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Investigating the Assumptions of Pedagogy

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The purpose of this article is to discuss the relationship between learning theories and teaching methodology from the perspective of the researcher and the teacher. All teaching methodologies have their roots in particular learning theories. Teaching methodologies are discussed in terms of the learning theories upon which they are founded. Learning theories are discussed in terms of their assumptions and the issues which divide them. A case is made that researchers need to validate the treatment not only in terms of the methodology the teacher uses but the learning process experienced by the learner. If it is the process which produces particular kinds of learning, then teachers need to be knowledgeable about the assumed learning processes of a teaching method and be able to observe for and teach for that process.

Recent literature and research in physical education pedagogy has seen a resurgence of the methods "wars." By this I mean that advocates for one type of method of teaching attempt to show that their way of teaching is far better than traditional or other methods of teaching. The most recent conflict in the literature has positioned more traditional, usually meant to imply more direct, styles of teaching against those primarily based on more constructivist and socially based applications of learning theories (Allison & Barrett, 2000; Chandler & Mitchell, 1991; Turner & Martinek, 1995). The most obvious example of this trend is the literature that surrounds the value of a games for understanding approach to teaching sport and sport education and, in a broader context, advocacy for "constructivist teaching" (Almond, 1986; Grehaigne & Godbout, 1995; Hastie, 1996; Metzler, 1999; Siedentop, 1994).

For those of us who were practicing physical educators in the sixties, the methods discussions in the literature are reminiscent of those surrounding movement education and the introduction of Mosston's styles of teaching (Mosston, 1966). During this time period in our history, more cognitive styles of teaching (see Rink, 1998) directly challenged the exclusive use of direct teaching as the "best" and only way to teach physical education. The movement education of this time carried with it a set of assumptions about how students best learn and, more importantly, claims about what students learn if you teach this way (Bilbrough & Jones, 1963; Logsdon, Barrett, Broer, Ammons, & Roberton, 1977; Mauldon & Redfern, 1969). Like our contemporaries in the more general field of education, issues of how to teach were primarily put on an "I believe" basis more appropriately reserved for discussions of philosophy than investigations into how to teach for

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particular outcomes. The notion of philosophy is used here to imply both issues related to serious discussions of ontology and epistemology related to pedagogical concerns, as well as the less formal and less thought through use of the term meaning a more ideological perspective and disposition toward a particular method. In either case, it is not my intent to pursue a discussion of the philosophical bases of teaching methodologies. For a good discussion of the issues and problems of making teaching methodology philosophy, see the recent ASCD publication *Perceiving, Behaving and Becoming Revisited* (ASCD, 1999).

Literature on movement education was often accompanied by a recipe for teaching that became commandments for followers. As an undergraduate and beginning teacher I personally became captivated by the notions that I could contribute in such a broad way to student development. I supported the psychology that gave birth to a lot of pedagogy of this time through the works of Carl Rogers (1969), Abraham Maslow (1962), and Arthur Combs (1959), usually referred to as "Third Force Psychology" (Goble, 1970). My early career as a movement education teacher was characterized by an attempt, well founded or not, never to tell a student how to do anything, but to let the student discover for themselves the best way. I was a missionary for the methodology.

The pursuit of a scientific orientation to looking at teaching and teaching methodology would come later (for an historical review of research on teaching for this period, see Shulman, 1986), although red flags were being sent up by several physical educators in the new field of motor learning (Locke, 1969) and in England where movement education was well established (McIntosh, 1972). Early pioneers in motor learning were just beginning to identify the very specific nature of learning, the difficulty of teaching for transfer, and the almost impossible task of doing "methods" studies (Cratty, 1967, Singer, 1980; Wickstrom, 1970). The point of this historical review, in a time when we are faced with similar appeals to wholesale adoption of particular teaching methods, is to suggest that we may learn something from the past.

