Paper Presented at the AARE Annual Conference, Newcastle, 1994
Australian Association for Research in Education

Cognition and Context: Revisiting Skill Learning Through a Multi-Disciplinary Approach

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Paper presented at the Australian Association for Research in Education, November 27 - December 1, 1994, Newcastle.

Abstract

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Multi-Disciplinary Approach

With the trend for increasing specialization and fragmentation of knowledge, similar theories of learning have developed in different academic fields. This paper is intended to initiate discussion about the learning of physical skills (for instance, those which form the substance of physical education in schools), by drawing on contemporary analyses and trends in motor learning, cognitive psychology, socio-cultural studies and physical education pedagogy. Thus, it is an attempt to begin a process of synthesizing the trends in these different fields which may form the basis of a future research program. Of particular interest is the influence of the context in which learning occurs. Curriculum innovations in physical education such as Teaching Games for Understanding, Sport Education, and the Queensland Board of Senior Secondary School Studies Trial Physical Education Syllabus, have each foregrounded the importance of the socio-cultural-ecological context of and for learning, yet the relationship between the context and cognitive dimensions of learning is poorly understood. While skill learning in physical education is the focus, our deliberations may be applied equally to other dimensions of education such as those within the physical domains of music, dance, manual arts, and computer and technical studies, and shed some light on effective learning processes in a variety of contexts.

Preface

Learning reading in the primary classroom is currently the site of a battle over the process by which young students become literate. "In this war functional grammar, traditional grammar and phonics are pitted against whole language..." (Hope, 1994. p.1). Whole language teachers emphasize personal meaning through introducing students to language which deals

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with issues and texts that are relevant to them. Rival theorists of functional grammar claim that the whole language approach has failed to meet the needs of many students. They teach the structure of language by analyzing different kinds of texts and coming to understand the social purpose or function underpinning the texts. While the literacy theorists remain deeply divided, both approaches seem to recognize the importance of social relevance for effective learning.

Learning about the social psychology of group size in a university lecture would conventionally be approached as a "chalk and talk" presentation. The lecturer would cite the relevant formal theories of group dynamics, together with pertinent examples, which would be noted by the passive body of students. Another approach to teaching group dynamics could be for the students to divide into pairs to discuss their ideas on group dynamics, followed by a periood of individual reflection. The pairs could then form a four for discussion, followed by reflection. And so the doubling process and reflection could continue until the total group was reunited. In the second approach, a structured situation was created "in which participants cognitively and experientially addressed the concepts underpinning group dynamics" (Marshak, 1983, p.76).

In introducing these different learning contexts and strategies, we want to highlight the breadth of teachers who are grappling with the most effective ways to structure learning. Frequently, considerations of learner experience, relevance, active learning, and social context are central to what are emerging as preferred processes. The following paper attempts to explain and exemplify contemporary approaches to learning by focusing on the field of physical education.

Introduction

In a paper presented to this conference in 1992, one of the authors argued for the development of a broader agenda for socially-critical work in physical education (Kirk, 1992). It was suggested that in the process of

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reconstructing physical education programs along socially-critical lines, much more attention needs to be paid to the nature of learning, and that without a sound understanding of how learning takes place in physical education classes, innovative programs might be little more than limited and ineffectual exercises in wish-fulfilment for curriculum developers. The question of the nature of learning interacts closely with the nature of teaching, which has to be viewed in relation to learning. The interdependency of teaching and learning has been examined too infrequently in physical education research, in both the empirical-analytical and the socially-critical approaches.

It was suggested that a broader agenda might be developed which acknowledges and builds on previous achievements and enriches these achievements by integrating some new and exciting elements into socially-critical research programs. This broader agenda included a form of socially-critical and responsible research which continues to explore the ways in which individuals and groups construct knowledge in, through and about physical activities. In so doing, such exploration can reveal the spaces for socially constructive self-determination and principled action in and through physical culture consistent with the principles of a socially democratic society. It also included a focus on learning in physical education, within a reconstructed understanding of projects of human empowerment and emancipation in and through physical culture, and the development of socially-critical programs in physical education which are built on and require close observation and empathetic understanding of learners' experiences of physical activity in school and community settings.

