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Towards a New Culture in Physical Education with the Universal Design for Learning

Carmelo MUNAFO

International PhD in Methodologies of Teaching, Special Pedagogy and Educational
Research, Università Foro Italico di Roma, ITALY

Email: Carmelomunaf98@gmail.com

Abstract

The traditional “one-size-fits-all” approach to curriculum tends to ignore the individual diversity in learning strengths, challenges, and interests creating barriers to learning and inclusion in Physical Education.

The Universal design for learning (UDL), based on neuroscience research and the work of educational psychologist Lev Vygotsky, is meaningful framework increasingly evident in discussions of approaches to enhance educational access for all students. The purpose of this article is to explore and analyze the Universal Design for learning (UDL) to build a didactic plan that ensures the active participation and success in learning of all students in Physical Education regardless of their ability.

Keywords: Universal design for learning, inclusion, physical education

Introduction

In learning environments, such as schools and universities, individual variability is the norm, not the exception. When curricula are designed to meet the needs of an imaginary “average”, they do not address the reality learner variability. Learners who are “in the margins”, such as learners who are gifted and talented or with disabilities, are particularly vulnerable. As well as learning barriers also exist in Physical Education (Cordoba, 2014; Rios, 2009). To make curricula more accessible and inclusive, UDL highlights guidelines that can “reduce barriers, as well as optimize levels of challenge and support, to meet the needs of all learners from the start” (CAST, 2011, 4). UDL is born in the United States in the years '80 to design buildings and environments accessible to the greatest extent possible by everyone, across the spectrum of functional capabilities. Later these concepts were extended successfully to the education field and UDL was considered a scientifically valid framework for guiding educational practices (Department of Education USA, 2008), stimulating to address the “limitations” of the learning environment rather than just student’s “limitations”.

Epistemological framework

The Universal Design for Learning (UDL) was born in the United States in the years '80 by an American architect to design buildings and environments that are accessible and usable to the greatest extent possible by everyone, regardless of their age, ability, or status in life, across the spectrum of functional capabilities. Later these concepts were extended successfully to the education field and UDL was considered a scientifically valid framework for guiding educational practices (Department of Education U.S.A, 2008). In learning environments, such as schools and universities, individual variability is the norm, not the exception. When curricula are designed to meet the needs of an imaginary “average”, they do not address the reality learner variability. Therefore students who are “in the margins”, such as students who are gifted and talented or with disabilities, are particularly vulnerable. Just as a 12-story building with no ramp or elevator would be inaccessible to a wheelchair user, many traditional educational curricula have learning barriers that do not support students with different learning needs; learning barriers also exist in Physical Education (Cordoba, 2014; Rios, 2009). To make curricula more accessible and inclusive, UDL highlights guidelines that can help educators develop flexible curricula to “reduce barriers, as well as optimize levels of challenge and support, to meet the needs of all learners from the start” (CAST, 2011,p. 4). In this direction four highly interrelated components comprise a UDL curriculum: goals, methods, materials, and assessments.

Goals are often described as learning expectations. They represent the knowledge, concepts, and competence that all students should master. Within the UDL framework, goals themselves are articulated in a way that acknowledges learner variability and differentiates goals from means. These qualities enable teachers of UDL curricula to offer more options and alternatives—varied pathways, tools and strategies for reaching mastery. Whereas traditional curricula focus on content or performance goals, a UDL curriculum focuses on developing “expert learners.” This sets higher expectations, reachable by every learner.

Methods are generally defined as the instructional decisions, approaches, procedures that expert teachers use to enhance learning of the students. Expert teachers apply evidence-based methods and differentiate those methods according to the goal of instruction. UDL curricula facilitate further differentiation of methods, based on learner variability in the context of the task, learner’s social/emotional resources, and the classroom climate. Flexible and varied, UDL methods are adjusted based on continual monitoring of learner progress.

Materials are usually seen as the media used to present learning content and what the learner uses to demonstrate knowledge. Within the UDL framework, the hallmark of materials is their variability and flexibility. UDL materials offer tools and supports needed to access, analyze, organize, synthesize, and demonstrate understanding in varied ways including choice of content where appropriate, varied levels of support and challenge, and options for recruiting and sustaining interest and motivation.