From my perspective, one of the most important things to understand for those of us involved in pedagogy is that all teaching methodology makes some assumptions about how students learn. A major assumption of "exploration" and "discovery" teaching was that the student would be engaged creatively in a way that would result in better movement responses that were more adaptable (transferable) to more real world use of the responses (Logsdon et. al., 1977; Stanley, 1969). Also inherent in such ideas was the notion that more indirect styles of teaching would have a great advantage over more direct styles of teaching because the "whole" learner would be involved. For the physical education teacher this usually meant more cognitive and affective involvement. What was missing in any discussions about the viability of movement education and problem solving methodologies by advocates was any attention to the fidelity of the assumptions about what children would learn and how they would learn it. What was missing from the practitioner's perspective was any attention to verifying that the intended student processes were in fact taking place.

Oddly enough it was a masters thesis I did in the later part of the sixties (Rink, 1969) that initially caused me to question what was really happening. Four first grade boys were followed over a 6-week period in a class taught using a "movement education approach." Two of the boys were selected by both the classroom teacher and the physical educator because they were "risk takers" and

more creative. Two of the boys were more conservative in their interactions and responses. The unit of analysis was the teacher task and the student response(s) to that task. The independent variable was the amount of freedom the student had in each movement task. Task freedom to respond was determined by a word by word analysis of the potential of each task for varied responses, either because of the nature of the task itself (e.g., the difference between the possibilities in a task involving running and a task involving balancing), the number of qualifiers the teacher put on the task (e.g., slowly, three parts the body), or because of the number of responses the teacher asked for (e.g., "how many different ways can you . . . ?). The dependent variables were the number of different responses each student produced to each task and the accuracy of the response relative to what the teacher asked. The results of the study showed that the more creative students did indeed produce more varied responses. The less creative students primarily looked around to see what others were doing and largely "copied" or came up with one or two responses that they stayed with during the time given for the task. The more creative students also produced a much larger number of incorrect responses (i.e., any responses that were not within the framework of what the teacher asked a student to do).

What I learned from this particular investigation was important. I did not learn that movement education didn't work. I learned that as a teacher I cannot assume that particular learning processes are taking place because a particular teaching method has the potential for that process to take place, particularly across all students. The idea of inferring learning (relatively permanent changes in behavior) from observations of behavior has always been problematic. The idea of inferring a particular learning process because a particular methodology is being used is even more difficult and more problematic.

What we see currently in education and in physical education is another reform effort aimed at shifting the focus of educational methodology to the learner, this time based on constructivist learning theory (Prawet, 1995). Cobb (1994) in a discussion of constructivism in math and science education commented:

> Pedagogies derived from constructivist [learning theory] frequently involve a collection of questionable claims that sanctify the student at the expense of mathematical and scientific ways of knowing. In such accounts the teacher's role is typically characterized as that of facilitating student's investigations and explorations.
>
> Romantic views of this type arise in part because a maxim about learning, namely that students construct their mathematical and scientific ways of knowing, is interpreted as a direct instructional recommendation. (p. 4)

The same notions of political correctness surround much of the current literature in physical education, which is even more interesting because constructivist methodologies are usually associated with attempts to teach particularly difficult cognitive material (Perkins, 1999). Because all instructional methodologies are rooted in some learning theory, they assume that particular processes are taking place that will lead to particular kinds of learning. If we are to understand the arguments separating any discussion of methods and are to make intelligent choices about what to teach and how to teach what to students and when, then we are going to have to understand the issues that separate learning theories. There are two important

issues for pedagogy. One involves the viability of the learning theory: Do students who engage in this process learn what we want them to learn? A second and perhaps more neglected area for pedagogy researchers and teachers is: When teachers teach a particular way, do students engage in a particular process? If we are to do meaningful research we are going to have to begin to investigate whether or not those processes are actually taking place and when and under what conditions they take place. We cannot assume that a particular method or approach to teaching automatically results in a particular process of learning. In order to investigate teaching we are going to have to investigate learning. Investigating learning means that we have to have a better understanding of the learning theories upon which different methods of teaching are based, and the differences between them. Although the discussion of teaching methodologies can take place from many perspectives, the intent of this paper is to explore the issue from the perspective of the assumptions of learning theory.

