999 Editorial Projects in Education*, Vol. 19, number 4. www.edweek.org/sreports/tc99/articles

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