Integrating Digital Video Technology in the Classroom

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Digital-video assignments enhance experiential learning.

Integrating technology into kinesiology-related professional preparation programs has the potential to enhance and improve student learning. A media-literate and experientially grounded student population, relatively easy-to-use and inexpensive resources, and higher professional expectations and accreditation standards support this integration. Digital video technology, in particular, is a strong tool that can enable students to develop a variety of skills, including research, communication, decision-making, problem-solving, and other higher-order critical-thinking skills (Theodosakis, 2001). In addition, the integration of digital video technology has the potential to enrich university classroom curricula, enhance authentic and meaningful pedagogical experiences, and provide new and sophisticated ways to improve student learning (Fiorentino, 2004). Technology-related standards have been progressively developed by various accrediting agencies and professional organizations, including the National Council for Accreditation of Teacher Education (NCATE), the International Society for Technology in Education (ISTE), and the National Association for Sport and Physical Education (NASPE). Digital video integration can be used as an example of technological competency for students and faculty.

In recent years, technology in the classroom has become easier to use and less expensive. A number of companies offer easy-to-use video-editing software for less than $100 and some even for free. Video-editing software enables students and faculty to integrate various types of media—such as text, video, audio, graphics, and animation—to create meaningful educational videos.

The purpose of this article is to discuss the importance and benefits of digital video integration, describe the essential tools needed (e.g., hardware and software) and the steps to create a digital video, and provide examples of digital video assignments or projects and an evaluation rubric for assessing them.

Importance and Benefits

Today's students are media literate and experientially grounded (McNeely, 2005; Oblinger, 2003; Windham, 2005). Contemporary research indicates that today's learners tend to prefer experiential-based activities and prefer to learn by doing, as opposed to learning by listening (McNeely, 2005; Oblinger, 2003; Windham, 2005). Student-produced digital video is appealing because it encourages active and problem-based learning. It also encourages student collaboration and authentic application (Choi & Johnson, 2007). For example, a team of four students in the author's sport management class at Minnesota State University–Mankato created a promotional video clip for a local sport business after conducting market research. As a result of their efforts, the company decided to place the clip on its web site to promote its products and services. This type of video integration in the classroom can support student learning in the context of collaborative work, knowledge building, decision making, and problem solving.
There is a need to reach educational outcomes of higher-order cognitive and critical-thinking skills for students who use educational technology (Bransford, Brown, & Cocking, 1999). Students need to engage in the use of technical skills that will adequately prepare them to think critically and creatively (Guibas, 2004). Digital video integration can be ideal for learning complex skills because it exposes learners to problems, equipment, and events that cannot easily be demonstrated or understood verbally (Choi & Johnson, 2007; Overbaugh, 1995). Recent studies have found that the integration of digital video technology in the classroom encourages students to think more deeply about subject matter (Swain, Sharpe, & Dawson 2003), promotes self-expression and creativity (Reid, Burn, & Parker, 2002), provides a sense of achievement, improves self-esteem (Ryan, 2002), and increases motivation and enjoyment (Burn et al., 2001). Students can gain confidence and competency by applying theory to practice and discovering how to view, analyze, create, and edit a digital video.

What Tools Do You Need?

In order to successfully integrate digital video in the classroom, educators need to have adequate training and necessary hardware and software (table 1).

**Training.** Students cannot be expected to benefit from digital video technology if their educators are neither familiar nor comfortable with it. According to the Office of Educational Research and Improvement (1993), educators are likely to be motivated to tackle the challenges of integrating technology when they have a vision for how it will improve the teaching and learning process. The primary reason educators do not use technology in their classroom is their lack of experience and training with technology (Rosen & Weil, 1995). Therefore, educators involved in the implementation of digital technology must receive adequate training in the effective use of all the equipment and software. Training should be designed to help educators learn not only how to use new technology but how to provide meaningful instruction and activities using technology in the classroom (Ringstaff & Kelley, 2002). It is also important that educators witness examples of successful digital video integration as a powerful tool to enrich teaching and learning. Some video examples of student and teacher projects can be accessed on Apple's website (http://education.apple.com/education/life/) and http://education.apple.com/ali/). Additionally, they need to be informed of the types of support that are available from the library and instructional technology office on their campus. With training and support, educators can effectively implement digital video projects that will become increasingly meaningful and relevant to the educational experience of their students.

**Computers.** Today, most computer manufacturers offer entry-level models with sufficient memory, hard drive space, and editing software to handle digital video production. All new Apple computers come with the video editing program iMovie, while all new Windows-based computers have a capability to use Windows Movie Maker, available for free download from the Microsoft website. This availability of free video-editing software tools helps make video projects affordable for every classroom. When selecting new video-editing software, minimum system requirements must be considered (table 2). Most existing computers have the capacity to be upgraded relatively inexpensively by adding more memory and hard drives. If a computer does not have a capture card, which allows the transfer of video images from the camera to the computer, one can be added to the system for less than $30 (table 2).