Assessment is described as the process of gathering information about a learning activity of students using a variety of methods and materials in order to determine learners' knowledge, skills, and motivation for the purpose of making informed educational decisions. The goal is to ensure that they are comprehensive and articulate enough to guide instruction for all learners.

Neuroscientific contribution

The UDL framework, is based on neuroscience research and the work of educational psychologist Lev Vygotsky (Rose, 2001). According to brain research conducted by Meyer et al.(2002/2014) when a person carries out any learning task (read, write, etc.) can be identified 3 neural networks involved in the learning process (fig.1):

A- The Knowledge Network active on the “what we learn”

B- The Network of Active Strategy regarding “how we learn”

C- Affective Networks regarding “because we learn”

It concerns the involvement in learning and is active when involved emotional aspects related to learning.




Three Learning Networks		
Recognition	Strategic	Affective
What	How	Why
		
Present information and content in different ways	Differentiate the ways that students can express what they know	Stimulate interest and motivation for learning

Figure 1. Three Learning Networks

In relation to these neuroscientific aspects emerge 3 key principles in the application of UDL:

- Provide Multiple Means of Representation
- Provide Multiple Means of Action and Expression
- Provide Multiple Means of Engagement

I. Provide Multiple means of representation

Learners differ in the ways that they perceive and comprehend information that is presented to them. For example, students with sensory disabilities (blindness or deafness), learning disabilities, language or cultural diversity may grasp information quicker or more efficiently through visual, auditory, tactile perception means (Lieberman & Houston-Wilson, 2002; Vargas-Tonsing et al., 2008; Vargas et al., 2012). Learning occurs when multiple representations are used, because it allows students to make connections within, as well as between, concepts. Therefore, to reduce barriers to learning is important to present key-information through different modalities:

Presentation of verbal information

Presentation of information through sign language

Presentation of visual information: images, animations, video, colors, graphic organizers: maps.

Visual markers can help athletes identify the physical boundaries of their playing area (outlined with cones), where their assigned positions are (identified with cones or poly spots), and role assignments during scrimmages and tactical drills (asking athletes to wear pinnies).

Presentation of information through the tactile and motor perception (Munafò, 2016)

For example two-dimensional relief map built by a group of students that included a boy with visual impairment during the orienteering course in the gym (fig.2).

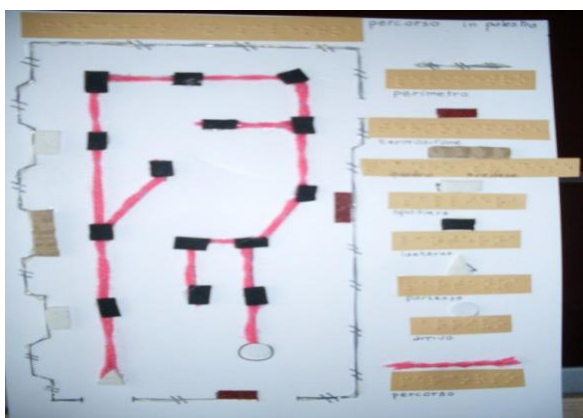


Figure 2. Map a two-dimensional relief

Handouts

Distributing handouts (in multiple languages) during practice can support students/athletes who learn best by reading, who need extra time to process information, or who missed information during practice. Handouts should include summaries of the skills covered and their steps, cue words and relevant vocabulary used in practice, and clearly labeled diagrams

for new drills or plays. Sometimes, the coach can also put a picture of professional players on the handout and explains what makes that athlete great, during the movement.

Organization of space and time:

- Station/space Activities.
Station activities where students rotate can provide practice time for a variety of skills and for small groups of athletes to receive instruction from a coach (Vargas-Tonsing et al., 2008; Beyer et al., 2009).
- Allow time for free exploration of skills
this is especially useful for young athletes who have been newly introduced to fundamental concepts like dribbling, shooting, catching, and throwing. Giving athletes time to explore skills on their own helps their brain to connect content knowledge with motor action.
- Spiral curriculum
a curriculum that starts from basic concepts known by the student and periodically revisited with more complexity to allow all students to progress in learning.

