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Helping All Students Meet the Standards with Technology and Project-Based Learning Considerations Packet

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Helping All Students Meet the Standards with Technology and Project-Based Learning

One of the greatest challenges facing educators today is how to deliver a standards-based curriculum in a manner that is both accessible and effective and that results in measurable gains by *all* students seeking a standard diploma. While expectations for academic performance have intensified, so has our knowledge of effective practices and classroom resources. Even before computer technology was introduced into the classroom, the educational community was realizing the power of project-based learning as a strategy to capture student interest and facilitate greater levels of productivity and learning. With the onset of the digital age, assistive technologies have made it possible for students with disabilities and differing abilities to participate successfully with their peers in general education.

This packet focuses on the use of multimedia technology by students of *all* abilities to showcase or share information they have gained through applied or project-based learning activities. This *Considerations Packet* starts with an overview of project-based learning as an essential tool for engaging students and increasing their productivity, particularly within inclusive settings. Practical ideas and resources for implementing and evaluating multimedia-based projects are then shared.

Project- or Activity-Based Learning

Project-based or applied learning is a technique used to expose students to opportunities to learn about, practice, and apply knowledge to the creation of a real-world projects that have value and relevance to an audience often outside the walls of the classroom. Typically, students work together in small groups to solve tasks, find answers to questions, and create a product or presentation. Within this learning environment, the role of the teacher becomes one of facilitator, providing direction and structure, posing questions, and offering support and feedback as students design and develop their projects.

Several researchers (e.g., Moursund, Bielefeldt, & Underwood, 1997; Stites, 1998) have documented that educators who implement project-based learning observe *significant* increases or improvements in students':

- motivation and engagement
- problem-solving ability
- research skills
- collaboration
- task management and organizational skills

Educators who have integrated technology into such projects and activities report an even greater impact on student achievement, particularly noting a significant increase in reading, writing, and mathematics skills, as well as higher scores on standardized tests. In addition, students can learn *technology-related skills* such as word processing, publication layout and graphic design, and the development of electronic presentations, web pages, spreadsheets, and databases, thereby increasing their value to potential employers.

Key Elements of Successful Projects

A number of initiatives have sought to assist educators wanting to implement project-based learning in their classrooms. For example, the Challenge 2000 Multimedia Project (Penuel, Korbak, Yarnall, & Pacpaco, 2001), designed to "infuse the classrooms of the Silicon Valley with an exemplary model of project-based learning supported by multimedia (p. 10)," has identified the following essential components as guidelines for educators.

- **Curriculum Connection**: The project should demonstrate successful and meaningful integration of standards-based content in both the process of learning and the resulting product.

  > **Tip**: Determine critical, foundational knowledge that students must acquire before advancing, and use these ideas to focus student inquiry. By examining the content and focus of standardized tests, educators can incorporate information that students will be tested on into group assignments (Reeder, 2002).

- **Multimedia**: The culmination of student learning should be presented or showcased through the creation of a multimedia project. Ideas for projects include electronic presentations, web pages, and video or CD productions. Technology should not be the focal point of the project but should be used as a tool to help students access and organize information throughout the project.

  > **Tip**: Introduce students to *storyboarding*, a technique used by the motion picture industry to document all elements required to produce a slide (Knapp & Glenn, 1996). Using a template, students draw or use text to describe the content of each slide, noting the use of text, graphics, animation, sound, links, or buttons that would connect the user to other slides in the presentation. This technique is also useful for web page design. A sample storyboard is included in Appendix A.

- **Student Direction and Decision-Making**: Students should be actively involved in decision-making with regard to project design and direction throughout the project from inception to presentation. Teachers guide and assist students in documenting the impact of decisions that occur as the project progresses.

  > **Tip:** Provide students with examples of successful projects and solicit their ideas on what made the projects successful. Viewing other projects will create excitement and serve as a springboard for students' imaginations. In addition, reflection on the elements of successful projects provides students opportunities to understand more thoroughly how various elements add to the success and quality of given projects.

- **Collaboration**: Collaboration is an essential component of all projects. That is, through the activity and process of working with others to achieve a desired goal, students acquire the skills necessary to communicate and work effectively as members of a team.

  > **Tip**: Help students examine how their behavior may impact the success of a project by using the technique of video debriefing (Penuel, Korbak, Cole, & Jump, 1999). Prior to the start of a project, the class reviews the goals of the projects and brainstorms the types of behaviors that would help or hinder the

accomplishment of these goals. The teacher videotapes snippets of group interactions, including behaviors that were helpful as well as those that were not. During a follow-up viewing, students are encouraged to identify both helpful and hindering behaviors, commenting only on how a given behavior or action influenced productivity, rather than how a particular student helped or hindered the process.

- **Real-World Connection**: Projects should have a real-world connection based on design (i.e., a solution to a real-world problem) or through collaboration with professionals outside the classroom in addition to communications via the Internet.

  Tip: Students' engagement and productivity rise when the activity they are engaged in has value. Discuss the potential impact of their work on others. Who could benefit from their work? How will it be shared?

