Technology in Education
Virginia Society for VSTE
www.vste.org

Infusing Technology into any Instructional Program

"5W / 5E"

by Wanda Walters

Author's note: The goal of this article is to illustrate that by combining the 5W's with the 5E's, an instructional planning tool emerges that allows teachers to easily, seamlessly, and efficiently infuse technology into any instructional program. The strategies presented are appropriate for all grade levels and content areas.

You may be wondering, "Why yet another technology integration tool?" The CEO Forum, *School Technology and Readiness Report* (2001) states that technology can have the greatest impact when integrated into the curriculum to achieve clear, measurable educational goals. Certainly, school districts have embraced this position as evidenced by the infusion of instructional technology resources that are currently available. Within the last twenty years, it is now commonplace to see in educational settings productivity software that includes word processing, spreadsheet creation, email, database, multimedia, and Internet browsing. These resources are all acquired with the implicit objective to further support student understanding and increase achievement of educational objectives

The requirement of high-stakes mandatory state testing, the federal No Child Left Behind Act (NCLB), time constraints, and training issues have teachers struggling to integrate the abundance of available technologies into their instructional day. It is still not unusual to walk through many schools and see state-of-the-art computers being underutilized and the supporting resources sitting idly on shelves collecting dust. Many teachers are often so overwhelmed by the magnitude of all that is required of them that they cannot conceive where to begin to "add another thing." Too often they simply elect not to use the invaluable technological tools that are available to the detriment of today's students who are very attuned to learning in such a modality. Teachers rationalize the under-use of instructional technology with comments like, "People have been educated without technology for centuries."

While most educators are comfortable using word processing and email for their own productivity, the real technology challenge for most teachers is incorporating a strategy to effectively and meaningfully integrate all of their available technologies into their instructional program to bolster student achievement.

5W / 5E, continued

For those teachers who want to use technology in their program, there is that ever pressing question, should instruction drive technology or vice versa? Should a teacher examine his instructional goals and then determine the technology, or does one look at the available technology and then decide how to apply into the instructional program? Are there times when both approaches are appropriate? As teachers use the 5W/5E planning tool, it becomes apparent that the instructional goal must be the foremost consideration when applying instructional technology.

The 5W/5E model

We are all familiar with the 5W's: Who, What, Where, When, and Why. We begin by asking the 5 W's as they apply to curriculum and integrated technology.

Who?

Who is being targeted for the integration of technology?

- Whole group?
- Flexible group?
- Students with differentiated needs?

What?

What is the instructional goal?
What technologies are available?
What technologies would the educator like to use?

Where?

Where will the technology be delivered?

- In the classroom using a teacher presentation system?
- In the classroom computer center?
- In the computer lab?
- With resource/peer support?

When?

When will the technology integration take place?

- As a warm-up or wrap-up activity?
- After a particular lesson?

What is the timeline?

Why?

The most important question that the teacher needs to ask herself is, "Why am I using technology?"

5W / 5E, continued

Let me cite an example of the value of teachers being able to articulate their reason for using instructional technology. As a technology trainer, I was listening to one of our very fine teachers sharing an integrated technology lesson that she developed. When asked why she designed that lesson, she looked quizzically and responded, "Because we were told to develop a lesson using technology for our next assignment." After listening to my 5W/5E presentation, she remarked, "Now I know why I developed that lesson, I wanted to evaluate my students understanding of the social studies vocabulary….thanks for giving me the words." I feel as though this teacher was pleasantly reminded that she did in fact have an educational purpose before she had a technology goal.

Why is the teacher using technology to address educational objectives?

To answer this question, we'll use the Biological Science Curriculum Study's (2004) "5E model." This model emphasizes engagement, exploration, explanation, elaboration, and evaluation.

Engage

Is the goal to engage students in the topic? For example, a teacher may use an interactive website as a warm-up activity to begin a unit on fractions, and then continue the lesson with manipulatives and/or text resources .

Explore

Is the goal to provide the students the opportunity to further explore the concept? An instructor may assign students a particular CD ROM or website, or she may utilize designated templates.

Explain

How about using technology to explain an objective? Technology may be used to further clarify the concept and define relevant vocabulary.

Elaborate

Could the most appropriate use of technology be to provide students with the opportunity to elaborate and build on their understanding of the concept by applying it to new situations? This is especially true when it is evident that students have already mastered a particular baseline goal and are in need of a more differentiated, higher-level thinking, educationally-related experience.

Evaluate

Finally, would the teacher's intent be to assign students technology based activities that will help them and the teacher to evaluate their understanding of the concept? For example, a teacher may direct students to open a paint program and show her that that they understand that 9 divided by 12 equals 75%.

5W / 5E, continued

Using Biological Sciences Curriculum Study's (2004) 5E constructivist model, teachers are better able to articulate their educational purpose for their selection and defend the appropriateness of the chosen technology. Another advantage of incorporating the use of the 5E model is best summarized by Moersch (2002), who says, "The 5E model provides teachers with a simple formula for designing quality experiential instructional units without the need to study brain hemispheres, research elaborate pedagogical theories, or pay consultants healthy ransoms to part with their personal models" (p. 101).

The 5-E model is based on a constructivist approach of learning (Trowbridge & Bybee, 1990). The theory of constructivism encourages educators to focus on making connections between facts that are required and tailoring instructional strategies that allow students to actively construct meaning and foster understanding of objectives. Effective use of technology is the perfect instrument to achieve this goal.