A focus on learning and learners in physical education is prefigured in the work of Smith (1991), who has argued that too little is known about children's learning in physical education and that what is known tends to be narrowly defined in the motor domain with few studies extended to the social construction of children's knowledge and experiences. Smith asks, "where is the child in physical education research?", and argues that before

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teachers can anticipate success in their endeavours, they must first learn to observe learners closely and attempt to gain some empathetic appreciation of the meaning of the child's physical education experiences for them. An interpretative approach to understanding meaning informed by social phenomenology is at the centre of the various forms of qualitative research which are now commonplace in education and physical education research.

But Smith's point is that researchers have neglected to apply this perspective to learning in physical education. He points out that a central aspect of the observational dimension of the pedagogical task is looking out for and looking after the learner and that as part of their educational mission

teachers have a duty to foster the learners in their care. Smith identifies the centrality of caring for (cherishing, protecting, nurturing) and about (valuing, respecting) the learner as intrinsic to the pedagogic relationship. His plea is for more grounded, particularistic, and empathetic observation of learners in addition to observation of the technical aspects of physical performance in physical education programs.

In our view, Smith's critique provides a useful corrective to the lack of integration of current approaches to learning in physical education and

serves as a starting point for the development of a perspective on learning we wish to advance in this paper. There currently exists a significant body of research and theory on how children learn, develop, and experience motor activities which we believe will continue to be not only beneficial but

necessary knowledge for physical education curriculum theorists. The central purpose of this paper is to begin to develop a perspective on learning physical activities similar to Smith's and consistent with a socially-critical approach to physical education, within which existing material might be

brought into meaningful alignment for the purposes of better understanding learning and learners' experiences.

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There are at least three theoretical approaches that might inform a perspective on learning which is able to align concerns for technical proficiency and experiential meaning in physical activity. For the purposes

of this paper, these approaches are labelled ecological/situated, developmental and constructivist, and each is underpinned by a subjectivist epistemology which acknowledges human experience as socially and culturally constructed. In the first part of the paper, we examine each of these approaches in turn. In the second part, we provide examples of applications of current practice in physical education which we believe to be consistent with the perspective on learning we are advocating.

Theoretical Approaches to Learning

Ecological and situated approaches

Recently, motor development, learning, and control scholars have been using ecological psychology (E.J. Gibson, 1991; J.J. Gibson, 1979) and dynamical systems (Jeka & Kelso, 1989; Kugler, Kelso, & Turvey, 1980, 1982) as theoretical bases for their research. Concepts and frameworks from these ecological bases can be used by physical education curriculum theorists to suggest metaphors and images that are quite different from linear behaviourist and perspective schema-based views of learning and teacher

feedback. Much current motor control research and theory is aimed at articulating what and how movement is perceived and controlled and is underdeveloped with regard to the needs of physical education curriculum theorising (Singer, 1990). For example, there are no general theories of physical education or more concrete theories of the learning of complex

skills in the contexts of games, gymnastics, sport, and dance. Nevertheless, theories about motor learning and development can function heuristically and, as such, be useful in informing how teaching proceeds (Newell & Rovegno, 1989).

Ecological perspectives claim the learner actively explores the relations

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among individual capabilities and intentions, the task (ie., the action, motor skill, etc.), and the environment (Newell, 1986). Development is the increased ability to detect these relations through direct perception (E.J. Gibson, 1991). Learners develop motor skills by searching available information and exploring coordination patterns (Newell, 1992). This characterisation of learning physical activities differs greatly from the view that motor learning means correcting 'errors' from some unitary optimal pattern and prescribing solutions to motor problems.