- **Extended Time Frame**: The nature of this type of project necessitates that educators allow time for student planning and design, as well revisions and reflections.

  Tip: Set a timeline for key phases of the project, building in some degree of flexibility. Share this timeline with students. Brainstorm ideas for organizing and managing the work so that *each* student contributes in a meaningful way and has an opportunity to use his or her strengths to help the group accomplish its task.

- **Assessment**: In addition to assessing the final project, educators should evaluate regularly throughout the life of the project. Opportunities for students to assess their peers as well as their own performance and growth during the project should be included.

  Tip: Rubrics make excellent tools for assessing multimedia projects as well as individual and group processes, because standards of quality are clearly defined. By sharing and using rubrics with students, teachers are not only clarifying their expectations, but also teaching students how to meet them (Goodrich, 1997). A sample rubric is provided in Appendix B.

Implications for the Inclusive Classroom

It is essential that teachers differentiate instruction to meet the diverse learning needs of students in inclusive classrooms. Many educators seem unsure about how to effectively convey the required content within the allotted time in a way that enables all students to perform well on standardized tests. Application and effective integration of technology in all phases of the design, planning, and creation of projects affords students with disabilities, as well as their nondisabled peers, opportunities to learn essential technology skills, as well as how to access, comprehend, and apply content knowledge in meaningful ways.

The universal design inherent in the products listed in the tables below allows all students to actively participate and learn. In addition, all students benefit from the multisensory features of these products as well as from opportunities to share their unique abilities and to learn from others as they work toward solutions to problems or the creation of projects.

Project-based learning involves careful planning and design, particularly when technology is involved. In a time where technology is increasingly available, teachers must ensure that the primary focus of learning projects is on the instructional goals, not simply technology.

To avoid some typical pitfalls in this area, follow the planning guidelines listed below.

1) Start with identifying and defining the instructional goals. Clearly answer what the students will learn and how you know they have learned it. This will keep the focus on learning and instruction.
2) Consider important pedagogical decisions for the project, including
    a. Prior knowledge
    b. Amount of time needed
    c. Grouping of students – individual, pairs, small groups, etc.
    d. Structure – teacher-centered, student-centered, etc.
    e. How your students learn best
3) After deciding on the instructional goals and pedagogy, decide what types of instructional activities support the instructional goals and pedagogical decisions (Wiggins & McTighe, 2005).
4) Select the type of technology that enhances and enriches the project (if available). Most computers currently used in schools are equipped with free programs and resources that can meet the needs of many students and projects, as illustrated below.

PC	**Macintosh**
Office (PowerPoint, Excel, Word, Publisher)	**Office** (PowerPoint, Excel, Word)
Windows Movie Maker – for editing and creating videos and movies	iMovie – for editing and creating videos and movies
PhotoStory – for creating digital photo stories or simple animations	iPhoto – for creating digital photo stories or simple animations
Audacity – free program for editing audio and creating mp3 files	Audacity – free program for editing audio and creating mp3 files
	iLife –Apple software that includes Garage Band, a program that allows users to easily compose music
	iWork – Apple version of word processing, spreadsheets, and presentation software

Web 2.0 Tools – Online tools
Wikis – a tool for creating documents that allows multiple users to create and edit documents online
Blogs – similar to a journal online. Some blogs allow for readers to comment or ask questions
Discussion boards – enable registered users to communicate and respond to one another on a variety of topics
Podcasts – regularly released episodes of audio conversations, interviews, etc.

Harris (2005) has designed a three-part assessment to help determine the effectiveness of technology when designing a project or activity, as follows:

1) Feasibility test: Will this learning activity, project, or unit idea work given the technological, interpersonal, logistical, and contextual factors currently operating in your particular learning environment?

2) Appropriateness test: Is this learning activity appropriate for your students given what you know about their learning needs and preferences? Is it appropriate for you as a teacher targeting specific curriculum knowledge and skills?

3) Relative advantage test: Can the same learning outcomes be accomplished as well or better using more readily available and easy-to-use tools and resources?

Conclusion

As the stakes for student mastery on standards-based assessments increase, it is understandable that educators might be reluctant to embrace a nontraditional instructional approach. However, the research is overwhelmingly clear: Significant learning gains on statewide assessments are evident when technology is incorporated in a meaningful way into project-based activities (Moursund et al., 1997; Stites, 1998).

In reflecting on her adoption of an applied learning approach, Reeder (2002) observed, "Initially, at least, applied learning is a more demanding way to teach. But it is also infinitely more rewarding. The hard work of teaching no longer feels futile, since students leave your class retaining the most important ideas and having clearly improved their problem-solving, reasoning, and other life skills. Teachers who use applied learning techniques don't need to work so hard to motivate students since the curriculum is no longer abstract, meaningless, and disconnected form their experience."