II. Provide Multiple Means of Action and Expression

Learners differ in the ways that they can “navigate” a learning environment and express what they know. It should also be recognized that action and expression require a great deal of strategy, practice, and organization, and this is another area in which learners can differ. In this case the coach shows her young athletes how to correctly throw a ball and asks them to practice throwing with a partner: peer tutoring/Peer demonstration. Through this scenario, it would be possible not only remember the steps of a launch, but it might also help other athletes who have lost important details during the coach’s demonstration (Beyer et al., 2009).

Guidelines

- Use social media and interactive web tools (discussion forums, chats, web design, comic strips, animation presentations)
- Ask student/athletes to demonstrate mastery of concepts through physical, verbal, and written mean: motor action, musical choreography, illustration, storyboards, comics, video.
- Solve problems using a variety of strategies
- “Start and Stop” Scrimmages
These can be used to collectively discuss technical and tactical concepts and to provide athletes with immediate feedback about their decision-making skills. The coach can think out loud in front of athletes to let them hear his or her thought processes (Vargas et al., 2012). During these scrimmages, the game is paused when the coach would like to highlight a technical skill, tactical decision, or re-try a play using models decision-making, for example, “I have the ball and there are two defenders in front of me. The sideline is to my left, so I can’t dribble that way. I can try to beat the two defenders, or I can pass the ball either behind me or to my right.”
- White Boards

The use of white boards can help athletes clarify thoughts or questions. For example a student/ athlete who needs to ask for the position on the playing field..

- Provide differentiated feedback for each athlete.
If the student is a visual learner, draw him a picture of where he needs to stand during a corner kick; if he learns best by “doing” can move her arms and legs into the desired position while correcting her batting stance.
- Instead of telling athletes what they are doing incorrectly; ask them open-ended questions to encourage reflection and critical thinking.

III. Provide Multiple Means of Engagement

Affect represents a crucial element to learning, and learners differ markedly in the ways in which they can be engaged or motivated to learn. There are a variety of sources that can influence individual variation in affect including neurology, culture, personal relevance, subjectivity, and background knowledge, along with a variety of other factors. Some learners are highly engaged by spontaneity and novelty while other are disengaged, even frightened, by those aspects, preferring strict routine. Some learners might like to work alone, while others prefer to work with their peers. In reality, there is not one means of engagement that will be optimal for all learners in all contexts; providing multiple options for engagement is essential. In an instructional environment, it is not so important the objective of learning itself but offer the student the choices relating to the "how" can be reached that objective with which tools or supports available. Offering learners choices can develop self-determination, pride in accomplishment, and increase the degree to which they feel connected to their learning. However, it is important to note that individuals differ in how much and what kind of choices they prefer to have. It is therefore not enough to simply provide choice. In this direction the right kind of choice and level of independence must be optimized to ensure engagement.

Guidelines

Optimize individual choice and autonomy:

- Provide learners with as much discretion and autonomy as possible on some basic aspects:
 - The level of perceived challenge
 - The type of rewards or recognition available
 - The context or content used for practicing and assessing skills
 - The tools used for information gathering or production
 - The sequence or timing for completion of motor tasks
 - Students participation in the design of classroom activities and academic tasks
- Know athletes’ interests and optimize relevance, value, and authenticity
Individuals are engaged by information and activities that are relevant and valuable to their interests and goals. In this direction, one of the most important ways that teachers recruit interest is to highlight the utility and relevance through authentic, meaningful activities. Vary activities and sources of information so that they can be personalized and contextualized to learners’ lives:
 - Culturally relevant and responsive
 - Socially relevant
 - Age and ability appropriate
 - Appropriate for diversity cultural, ethnic, and gender groups.

- Provide tasks that allow for active participation, exploration, experimentation and self-reflection
- Include activities that foster the use of imagination to solve novel and relevant problems, or make sense of complex ideas in creative ways.