During the past year, I have discussed the 5W/5E concept with countless colleagues and the response has been virtually unanimous: "This makes so much sense," "It is so logical, understandable and doable." Many School Based Technology Specialists (SBTS) with whom I have had the pleasure of working are planning to use the 5W/5E framework to organize technological resources for their teachers during the upcoming school year. The appendix includes an outline and sample of how to use the 5W/5E Technology Integration Tool. The next time you are planning to use technology within your instructional program, try using the 5W/5E model.

Many resources used in the examples are web-based and can be found at the free bookmarking website, Portaportal (see "Article Resource Links").

References

Biological Sciences Curriculum Study. (2004). Retrieved December 21, 2004, from http://www.bscs.org

CEO Forum on Education & Technology. (2001). *School Technology and Readiness Report. Key Building Blocks for Student Achievement in the 21st Century: Assessment, Alignments, Accountability, Access, Analysis*. Washington, DC: CEO Forum.

Moersch, C. (2002). *Beyond Hardware: Using Existing Technology to Promote Higher-Level Thinking*. Eugene, OR: International Society for Technology in Education.

Trowbridge, L. W., & Bybee, R. W. (1990). *Becoming a Secondary School Science Teacher* (5th ed.). Columbus, OH: Merrill Publishing Company.

5W / 5E, continued

Article Resource Links

Biological Sciences Curriculum Study: http://www.bscs.org

Examples on Portaportal (guest id = solmath): http://www.portaportal.com

About the Author

Wanda Walters is currently an FCPS Instructional Technology Project Manager. She was an elementary classroom teacher for seventeen years in Fairfax County Public Schools, Fairfax, Va. In 1991, Ms. Walters served in the newly created position of science/technology resource teacher at the central level with primary responsibilities to facilitate the seamless integration of technology into the elementary science curriculum and assist with the planning, designing, and teacher training in the use of basic technology productivity skills. For over a decade, Ms. Walters was also an FCPS instructional technology trainer for enterprise initiatives. Ms. Walters can be contacted at Wanda.Walters@fcps.edu.

Special thanks to FCPS Elementary School Base Technology Specialists (SBTS), and most especially, thanks to Regina King (Laurel Ridge ES).

5W / 5E, Appendix A *(W. Walters)*

5W / 5E Planning Tool Outline

What are you teaching (instructional goals…e.g., specific educational objectives);

What are the available technological resources?

What resources would you like to use?
For example:
Templates
Specific titled CD ROMs
Productivity Software
- Microsoft office suite™ (Word, PPT, Excel), AppleWorks™, etc.
- Kidspiration/Inspiration™
- Response System Technologly (e.g., LearnStar, Qwizdom)

Windows On Science™ (can be used across the curriculum)
Resources identified in the FCPS 24/7 online Instructional Gateways
Other

Who (Targeted Audience)

For example:
Whole Group
Flexible Groups
Rotation Teams
Students with Differentiated Needs (e.g., special ed, ESOL, GT, etc)
Other

When:
After examining the curriculum guides, text books, manipulates, etc…plan where the technology integration will best fit.

Establish timelines

Why are you using integrated technology with the targeted population**?**

Engage
Explore
Explain
Elaborate
Evaluate

Where/How will the technology infusion take place to address the instructional objective(s)?

Teacher using presentation system
Classroom computer center using rotation system
Computer Lab
With Parent Aide
With Peer Tutor
Other

5W / 5E, Appendix B *(W. Walters)*

Sample 5W/5E Technology Integration Model

(Virginia Standard of Learning - SOL 5.2a)

Grade: 5 **Content Area:** Math

What is your instructional goal (e.g., Standards of Learning objective)?

POS objective NCT 5 and NCT 6/ SOL Objective 5.2 - The student will:

1. recognize and name commonly used fractions (halves, fourths, fifths, eighths, and tenths) in their equivalent decimal form and vice versa; and
2. order a given set of fractions and decimals from least to greatest. Fractions will include like and unlike denominators limited to 12 or less, and mixed numbers.

Sample	A	B	C	D
WHO	Whole Group	Special Needs Inclusion Student	Whole group	Students who may already understand the correlation between fractions
WHY	Engage and Explore	Explore (Matching halves)	Elaborate	Evaluate
WHAT	Website http://illuminations.nctm.org/mathlets/fractionpie/index.html	Website http://www.abc.net.au/countusin/games/game13.htm	Website (recipe using fractions)… http://mathforum.org/paths/fractions/frac.recipe.html	Using a Paint program, show me you understand that 9 divided by 12 = 75%
WHEN	Demo/Warm-up at the beginning of lesson	While others are working at their desks	After we complete page XYZ Tuesday Morning	Rotation during Center Time
WHERE	Using teacher presentation station	Resource Staff/Parent Aide/Peer Tutor	In the pod area and make the recipe in teams	Classroom

Technology in Education
Virginia Society for VSTE
www.vste.org

5W / 5E, Appendix C *(W. Walters)*

5W / 5E Planning for Technology Integration Template

Grade_____ Content Area_____

What is your instructional goal (e.g., Standards of Learning objective)?

Who: Who is your targeted audience? Whole group? Flexible group? Inclusion student? G&T student? Other?

Why: For more information log on to *http://www.bscs.org* [Engage, Explore, Explain, Elaborate, Evaluate]

What: What resources are available to you? What resources would you like to use?

When: When are you going to integrate the technology into your instruction? Demo at beginning of lesson? After xyz page? After using xyz manipulates? Other?

Where: Where will the technology infusion take place? Classroom Demo from Teacher Presentation Station? Computer Lab? With Special Ed Resource Teacher? Peer Tutor? Computer Station in Classroom? Other?

WHO	
WHY	
WHAT	
WHEN	
WHERE	