Gough (1989) has advocated that curriculum scholars use ecological theories of perception as a basis for curriculum work. He contends that these theories provide a much needed contrast to the predominant empiricist notions of

cognition which emphasise the transmission of abstract knowledge to learners. He argues that 'ecological theories of perception liberate teachers from being, as it were, tour-guides in "the accumulated pile of so-called social knowledge". The "education of attention" means guiding learners in the many and various ways of enhancing their capabilities for extracting information from their environments' (Gough, 1989, p.228). Within physical education, the ecological perspective's focus on an active learner exploring individual/task/environment relations implies that teaching should, first and foremost, be concerned with learners' explorations and attention while performing appropriate tasks within an appropriate environment, an environment that is matched to the characteristics and capabilities of the individual. Teaching would build on and guide explorations, attention, and search strategies (Newell, 1992).

Early theories of motor control and learning suggested the central task of teaching was providing information. Consequently, much attention in physical education curriculum work was given to the frequency and type

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of feedback used to give information. Although ecological/situated perspectives do not deny a role for feedback and information (Newell, 1991), these approaches imply that the central task of teaching is structuring tasks and the environment in which these tasks are performed in relation to learners' capabilities and intentions. Included in the task would be both the immediate motor demands and also the demands set through the socio-cultural environment. Physical education curriculum work would focus not on the specific skills (eg., chest pass, bounce pass, lay up shot as components of basketball) and rules of a sport, but on a series of tasks with cues which allow learners to explore the range of ways a skill is performed in context. The focus for feedback would be to guide search strategies (Newell, 1992) and the education of attention (E.J. Gibson, 1991; Gough, 1989). For example, having learners attend to changes in the feeling of speed when learning to accelerate and decelerate while dribbling, or having learners attend to the perceptual aspects of the flight of the ball in relation to other players.

One further benefit of using ecological psychology and especially dynamical systems perspectives is that these perspectives deal with change in complex environments. Dynamical systems viewpoints illustrate that because of the non-linear nature of interactions in complex systems (be they chemical, physical, biological, or social systems), the behaviour of these whole systems is not predictable from detailed (reductionist) study and knowledge of each of the component parts. Equally importantly, dynamical systems perspectives demonstrate that the nature and direction of a system, and its propensity for change, can only be understood by knowing the history of the system, and by identifying the location and typology of those elements which serve as

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attractors for the system's behaviour. While dynamical principles currently serve as a major impetus to the study of the psychobiology of movement control (Abernethy, Burgess-Limerick & Parks, 1994) a number of its fundamental premises should strike a chord with students of educational systems and the mechanisms for change within such systems.

Ennis's (1992) work well-illustrates how conceptual tools and metaphors from dynamical systems can suggest powerful ways to think about and explain the change process in teacher development, children's learning, and educational systems. Ennis used two conceptual tools from dynamical systems to talk about the change process: "attractors - major variables that influence or attract surrounding elements - and constraints - secondary factors that mediate attractors' power to control the ecosystem" (Ennis, 1992, p.116). She suggests that an individual's knowledge structures may remain stable due to the strength of a set of attractors and relevant constraints despite efforts by teachers or other change agents to destabilise or change the system. Conversely, a small change in attractors, such as a teacher's value orientation, can have a multiplying effect resulting in large-scale changes in a teaching/learning process. The issue for curriculum theorists is to identify potential major concepts and the sets of attractors for a content area that can elicit critical changes and development.

Similar, to ecological and dynamical systems approaches but concerned with complex learning and participation in cultural contexts is a situated cognition approach. This approach is underwritten by a situated view of the learner of physical activities, in keeping with situated views of socio-cultural theorists, and suggests that learning and knowing are experienced as interactions with others and in relation to an activity, available tools and other material resources, and the sedimented values, practices, and perspectives which constitute the cultural context (Brown, Collins, &

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Duguid, 1989; Lave, 1988). Situated cognition researchers theorise how learning "can be neither fully internalised as knowledge structures nor fully externalised as instrumental artefacts or overarching activity structures. Participation is always based on situated negotiation and renegotiation of meaning in the world" (Lave & Wenger, 1991, p.51).

Situated and ecological perspectives claim the individual, task, and environment are an irreducible unit. Typically, this implies, for curriculum work, that we reconsider our theoretical basis for learning progression.