Create a safe and predictable environment

Structured environment can help students/athletes to be included in all aspects of the practice through routine, calendars, schedules, visible timer, increasing the predictability of daily activities and transitions (Beyer et al., 2009; Vargas et al., 2012). For example Joanna, an athlete with ADHD, is never nervous when she goes to physical teacher's basketball practices because she always knows what is going to happen next, where equipment is located, what athletes can do if they arrive early to practice, and the order of practice activities.

A safe environment can encourage appropriate risk-taking (Lieberman, Lytle, & Clarcq, 2008). Athletes can be encouraged to experiment with newly learned skills during scrimmages and formal competitions when the coach praises their attempts at employing new skills (versus only praising successful outcomes) and sets goals for them to use new skills.

Provide options for sustaining effort and persistence

Many kinds of learning, particularly the learning of skills and strategies, require sustained attention and effort. When motivated to do so, many learners can regulate their attention and affect in order to sustain the effort and concentration that such learning will require. However, learners differ considerably in their ability to self-regulate in this way. Their diversities reflect disparities in their initial motivation, their capacity and skills for self-regulation, their susceptibility to contextual interference, and so forth. A key instructional goal is to build the individual skills in self-regulation and self-determination. In the meantime, the external environment must provide options to accessibility by supporting learners who differ in initial motivation and self-regulation skills.

In this direction it is important:

- Encourage division of long-term goals into short-term objectives
- Differentiate the degree of difficulty or complexity within which core activities can be completed
- Provide alternatives in the permissible tools
- Vary the degrees of freedom during physical activities
- Emphasize process, personal effort, improvement as alternatives to external evaluation and competition.
- Engage learners in assessment discussions of what constitutes excellence and generate relevant examples that connect to their cultural background and interests.

Build a Community of Practice

This can be achieved by helping athletes to learn from one another, strengthen relationships with teammates, and think critically about sport skills (Wenger, 1998). To build a community of practice, coaches can also encourage athletes to explain sport skills and concepts to one another, share "tips and tricks" with teammates, and share ideas during team meeting and debriefs. In this direction the researchers have found that Cooperative Learning can have positive effects on academic achievement, physical fitness, self-esteem, active learning, social interactions, the ability to work collaboratively with others and equal opportunities (Slavin,

1996; Smith et al.,1997; Dyson 2002; De Anna, 2009; Dyson & Casey,2012;Dyson et al.,2012; Goodyear, 2012)

Increase mastery-oriented feedback

The *type* of feedback is also critical in helping learners to sustain the motivation and effort essential to learning. Mastery-oriented feedback is the type of feedback that guides learners toward mastery rather than a fixed notion of performance or compliance. It also emphasizes the role of effort and practice rather than “intelligence” or inherent “ability” as an important factor in guiding learners toward successful long-term habits and learning practices. Below are some guidelines based to the learning process rather than “the product”:

- Provide various types of feedback (verbal, video analysis, written rubrics) and ask athletes to assess themselves.
- Provide feedback that encourages perseverance, focuses on development of efficacy and self-awareness, and the use of specific supports and strategies in the face of challenge
- Provide feedback that emphasizes effort, improvement, and achieving a standard rather than on relative performance
- Provide feedback that is substantive and informative rather than comparative or competitive
- Reduce feedback when increases a student's motor and social abilities/competence.

Develop self-assessment and reflection

One of the key factors in learners losing motivation is their inability to recognize their own progress. In this direction is important, moreover that learners have multiple models of different self-assessment techniques so that they can identify, and choose, ones that are optimal: self assessment forms, evaluation group forms, group discussion.

Conclusion

The Universal Design for Learning approach encourages us to look at and work from a different perspective, it considers a “disabling environment” instead of “disabilities”. It highlights the fact that so-called disability always reflects mismatches between environment and the individual.

In this light it's possible encourage solutions that address the limitations of the learning environment rather than the limitations of the student, making the learner less of a problem, and more a part of diversity. In particular, modified to fit inside a sport environment, UDL guidelines can help community-based physical education teachers to develop practice plans and coaching methods that support the learning needs of a broad spectrum of learners. Additional research is needed in the field of physical activities and sports to validate the impact of UDL approach on students and identify the most efficient means to expand opportunities for access, participation, and progress in the general education curriculum for all students.

Conflict of Interest

The author has not declared any conflicts of interest.

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