**Video-Editing Software.** The cost of video-editing software ranges from free to over $1,000. The authors use Pinnacle Studio software because it is easy to use and capable of making professional-looking videos at a reasonable cost. This software can be purchased for less than $70 per copy.

Pinnacle enables students to quickly and reliably capture photos, videos, and audio from all popular consumer electronic devices and easily add titles, transitions, music, and special effects (e.g., pan-and-zoom and green screen effects). Subsequently, students can easily create professional-looking videos suitable for use on the Internet, in a campus network, or on CD/DVD. Most students find this software to be very easy to use and only a little more advanced than PowerPoint. The easy-to-use color key effect feature allows students to appear in front of any still image or video footage, which sparks students’ imagination. Students actively explore more advanced features and techniques on their own and, in the process, take their digital technology acumen to the

**Table 1. Equipment and Software for Movie Production**

<table>
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<tr>
<th>Equipment Needed</th>
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<tbody>
<tr>
<td>Computers</td>
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<tr>
<td>External hard drive (storage)</td>
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<td>Digital video cameras</td>
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<tr>
<td>Green screen</td>
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<tr>
<td>Videotapes</td>
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<td>Tripod</td>
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<td>Microphones</td>
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<tr>
<td>Headsets</td>
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<td>Lights</td>
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**Editing Software**

- Pinnacle Studio (Windows): [www.pinnacle.com](http://www.pinnacle.com)
- Dazzle Video Creator Platinum (Windows): [www.dazzle.com](http://www.dazzle.com)
Table 2. Minimum System Requirements for Pinnacle Studio 10

- Windows XP
- Intel Pentium or AMD Athlon 1.4 GHz or higher (2.4 GHz or higher recommended)
- 512 MB RAM (1 GB recommended, 1 GB required for HD)
- DirectX 9 or higher compatible graphics card with 64 MB (ATI Radeon or NVIDIA GeForce 3) or higher with 128 MB recommended for SD (128 MB required for 720p HD, 256 MB required for 1080i HD)
- DirectX 9 or higher compatible sound card (Creative Audigy or M-Audio recommended)
- 1 GB of disk space to install software and 3 GB to install bonus content

Optional:
- DVD-ROM drive (required to install bonus content)
- CD burner for creating Video CDs or Super Video CDs (S-VCDs)
- DVD burner for creating DVDs
- Sound card with surround sound output required for preview of surround sound mixes

Students shoot their digital video.

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next level of sophistication. Mentoring programs also can be implemented, so that senior students who already have technical skills in digital video can help less experienced students with video-editing issues.

Digital Video Cameras. Digital video (DV) cameras have become easier to use in classrooms and more affordable as technology and manufacturing improve. A variety of DV cameras are available, ranging from the miniDV to the professional high-definition video used in the production of Hollywood films. For classroom use, the authors have purchased Sony miniDV (DCR-TRV 22) cameras that include important features, such as an external microphone jack—which is useful when students interview people using either wire or wireless microphones—and DV-in/DV-out. These cameras cost approximately $300 each.

Other Equipment. Other equipment includes external drives, firewire (IEEE 1394) cables, and lights. Availability of external hard drives is essential for using this technology in the classroom, because each video project requires substantial hard drive space. External hard drives for video editing should have at least 250 GB of hard drive capacity with a 400 hard drive rotation speed. Each drive costs approximately $100. When students save projects on a computer hard drive, the space often fills quickly. Therefore, each group of students creates its project folder on an external drive and then its subfolders for images, videos, and audio. This procedure has enabled faculty and students to utilize the workstation more effectively.

Students are encouraged to use a tripod, whenever possible, because tripods help to create steady and smooth shots. A tripod should provide smooth side-to-side motion and up-and-down motion. The firewire cable is used to connect the video camera to the computer and to transfer video images from the camera to the computer. Each cable costs approximately $6; however, the price varies depending on length. Other equipment needed may include lights, since a poorly lit scene can quickly ruin a good movie. Lighting has a very significant effect on the quality of a video. The general rule is that soft light is better than hard light. For instance, a 500 watt tungsten work light found at a hardware store can be a low-cost alternative to high-end lighting. It is imperative to avoid complex shadows and hot spots. When feasible, shooting outside on a sunny day is best. The person being videotaped should be positioned so that the sun or brightest room lights are not directly in the person’s face. When shooting inside, every light in the room should be turned on. When shooting inside during daylight hours, make sure that the window shades are pulled back to allow the maximum amount of light to enter the room.