The Learning Roots of Teaching Theories

Most instructional methods or approaches to teaching fall under a continuum of two orientations to instruction: direct to indirect teaching. Direct instruction, and the methodologies attached to it, usually means that teaching is explicit, broken down, step by step, and highly monitored (Rosenshine, 1987). Direct instruction is generally thought to be a more teacher centered approach to teaching methodology and more associated with the term "transmission" (Cobb, 1994). Indirect instruction, and the methodologies attached to it, usually is more implicit, involves larger chunks of content, and is more holistic in its approach to content (Peterson, 1979). Indirect instruction is usually associated with more student centered teaching methodologies. Generally speaking, direct instructional strategies find their roots in more behavioral and information processing theories of learning, and indirect instruction finds its roots in more cognitive strategy orientations that emphasize the role of perception and social learning theories of learning. There are several very important differences that divide these theories that are critical from a pedagogy perspective. These critical differences usually revolve around the following primary issues:

1. What kind of learner engagement and cognitive processing is necessary for learning to occur?
2. How much information does the learner need about the content?
3. What is the appropriate size of the "chunk" of content that the learner should handle at one time?
4. Is learning an independent or socially constructed process?

Learner Engagement and Cognitive Processing

It is important to say from the outset that all approaches to instruction recognize the need for high levels of learner involvement with the content. There is no learning theory that does not recognize the critical nature of the level of student engagement in what they are doing. Even motor skill learning theorists have come to understand the importance of engagement (R. Magill, 1998). Our own pedagogy

research on time with the content has documented from an historical perspective the transition from allocated time to motor engaged time to the need for a high level of processing and learner engagement (Ashy, Lee, & Landin, 1988; Metzler, 1989; Silverman, 1990; Silverman, Devillier, & Rammirez, 1991; Solmon & Lee, 1996). Motor skill practice that does not require a high level of student processing may not be the best practice that we can offer, suggesting that rote repetition of responses is not appropriate practice.

The big theoretical issue from a learning perspective is currently an issue regarding the nature of student processing necessary for learning to occur. Although there is consensus on a high level of student engagement with the content, there is less consensus on issues related to the level of cognitive processing essential for learning and whether or not cognitive processing has to be at a conscious or awareness level. Constructivists would advocate a high cognitive level of engagement, sometimes referred to as higher order thinking (Anderson, Reder, & Simon, 1996; Brooks & Brooks, 1993), while the behaviorists are not as concerned with the level of processing as they are with the nature of the response of the learner. The behaviorist is concerned with finding a way to get the learner to produce an appropriate response and then reinforcing that response (Bandura, 1969; Becker, Engleman, & Thomas, 1971). The process the learner uses to produce that response may not be critical.

Level of Processing

Constuctivist theories of learning are based on the idea that students process information at a higher level in learning experiences designed from a constructivist perspective and therefore learn more and better (Brooks & Brooks, 1993). Learners construct their own ways of knowing (Cobb, 1994). A high level of cognitive processing is facilitated because the learner is encouraged to find their own way through tasks rather than being given explicit detailed information on how the task is to be accomplished. Of course it is not that easy. One of the problems that we have when we look at level of student processing as an indicator of "good practice," or a good indicator of an appropriate learning experience, is that you cannot predict the level of student processing from the methodology a teacher uses. You cannot rule out higher order thinking because a teacher uses a more direct methodology. You cannot predict higher order thinking because a teacher uses a problem solving approach (Styles, 1974). This was made abundantly clear at the recent AISEP conference (1999), in which researchers from France presented their analysis of a teaching episode in which the teacher began asking a class some questions that were designed to elicit some higher order thinking (Amade-Escot, Loquet, & Refuggi, 1999). It became very clear to the researchers that the students were in search of the answer they thought the teacher wanted. Most of us have had the experience of being in a lecture class and struggling to stay awake. Likewise most of us have had the experience of being in a lecture class and hanging on every word of the professor. We have been in group learning environments with similar contrasts in level of engagement.