References

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Stites, R. (1998). *Evaluation of project-based learning*. Retrieved May 7, 2002, from http://pblmm.k12.ca.us/PBLGuide/pblresch.htm

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Additional Resources

Resources are available on loan through the T/TAC W&M library. Visit the website at http://education.wm.edu/centers/ttac/index.php for a complete listing of all materials. Select the Library link off the home page and enter Technology or Cooperative Learning as the subject of the search.

Online Resources for Implementing Project-Based Learning with Technology

George Lucas Educational Foundation (GLEF): Non-profit organization providing articles, models of innovative practice, and resources for educators wishing to implement project-based activities integrated with technology. http://www.edutopia.org

International Society for Technology in Education (ISTE): Non-profit professional organization providing articles, models of innovative practice, and resources for educators wanting to implement project-based activities integrated with technology. http:www.iste.org
The Virginia Society for Technology in Education (VSTE) is Virginia's affiliate.
http://www.vste.org

MidLink Magazine: a digital magazine by and for students ages 8-18. Non-profit educational project sponsored by SAS inSchool®, NCSU, and UCF. Provides articles, resources, and rubric tools for educators. Sponsors Multimedia Mania Contest for students.
http://www.ncsu.edu/midlink

Rubrics and Other Assessment Tools

Kathy Schrock's Guide for Educators: Assessment and Rubric Information: Extensive listing of sites for sample rubrics; articles on rubric design.
http://school.discoveryeducation.com/schrockguide/assess.html

MidLink Magazine (refer to earlier listing)**:** Project-based learning and multimedia assessments,
including group as well as individual student checklists. May be customized and downloaded from http://www.ncsu.edu/midlink

Project-Based Learning + Multimedia: Student Reflection Questions:
Sample questions to guide student reflection; may be used as students plan projects or as a post-activity exercise. http://pblmm.k12.ca.us/PBLGuide/PlanAssess/StReflectionQuestions.html

This *Considerations Packet* was updated by Fritz Geissler, April 2009.

Appendix A
Storyboard Template

Slide/Card __1___
(Sketch slide content)

The Three Branches of Virginia Government

Executive | Legislative | Judicial

(picture) | (picture) | (picture)

Have button to click for audio introduction to the three branches of Virginia government

Element	Content	Source
Text	Listed above	
Graphics	Pictures of the buildings related to the each branch	Find online
Animation	None	
Sound	Narration introducing the three branches	Recorded in classroom
Video	None	

Navigation	Button/Link/Hypertext	Destination
Home page	Hyperlink from the words, *executive*, *legislative*, and *judicial*	Each link will go to a page about the specific branch

Appendix B

The Multimedia Project
Project-Based Learning with Multimedia

Multimedia Project Scoring Rubric: Scoring Guidelines

Score Levels	Multimedia *The integration of media objects such as text, graphics, video, animation, and sound to represent and convey information. Videotapes which include sound and images fit this definition.*	Collaboration *Working together jointly to accomplish a common intellectual purpose in a manner superior to what might have been accomplished working alone.*	Content *The topics, ideas, concepts, knowledge, and opinions that constitute the substance of the presentation.*
5	Students have used multimedia in creative and effective ways that exploit the particular strengths of the chosen format. All elements make a contribution. There are few technical problems, and none of a serious nature.	Students were a very effective team. Division of responsibilities capitalized on the strengths of each team member. The final product was shaped by all members and represents something that would not have been possible to accomplish working alone.	Meets all criteria of the previous level and one or more of the following: reflects broad research and application of critical thinking skills; shows notable insight or understanding of the topic; compels the audience's attention.
4	Presentation blends 3 or more multimedia elements in a balanced, attractive, easy-to-follow format. Elements include original student work. With minor exceptions, all elements contribute rather than detract from the presentation's overall effectiveness.	Students worked together as a team on all aspects of the project. There was an effort to assign roles based on the skills/talents of individual members. All members strove to fulfill their responsibilities.	The project has a clear goal related to a significant topic or issue. Information included has been compiled from several relevant sources. The project is useful to an audience beyond the students who created it.
3	Presentation uses 2 or more media. There are some technical problems, but the viewer is able to follow the presentation with few difficulties.	Students worked together on the project as a team with defined roles to play. Most members fulfilled their responsibilities. Disagreements were resolved or managed productively.	The project presents information in an accurate and organized manner that can be understood by the intended audience. There is a focus that is maintained throughout the piece.
2	Presentation uses 2 or more media, but technical difficulties seriously interfere with the viewer's ability to see, hear, or understand content.	Presentation is the result of a group effort, but only some members of the group contributed. There is evidence of poor communication, unresolved conflict, or failure to collaborate on important aspects of the work.	The project has a focus but may stray from it at times. There is an organizational structure, though it may not be carried through consistently. There may be factual errors or inconsistencies, but they are relatively minor.
1	Multimedia is absent from the presentation.	Presentation was created by one student working more or less alone (though may have received guidance or help from others).	Project seems haphazard, hurried or unfinished. There are significant factual errors, misconceptions, or misunderstandings.
	Multimedia score =	Collaboration score =	Content score =