Funding Sources. Cost often becomes a crucial factor in deciding whether or not to use digital video in the classroom. Fortunately, a variety of internal and external grant opportunities are available at many institutions. University faculty should be encouraged to write grant proposals to request potential funding. The International Society for Technology in Education offers funding ideas on its website (http://www.iste.org). Additionally, many universities have good technical support available for their faculty and students, which reduces the costs for integrating digital video.

Libraries at most universities typically stock a number of DV cameras for student use.

Steps to Create a Digital Video

In order to maximize organizational and production efficiency and effectiveness, five steps should be followed in creating digital video clips or movies: (1) development, (2) preproduction, (3) production, (4) post-production, and (5)
distribution (Theodosakis, 2001).

**Development.** Development refers to all aspects of preparation and planning for creating a video. This includes goal setting, production team formation, idea development, and script production. Although initially time-consuming, working through planning issues early can save time over the entire production process. Planning should first focus on defining project goals. Goals should relate to what is to be conveyed (the content) and the ways in which the video will convey that information. In addition, goals should be developed that define production completion, the intended audience, and how success will be measured. Assigning students and staff to production teams is another element of planning that should be completed early. Obviously, it is important to form production teams according to the technical, equipment, and personnel needs of the project. Idea development is one of the most difficult parts of project development. Needless to say, everyone participating in the project should be involved. The key to success is to make certain that the final project ideas reflect the original goals of the project. Once project ideas are agreed upon by the production team, a script must be developed. The script should set the background of scenes, define the timeline for each scene, and outline any talking parts that may be needed. Overall, defining clear goals, forming effective production teams, and developing a creative and defined script will help ensure a successful video production process.

**Preproduction.** Preproduction refers to creating a vision for the production team through storyboarding and planning the shoot. A storyboard is simply a series of drawings that represent what each scene should look like. A storyboard might highlight the actors or angle of the shot and include text about further specifics of each scene. Planning the shoot includes working out potential problems and details before actually filming. This includes verifying the props, equipment, and costumes needed according to the script and making sure filming locations are available and that the equipment will be ready when needed. Finally, it is important that permission be secured for students acting or being filmed in the project. The effort put into preproduction can greatly streamline the amount of time and energy spent during the actual production phase.

**Production.** Production refers to the filming phase. Throughout the filming process, the production team will be using cameras and other equipment to make the film a success. During production, it is important that a record or log be kept to define which scenes have been filmed and whether they have been deemed useable or not. In addition, it is important to keep track of equipment to reduce misplacement or loss.

**Post-production.** This is an important phase of the digital video clip or movie-making process because it is when the movie is actually created. Post-production includes editing and finalizing the video and sound tracks, adding titles and text, and exporting to a viable media (i.e., streaming video, VHS, or DVD). The first step in this phase is to sequentially lay out the project by arranging the various available clips created during production. Most of this process will be done digitally through the use of several commercially available editing programs such as iMovie, Windows Movie Maker, or Pinnacle Studio. The video and sound clips from various scenes will be placed into one electronic, editable file where cuts, edits, and transitions can be quickly accomplished. After the sound and video are edited, titles and text can be added. Some important points to remember when creating titles and credits include having the text remain on the screen long enough for the audience to read it; having the text stand out from the background; keeping text short, clear, and to the point; and designing credits that mention everyone who assisted in the project creation or who may have volunteered space or equipment. The final aspect of post-production is to finalize the movie and export it to a viable medium for distribution. Most movie projects will be exported to the web, VHS, or DVD.
Examples of Integrating Video Technology in the Classroom

Examples of digital video projects for courses in sport management and physical education teacher education appear in Table 3. The recommended length for a student-produced video project is three to five minutes. The table provides a list of assignments designed to integrate video technology into these courses. The assignments include:

### Sports Management

#### Career Exploration Video
Students will create a three- to five-minute digital video that explores specific careers in sport management. The following components will need to be included to create the digital video: job title, job description, essential skills and experience necessary, required education, salary range, and career outlook. Also, show what a typical day is like for someone in the position.

#### Digital Documentary Movie
Students will create a three- to five-minute documentary movie that examines social issues in sport, such as gender, race, ethnicity, deviance, violence, or other social problems. Students should express and communicate their views and also include an interview with an expert in the field.

#### Sport Commercial Video
Students will create a 30-second commercial for a client. Students will find a client who is interested in having a 30-second advertisement on his or her website. Students will participate in brainstorming, researching, and developing ideas after studying examples of contemporary advertising and determining the needs of the client. Students should demonstrate their understanding of the relationship between theoretical concepts and their practical application through the finished movie.

#### Mock Trial
Students will create a three- to five-minute movie of a mock trial that allows students to practice communication and critical-thinking skills. Students will be given a court case in a sport law class. Students will research all the facts of the case, identify and formulate the issues, and prepare their arguments. The finished video should include opening statements, witness examination and cross-examination, and closing arguments.