Just as learners in a motor skill eventually reduce the level of processing needed to perform a motor task to lower and even automatic levels of cognitive response (Fitts & Posner, 1967), learners in cognitive tasks do the same, depending on, among other things, their experience with the task. A process that facilitates a

higher level of processing in one student may elicit a lower level in another student for a variety of reasons, including motivation, past experience with the task or similar tasks, the social context of the environment, or perhaps cognitive strategies available to the student. This means that students in a highly structured information processing or more behaviorally oriented pedagogical experience who are highly motivated and involved could be processing at a very high level, and students who are in a problem solving or constructivist oriented learning experience could be processing at a low level. In other words, there is no direct line from a method of teaching to a level of student processing; too many other factors are involved (Styles, 1974). Researchers in pedagogy and, perhaps more importantly, teachers in the field will need strategies to identify the expected nature of processing, if they are to really understand what is happening in particular teaching methodologies. Researchers are going to have to investigate the nature of student processing and engagement and not merely the products of the process in order to understand how to effectively use teaching methodology.

For the researcher and the teacher the idea that learning and process cannot be assumed from method presents many problems. As stated before, just as there is no direct measure of learning and we infer learning from observable products, there is no direct measure of processing. To some extent it is easier to infer processing in motor responses because the process is oftentimes more observable (trials and attempts at a response). On the other hand, direct measures of observable behavior for predicting learning outcomes are mostly inadequate. The current emphasis in psychology on talk-aloud and other self-report kinds of measures holds much promise and has been used in our field by a variety of researchers with some very interesting results (see for instance, Rink, French, & Tjeerdsma, 1996; Solmon & Lee, 1996, 1997).

Conscious Level of Processing

What we do not know is whether or not there is a difference between the effect of responses produced at a high level of conscious processing and those responses produced perhaps at a high level of processing but not at a conscious level. While constructivists and behaviorists do not address the issue of conscious level of processing, the issue is imbedded in the pedagogy of the constructivist and the behaviorist. The synonym for the terms *direct/explicit* and the synonym for the terms *indirect/implicit* instruction are the terms used by the psychology literature to indicate conscious and unconscious processing, respectively (Biehler & Snowman, 1982).

The dynamical systems literature coming out of motor control and other research on learning clearly alludes to the idea that the learner does not have to process what they are doing at a conscious level in order to make an appropriate motor response to a task (Newell, 1986; Schmidt, Young, Swinnen, & Shapiro, 1989; Singer, Lidor, & Cauraugh, 1993; Starkes & Allard, 1993; Wulf & Weigelt, 1997). In this context the notion of conscious level of processing means to bring an idea to an awareness level. In the dynamical systems literature, the "system" will always choose an appropriate response based on the constraints (Newell, 1986). Constraints in this context means organismic, task, and environmental. D. Magill, in a recent publication (1998), explored the notion that learners can acquire knowledge about how to perform motor skills without being able to verbalize that knowl-

edge. Knowledge, in the context of this work, means environmental critical cues necessary to perform primarily open skills. This work, in its larger context, supports the idea that learners do not have to be given explicit information on how to perform a skill in order to learn the skill, and that brings us to the next issue.

How Much Information Does the Learner Need About the Content?

An exploratory study done by Sweeting and Rink (1999) contrasted the effects of kindergarten and second graders learning a long jump either through direct instruction or through an environmentally designed task approach that elicits the appropriate response from the learner. The direct teaching approach used a whole-part-whole orientation to teaching the task, step by step instruction, learning cues, and student feedback on performance. The environmental design approach put students in a variety of environmentally designed situations where they had to complete the task to accomplish a particular goal like jumping over low hurdles, jumping to achieve marked colored bands on a mat, and so on, using the standing long jump skill. No teacher information on how to do the skill or augmented teacher feedback was given to the students in the environmental group. The environmentally designed task clearly increased initial performance, particularly for younger and less skilled students, but lost its effect with time and increasing skill. An analysis of process characteristics of the jump indicated that students in both groups were strong in different parts of the jump, which means that they learned different things from the two different instructional orientations to teaching the skill. The idea that students may learn different things from different methods was also suggested in the results of a study investigating tactical and skill orientations to teaching badminton (French, Werner, Taylor, Hussey, & Jones, 1996).

