

“Grounded” Technology Integration Using Physical Education Learning Activity Types

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Physical educators today are expected to have a deep understanding of how educational technologies can assist students in linking specific physical fitness knowledge and concepts to measuring, interpreting, and prescribing appropriate fitness activities. Using digital tools such as pedometers, heart rate monitors, and exergames in physical education classes can provide creative and motivating ways to engage in and monitor physical activity (NASPE, 2009). How can we best choose and integrate these tools into physical education teaching?

Technology Integration via Learning Activity Types

One way to help teachers integrate technology effectively is to focus upon instructional planning. Research tells us that teachers plan instruction primarily according to students’ curriculum-based learning needs. They typically plan according to content-based *learning activities*. We recommend matching technology integration strategies to how teachers plan, rather than asking teachers to design instruction around a particular technological tool. More about this curriculum-based, pedagogical approach to technology integration can be found in the October 2009 issue of *L&L*. Social studies, mathematics, world languages, secondary English, science, and K-6 literacy learning activity types were described in the October 2009 through April 2010 issues.

To assist teachers with technology integration, we offer *comprehensive sets of learning activity types* (LATs) in ten curriculum areas, with specific educational technologies suggested that can best support each learning activity described. The LATs are organized into subcategories, so that each content-based collection of learning activity types forms an informal taxonomy. Once teachers have determined the learning goals for a particular lesson, project, or unit, they select and combine activity types in the taxonomy that will best help students to achieve the designated goals. Since appropriate educational technologies are recommended for each learning activity type, choosing the activities helps teachers to subsequently select technologies to support the plan in practical and usable ways. We think of this as “grounded” technology integration, since it is based in content, pedagogy, and how teachers plan instruction.

Physical Education Learning Activity Types

We have identified 56 physical education learning activity types to date. The complete physical education taxonomy is available on the Learning Activity Types site. Sample activity types with brief descriptions are presented below, along with illustrative (not exhaustive) lists of technologies that may be used to support each. We recommend planning each lesson, project, or unit to include more than one activity from both cognitive and psychomotor categories.

The physical education taxonomy incorporates both *physical fitness* and *motor skills development* activity categories. Physical fitness activity types are sub-divided into those that

help students build *cognitive understanding* (as either *knowledge development* or *application*) or *psychomotor development* (as either *practice* or *application*). The *motor skills development* section is also subdivided into *cognitive* and *psychomotor* categories.

Physical Fitness Activity Types

Physical fitness is a physical state of well-being that helps people to perform daily activities with vigor, reduces the risk of health problems related to lack of exercise, and provides a fitness base for participation in a variety of physical activities. Twenty-one of the 56 physical education activity types emphasize physical fitness-related *cognitive knowledge development* and *application*. Two examples appear below.

Sample Knowledge Development Activity Type	Brief Description	Possible Technologies
Create a representation	Students develop a representation of a physical fitness concept or process (in text, images, presentation, concept map, etc.)	Drawing software, concept mapping software, presentation software, video camera

Sample Knowledge Application Activity Type	Brief Description	Possible Technologies
Select a health-related physical fitness test	Students learn the correct form(s) for and choose relevant test(s) to measure a physical fitness component (e.g., muscular strength, agility, coordination)	e-books, Web sites, virtual demonstrations

Psychomotor learning activity types help learners to practice and apply health and skill-related physical exercises to develop and maintain a healthy lifestyle. Seven physical fitness activity types involve the *practice* and *application of psychomotor skills*. Two examples appear below.

Sample Psychomotor Practice Activity Type	Brief Description	Possible Technologies
Evaluate and revise physical performance	Students review, consider, and make changes to an exercise performance based upon feedback from teachers and/or peers	Exergames, digital video camera

Sample Psychomotor Application Activity Type	Brief Description	Possible Technologies
Create an exercise or exercise routine	Students create a series of movements to address a particular fitness concept and perform them	Digital camera, digital video camera, presentation software, Web sites, Web authoring software

Motor Skills Development Activity Types

Motor skill development activity types reflect three stages of motor skill acquisition: understanding, practice, and automatic learning. Combining and sequencing these activities can help students to understand, acquire, practice, and perform motor skills automatically. Nineteen

of the 56 physical education activity types emphasize motor skills-related *cognitive knowledge development* and *application*. Two examples appear below.

Sample Knowledge Development Activity Type	Brief Description	Possible Technologies
Plan for collaboration in a game situation	Students develop a strategy or game plan to address specific goals	Concept mapping software, word processor, spreadsheet

Sample Knowledge Application Activity Type	Brief Description	Possible Technologies
Do movement analysis	Students assess movement patterns and/techniques to improve performance	Movement analysis software

The nine motor skill development-related psychomotor learning activity types focus on *practicing* and applying motor skills that lead to their *automatic performance*. Two examples appear below.

Sample Psychomotor Practice Activity Type	Brief Description	Possible Technologies
Refine the performance of each part of the motor skill	Students practice parts of a motor skill separately. (e.g., a spike in volleyball can be segmented into running, stepping, jumping and striking).	Digital video camera, movement analysis software, Exergames

Sample Psychomotor Automatic Performance Activity Type	Brief Description	Possible Technologies
Demonstrate/teach the mechanics of a skill	Students share their understanding of a game concept or principle	Digital camera, digital video camera, presentation software, realtime data collection tools

In all physical education activity types, affective learning outcomes are linked to explicit cognitive and psychomotor goals. Whether affective learning is a component or the central focus of instruction, specific instructional strategies should be employed to ensure its inclusion.

Combining Activity Types: An Example

The following example illustrates how multiple physical education activity types (*italicized*) might be combined and sequenced in a unit focused upon cardiovascular endurance. The teacher begins by *posing a series of questions* (e.g. What is cardiovascular endurance? How do we measure cardiovascular endurance?) to trigger students' curiosity. The students then work with partners to *explore the concept* of cardiovascular endurance using electronic texts, learning how to calculate heart and target heart rate, and to measure cardiovascular endurance. They then *organize their ideas* using concept-mapping software, and *select the appropriate tool and test* to generate data to answer fitness-related questions.

The students can decide, for example, to measure heart rate during a 1-mile walk using a heart rate monitor as a *realtime data collection* tool. Prior to collecting the data, the students *review a*

Web-based virtual demonstration on how to *administer the 1-mile walk test* and *how to use the equipment*. They then *practice using the equipment* by entering sample target heart rates and *collecting data* by *performing a series of movements* to elevate their heart rates.

Once the students are ready to apply what they have practiced, they begin *gathering data*. They complete the 1-mile walk, then download the data generated from monitors and organize it for statistical analysis using a spreadsheet. They then *compare, contrast, and interpret the results* using standardized heart rate criteria and assessment software such as “FITNESSGRAM.” Based upon their findings, each group *determines physical fitness goals* to improve and/or maintain cardiovascular endurance. They then *create and record an exercise routine* to address selected fitness goals using a flip camera, *presenting their findings* using presentation software.

Invitation

Given continual changes in curricula and available resources, the range of physical education learning activity types, as well as the technologies that can support each, will change over time. We invite you to help us to expand, refine, and revise this activity types taxonomy by visiting the Activity Types site and sharing your ideas via the contact link posted there.

References

Learning Activity Types Wiki: <http://activitytypes.wmwikis.net/>

National Association for Sport and Physical Education. (2009). *Appropriate use of instructional technology in physical education*. Reston, VA: Author.

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