### Physical Education Teacher Education

#### Video-Based Analysis and Reflection of Teaching Experiences
The teacher candidate will create a digital video that reflects one aspect or component of best teaching practice at the elementary or secondary level. The teacher candidate will identify one best-practice teaching component based on the Danielson’s Framework for Teaching (Danielson, 2007) after videotaping teaching a lesson in physical education either at the elementary or secondary level. The following components will need to be included to create the digital video: essential teaching questions, answers to the essential teaching questions, live footage to demonstrate the best teaching practice, and strategies.

#### Sport Analysis
The teacher candidate will create an instructional digital video about a particular sport skill for elementary and middle school students. The following components will need to be included: a particular sport skill (e.g., identify the specifics of dribbling a basketball, throwing a football, serving a tennis ball, setting a hail in volleyball); teaching cues; proper technique including the stance, execution, and follow-through; essential questions for the use of the sport skill; and examples of the stages of skill development.

#### Technology in Physical Education
The teacher candidate will create a digital video that promotes the use of technology tools (e.g., pedometers, heart rate monitors, personal digital assistants) in the class to enhance student learning. The digital video can promote the tool and provide a step-by-step guide to using it effectively.

#### Game Performance
The teacher candidate will create a digital video that demonstrates proper teamwork, sportsmanship, and feedback. The digital video could include live footage of students in an activity (e.g., volleyball, soccer, rock climbing) or using a particular strategy. Title slides for teamwork, sportsmanship, feedback, essential questions, and how to demonstrate skill techniques would help focus student attention on positive behaviors, skill use, or performance highlights.
digital video is usually between three and five minutes. The authors generally use the following steps of the process in completing the assignment or project:

Step 1: Students will be given a clear explanation of the assignment and expectations in the form of a rubric.

Step 2: Teams of three or four students will participate in brainstorming, researching, and developing ideas for their assignment.

Step 3: Students will submit a project proposal with their ideas to the instructor.

Step 4: Upon the instructor’s approval, students will incorporate a storyboard to develop their video based on their research findings.

Step 5: Students will film scenes, import and edit video clips and photos, record narration, and add titles, transitions, music, and other elements using the software program.

Step 6: The finished movie will be exported to a Windows Media file (streaming movie) and shared with the class.

Digital video technology has a broad range of possibilities as an instructional tool for educators. The types of digital video projects are only limited by the educator’s imagination.

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<tr>
<th>Criteria Components</th>
<th>Levels</th>
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<tr>
<td></td>
<td>Exemplary 4 points</td>
</tr>
<tr>
<td>Preproduction</td>
<td>The video plan is characterized by detailed goals, a coherent script that reflects the goals, and a comprehensive storyboard that highlights the actors, scene description, and video sequence.</td>
</tr>
<tr>
<td>Production</td>
<td>A meticulous record was maintained as to what scenes have been filmed, a record of daily tasks, and types of equipment used.</td>
</tr>
<tr>
<td>Post-Production</td>
<td>The audio and video are clear and coordinated, and they add meaning to the project. Transitions and edits create a smooth flow to the video.</td>
</tr>
<tr>
<td>Overall Presentation</td>
<td>The video project covers the topic in depth and includes detailed information.</td>
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</tbody>
</table>

TOTAL POINTS: ______/16
If you think about your own content area, you will no doubt come up with excellent content-specific ideas of your own.

Evaluation
Providing feedback to students and evaluating their projects are important aspects of the creation process of digital video projects. Table 4 presents criteria areas for feedback and evaluation of the students' videos. The rubric example can be adjusted to meet individual or group needs and differences.

Summary
Digital video cameras and editing software have great possibilities as instructional tools due to their convenience, ease of use, and affordability. These technologies provide a unique opportunity to integrate core content and pedagogical practice within specific academic disciplines. Using students' video projects in the classroom has become an engaging way to incorporate technology into the exploration and learning of core content. The authors believe that their students, as well as their programs, have benefited from using digital video technology in and outside the classroom. Also, having students create their own videos provides a perfect opportunity for discussing ethical issues with regard to intellectual property, copyright, and privacy.

When digital video becomes effectively integrated in the classroom, it helps students to develop a range of higher-order cognitive skills (e.g., research, communication, decision-making, problem solving) as they progress from conceiving original ideas to presenting their finished movie (Theodosakis, 2001). It is recommended that educators design digital video projects and assessment strategies to help students develop these higher-order cognitive skills. However, in order to be successful, it is vital to give educators the tools and training they need. It is hoped that this article has provided guidance for educators who might integrate digital video technology into their classes and will lead to more consistent and effective use of this technology in the learning environment.

References

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