A second study that attempted to sort out how much information a learner needs on how to perform was done in the context of volleyball progressions (Rink, French, Werner, Lynn, & Mays, 1992). One group was given helpful information during the practice of a progression on how to best perform and another was not. For most initial tasks in the progression, the success levels during practice were similar. For a later stage of the progression the group that did not receive information from the teacher on how to make an adjustment to a task that had increased in complexity was not successful. Learners in this context were not able to "read" the environmental cues appropriately. This lack of success was maintained through later stages in the progression.

Advocates of a "games for understanding" approach to developing games players suggest that students should not be given information on how to execute motor skills *prior* to needing it in the context of game play. The emphasis of this approach is clearly the attention given to the role of tactics (Almond, 1986; Chandler & Mitchell, 1991). In a sense, games for understanding is another approach that is not supportive of giving a lot of information to learners on how to execute skills, at least not initially in the teaching of games. The results of this research are mixed (Rink, 1996). However, the real issue for all of these orientations is not if but when the learner should receive information on how to execute a motor skill. Does the learner need specific information on how to execute a motor response? Not always but clearly sometimes. Is not giving learners information on how to do

a skill non-teaching and trial and error learning, or is the teaching just different? If it is true that beginners do not need, or cannot use, explicit information, are there any principles that guide when and under what conditions learners might need more specific help? Are there any guidelines that help teachers to know how best to construct learning experiences that "lead" the learner without "feeding" the learner? What is at issue here from a theoretical perspective is how much information the learner needs and whether or not the teacher should be communicating anything to learners on how to do a motor skill (Kwak, 1993; Lee, Swinnen, & Serrien, 1995; Rink, 1994; Werner & Rink, 1988). Learning requires processing, regardless of whether information is given by the teacher. Knowing how to get learners processing what they are doing enough to "generate" appropriate motor responses and knowing when to intervene with more specific help and different tasks that elicit more advanced responses may be the art of teaching in physical education and should be a major concern for researchers who would understand teaching. Research on feedback in a physical education setting also seems to suggest that it is an "it depends" issue, which means that teachers should be prepared to understand how and under what conditions learners need particular kinds of information (Lee, Keh, & Magill, 1993; Magill, 1994).

Related to issues involving the amount of information the learner needs are those related to teacher clarity. Part of the justification for the identification of more explicit teaching styles as more effective is related to the notion of teacher clarity (Kennedy, Cruickshank, Bush, & Meyers, 1978). There is no reason to assume that these characteristics of teacher clarity are not still important components of all effective instruction (Werner & Rink, 1988). All of the research indicating the importance of teacher clarity I consider to be part of that group of teaching skills that transcend methodology—those generic teaching skills (Landin, 1995; Magill, 1994). There is a tendency for advocates of, and particularly novices at, indirect teaching styles to confuse being clear and having clear expectations for what students should be doing with telling students exactly what to do. Some of the most effective teachers of movement education use some of the most direct and explicit teaching styles. In a Barrett style of movement education, learner expectations are explicit (Logsdon et al., 1977). Student options for responses are clear within a set of clearly communicated expectations. Using an indirect teaching style does not abdicate a teacher from being clear or having clear expectations for performance.

One of the most important sets of questions for those who would study learning is not necessarily how you help students to produce a response, but the long term effects of that experience on future learning, the ability of the student to use responses appropriately, and the transfer of learning from one context to another. In terms of future learning, if you can produce the response without a high level of conscious processing, does that have an effect on how you can refine the skill or the more long-term ability of the student to learn other related skills? If the response is not conscious it usually means that the student does not have to have a language label for what they are doing. Is learning motor skills or future motor skills facilitated by a language label? If for instance I have learned to do a drop shot in badminton but do not know it is a drop shot, what effect does that have on future learning? What is clear is that learners can produce appropriate motor responses without processing what to do at a conscious level (Singer, Lido, &

Cauraugh, 1993; Wulf & Weigelt, 1997). What is also clear is that there must be some kind of cognitive processing.

One of the assumptions of teaching based on constructivist orientations to learning is that because the learning experience is more appropriately contextually based, which means that the student should be learning the skill in the context in which it is going to be used, the problems of transfer when the context changes are minimized (Brooks & Brooks, 1993). Intuitively this makes sense, but yet to be investigated are assumptions about transfer to different or more complex settings and the difficulties of putting students into environments that may be contextually too complex. Recent work reconceptualizing the transfer issues of learning may support more constructivist orientations to learning, or at least not dismiss them so quickly (Bransford & Schwartz, 1999).

Related to both the type of processing and the level of processing are issues of student motivation, particularly as student motivation relates to levels of student engagement and processing. Recent educational literature has given a lot of attention to notions of student motivation (Lepper, 1988; Pintrich, March, & Boyle, 1993; Wigfield, Eccles, & Rodriguez, 1998) and with good reason. If student engagement is crucial to learning, then how to increase student engagement is critical. Student motivation is certainly a key to engagement. Of particular concern are issues related to choosing teaching strategies and creating environmental conditions that facilitate student motivation, which should lead to higher levels of student engagement and therefore higher levels of processing. In school settings both academic and social goals interact to influence learning and are linked to notions of an appropriate learning environment. Although the recent emphasis on more indirect and constructivist methodologies is in part driven by a commitment to make learning more meaningful for individual learners and to the improvement of student motivation, the assumption that students are not and cannot be motivated in non-constructivist and more behavioral orientations to learning cannot be supported. Likewise, using a constructivist orientation to teaching does in no way guarantee high levels of student motivation, particularly teaching that relies entirely on establishing tasks that motivate learners intrinsically.

Questions related to what kinds of tasks and methods motivate students are beginning to be of interest to pedagogy researchers. This is the level of investigation that should capture the pedagogy researcher interested in issues of motivation. If we are to understand the role of student motivation it is important for us to understand what motivates different kinds of students in teaching (Chen & Darst, 1999). Issues of the nature of the content, the appropriate level of content, design of the task, and lesson and unit pacing are likely to be fruitful avenues of investigation in our attempt to understand how to develop and maintain student interest and motivation for a high level of processing. As the debate of the sixties clarified, waiting for all students to be highly motivated to do a task so that all learning can be intrinsically motivated is a luxury that most educators do not have (Freiberg, 1999).

The Size of the Chunk of Content

The selection of the learning task is perhaps the single most critical decision that the teacher has to face. What constitutes a "meaningful chunk" of content is a critical issue for learning theorists. Current learning theory is concerned that the content the learner is asked to work with has "meaning" in and of itself and is not just a fragmented part of something else (Anderson, Reder, & Simon, 1996; Kirk

& McDonald, 1998). The issue is decontextualized learning. Constructivists have advocated that a larger and more meaningful "chunk" of content be presented to learners as opposed to breaking down content into less than "wholes" characteristic of more behaviorist orientations to instruction (Anderson et al., 1996; Kirk & MacDonald, 1998). The pedagogy of the behaviorist is concerned with creating small step by step increments of content to create success oriented learning (Mathis & McGagaghie, 1974). So what we have is one group advocating large chunks of content to make sure the content is meaningful and in context and another group advocating smaller chunks of content so that the experience of the learner is successful.

The selection of an appropriate task will largely be based on the teacher's ability to balance the need for student meaning and the need for student success. We need to know more about this process from the learner's perspective. Many behavioral models of step by step instruction may have overemphasized the need for immediate success and become mindless and meaningless exercises for many students. However, learning theories that provide large chunks of content in an attempt to deal with contextualized learning and student meaning for the learner may choose too large a chunk of content for learner success and run the risk of skipping vital stages of development in the learning of some content areas. Designing learning experiences to promote challenge and processing without putting the learning task out of reach of the learner would seem to be the teacher's challenge.

Current thinking regardless of where you are on the continuum of direct to indirect teaching clearly asserts that skills should *ultimately* be practiced in the context in which they are going to be used. Both orientations would support the idea that students are not likely to use in meaningful contexts what they have been taught in fragmented ways and out of context. Ample evidence exists to support the idea that unless safety is an issue, practice of the whole should precede any attempt to temporarily fragment the skill and practice part of a skill. Motor learning theorists have vigorously suggested that it is the whole skill that should be practiced when possible and not the individual parts (R. Magill, 1998).

At first, the idea that the whole is critical would seem to settle the issue of context or chunk of content. However, in the context of physical education content, is a meaningful whole the individual skills of a sport, the game, or something in between? What constitutes a meaningful whole? Does this change with age and experience? At a more micro level the issue for sport skill instruction becomes an issue of whole-part-whole learning: should the teacher break down individual skills? At a more macro level the notion of progressions also involves reducing the complexity of the context in which skills are learned and practiced. No one is suggesting that the learning of motor skills occur in a full game. As a matter of fact research done on skill improvement over time would suggest that players do not improve their individual motor skills by playing the game (French & Thomas, 1987; Parker & O'Sullivan, 1983). Research also supports the idea that reducing skills and learning contexts is essential when students are not successful. In some of the studies done by the author, students who practiced a final skill task in a volleyball study (receiving a pass from one direction and sending it to another direction) were not as ultimately successful as those students who practiced with a progression that initially reduced the complexity and then gradually added it (French, Rink, Rikard, Mays, Lynn, & Werner, 1991; Rink, French, Werner, Lynn, & Mays, 1992). Whether the issue was more related to motivation and meaningful practice or more related to success has yet to be resolved.

Is Learning an Independent or Socially Constructed Process?

Most learning theories have assumed that learning is a private experience: groups do not learn, individuals do. Social constructivists would say that all learning is social, meaning that learning is socially constructed (Salomon & Perkins, 1998; Vygotsky, 1978). From the perspective of the learner, individual self-perceptions, goals, and the social learning environment all mediate student choices, performance, and effort, and therefore student engagement and learning. Sorting out the specific role created by the learning environment has been most difficult. When translated into practice, the learning environments created by the social learning theorists rest heavily on pedagogy that involves the learner in social ways with others (peer teaching, cooperative learning, creating learning communities, etc.; Johnson, Johnson, & Holubec, 1994).

The issue for research on the learning environment from the perspective of learning theory is related to the kind of learning environment that facilitates learner processing and engagement and how knowledge is constructed (Anderson, Reder, & Simon, 1996; Kirk & McDonald, 1998). The early research on teacher management clearly illustrates the need for a well managed learning environment (Brophy & Good, 1986). What is new about the present discussion of learning environment is the issue of whether learning is a social or an independent process. Much of the research on learning has taken place from the perspective of the individual learner and has been concerned with studying how individuals acquire knowledge and skills that may be facilitated by another or others. Learning from this perspective is primarily construed as an individual process. Additional research has considered the social interaction of students as a critical factor in the ecology of the gym (Hastie & Siedentop, 1999). Research done from a social learning perspective is more concerned with the manner in which learning is actively constructed by a group of learners in particular environments (Salomon & Perkins, 1998; Vygotsky, 1978).

An active construction perspective and an individually acquired perspective on learning can coexist as explanations for different phenomena (Bredo, 1994). Individuals can learn alone. They can acquire skills and knowledge from a facilitator whose role it is to help them acquire particular skills and knowledge (teacher or tutor). They can also learn in group environments devised to encourage interactive processes that help groups construct meaning. Physical education has been studied from the first two situations: individual learning and facilitated learning. Some work on sport education and games for understanding approaches a group learning situation, and this work would indicate that group learning environments are effective in physical education (Hastie, 1996, 1998), particularly in terms of more affective concerns.

Putting students into groups does not insure positive interaction. We know very little about the nonverbal and verbal interaction that takes place in a gymnasium where groups of learners are trying to acquire individual skills but have access to knowledge of the performance of others. We know less about the verbal interaction process between learners that might facilitate the process. Sport education research and research on other processes involving group interaction will need to study the process of group learning to the level of detail that would help us know what is happening and how to facilitate the positive and productive interactions between students so crucial to the assumptions of social learning theory.

Group learning environments are not without their problems and, like most recommendations for pedagogy, should not be considered universally effective for all students in all situations. The research on the effects of group learning environments on students with different characteristics is conflicting (Fradd & Lee, 1999; Lou, Abrami, Spence, Poulsen, Chambers, & d'Apollonioa, 1996). For instance there is some support for the idea that less aggressive students (many girls) and the average student are more likely to not be as involved in the process as males and more highly aggressive students (Mael, 1998). When grouped heterogeneously these students are not likely to be as involved in the interactive process and therefore not likely to learn as much as other students (Salomon & Perkins, 1998). Although most of the research clearly supports the positive effect of heterogeneously grouped groups on low skilled and below average students, like most recommendations for pedagogy the critical issues revolve around for whom and under what conditions a particular pedagogy is appropriate (Driver, Asoko, Leah, Mortimer, & Scott, 1994).

What is significant about the more recent emphasis on constructivism and social learning is the recognition that teaching and learning does not always have to be explicit and is not always an independent experience. While there is sufficient documentation to support explicit teaching and explicit learning, there is now also the beginning of support for teaching and learning that rests heavily on implicit strategies.

Conclusions

So what is the point of this discussion? Put quite simply, there is no single theory of learning that explains learning or the lack of it in all situations, and therefore, there can be no single approach to instruction. Each theory of learning is used to support an approach to instruction. Each has but a piece of a very complex phenomenon we call learning. A lot of the research done on instruction has been framed, not to establish theory or to understand learning, but rather to establish direct links between what a teacher does and what a student learns. Often this research looks at a particular kind of learning, rather than viewing learning more holistically. The advantage of using learning theory to talk about pedagogy is that you get to test the assumptions of the theory—what it is based on. For instance, is it true that constructivist learning environments are more motivating to learners? Is it true that students process more when practice is not rote?

You don't want to know simply that something works—you want to know why it works and how it works in different conditions. Knowing why it works and how it works allows you to develop pedagogy that is consistent with that why. When you build a knowledge base on theory you can test the assumptions of a theory. When you spend all of your effort proving that a particular kind of teaching is better than another kind of teaching, you limit what you can learn about the very complex teaching/learning process. I am not advocating that we do not do methods studies. I am advocating that we ground our work in the theories that are the underlying basis of these methods so that we have a better way to build a knowledge base. This kind of thinking changes the question that we ask from "Which is best?" and "What do I believe?" to "What is happening here, and for what purposes, under what conditions, and in what way should I use this instructional methodology?" There may not be a best way to teach, but there may be a best way to teach

particular content to particular learners. Lee (1991) made this point abundantly clear in her review of the research up to this time.

Part of the process of understanding what is happening for both the teacher and the researcher should involve developing an understanding of the assumptions of what is taking place in the learning process and testing those assumptions. Periodically those of us who are involved in studying the teaching and learning process forget that the process involves what students actually do and that the process should result in particular products. We confirm the treatment by looking exclusively at what the teacher does, when in actuality we probably should be focusing more attention on what the student does. This is not a new problem for us. It took the academic learning time research movement to move us out of an era of looking at what the teacher does in our early work. More recent work being done in student cognition and with ideas related to the student as the mediator of instruction are an attempt to refocus our work on the importance of the learner (Lee, 1994). Work being done in Europe on didactics in the instructional process puts a similar emphasis on the process and the critical role of the process of learning from the student perspective (Amade-Escot, Loquet, & Refuggi, 1999). An important difference between the European work on didactics and current work in the United States is the emphasis didactics puts on the role of content. Framing the focus on the student with a learning orientation should organize our quest.

A focus on teaching methodology in professional preparation without attention to the underlying assumptions of that methodology is also problematic. Unless teachers implement methodologies with a knowledge of what processes should be taking place, and unless they are given strategies to confirm that those processes are taking place, we are placing teachers in an untenable position. They too must understand that there is no direct link between what a teacher does and what a student learns.

When newer ideas (or ideas from previous decades) on how to teach and what to teach are introduced into our literature they generate an excitement and an enthusiasm that is good. Teachers get motivated and they try new things, which in and of itself is good. It is not good when any single methodology or approach to teaching becomes more than just a choice from many different teaching methodologies. Pedagogy researchers have an obligation to develop an understanding of approaches to content and methods of teaching that informs the field objectively. Those direct lines that we are looking for between learning theory and student learning and between teaching and learning are mostly not out there.

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