Progression is typically a matter of teaching a skill, emphasising the technique of mature performers, and then increasing complexity by increasing the environmental variables the learner needs to manage (eg., learning the technique of a volleyball forearm pass, combining that pass with other skills, adding perceptual variables such as the direction and flight of the ball and the location of teammates and opponents). In the common learning progression in physical education programs, biomechanical information about the technique of the mature performers is privileged while perceptual and contextual aspects of the interaction between the individual, task, and context are added on (Rovegno, 1993).

Ecological and situated perspectives, however, suggest that developmental progressions are considered that are a series of more holistic tasks, which include perceptual, contextual, and socio-cultural aspects from the start.

Situated and ecological approaches to learning promise to generate new ways of thinking about the learning process within a socially-critical approach to physical education. They focus on the ways in which individuals and groups construct knowledge in, through and about physical activities, thus revealing the spaces for socially constructive self-determination and principled action in and through physical culture, consistent with a socially democratic society. These approaches reject dualistic views of the individual

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and environment while insisting on holistic, relational understandings of the learner engaged in activity in a physical, social, and cultural environment. According to this holistic and relational view, "curriculum" might then be understood as referring to the dynamic interplay of teacher/learner interactions, content, and situation (Kirk, 1988, pp.14-16). Neither the individual, content, nor environment are privileged but, as Newell (1992) suggests, are treated as an irreducible unit.

Developmental approaches

Although commonly misunderstood to be a naturally unfolding process of maturation, development is, instead, change and stability across the lifespan as a result of the interaction between individuals and their cultural and material environments (Roberton, 1989). Because developmental approaches are interactionist, when applied to the motor domain, they emphasise structuring the environment to elicit more mature movement patterns (Halverson, 1966) at the same time positing an active rather than a passive learner whose learning is shaped by environmental contingencies.

Motor development research also indicates that the development of mature motor patterns can take many years and that mature patterns will develop, if at all, at different times and at different rates for individuals (Halverson, Roberton, & Langendorfer, 1982; Roberton & Halverson, 1984). The implication is for curriculum theorists to pay serious attention to the wide range of individual differences among learners and tackle the difficult tasks of designing programs that accommodate such differences and help teachers learn how to put such programs into effect. Developmental perspectives also provide an image of motor learning as characterised by qualitative and quantitative changes in motor performance. The nature of the change process (ie. learning process) is portrayed as transformative rather than simply additive. For example, research on the development of motor skills

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describes common qualitative changes in coordination patterns as children's movement patterns become more mature (Roberton & Halverson, 1984; Wickstrom, 1983).

In 1966, Halverson suggested that such research can help teachers know what to look for and how to interpret learners' movement patterns during motor skill performances. This, in turn, guides the selection of tasks, cues, and feedback. A body of research detailing the qualitative changes and common beginner movement patterns is, potentially, a powerful knowledge base for physical educators because it contributes to teachers' pedagogical content knowledge at the detailed level used in teaching. For example, research for the overarm throw informs teachers to observe the angle of the humerus and design practices to help children get their hands away from their ears. Motor development also suggests that common practices such as explaining all components of the mature, efficient movement pattern in an effort to teach beginners the motor skills in a unit are misguided (Rovegno, 1993).

Research on how children learn and develop particular content has been used across classroom subjects (eg., reading, mathematics, science, writing, etc.), in some instances extensively, to guide the selection and design of curriculum, instructional techniques, and national standards. Although the amount of similar research is inadequate for physical education, what research we have has been shown to contribute to pedagogical content knowledge (Walkwitz & Lee, 1992). In addition, the use of motor development research as a basis for observing learners' movement and generating feedback and cues is now widely evident in current elementary textbooks and has been used as a heuristic to create similar information about skills without a research base (cf. Gallahue, 1993). Socially-critical curriculum work can follow and extend the tradition of basing curriculum development

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and theorising on developmental theory. Further, it could extend this work to include more complex skills and content, if necessary by means of suppositions based on experience, expert opinion, and inference.

Constructivist approaches

The term constructivist has different, sometimes contradictory, meanings depending on the field of study. In the field of education the term is currently used to imply an active learner constructing knowledge, in the Piagetian sense like a scientist, rather than a passive learner receiving initially meaningless information from the teacher (Resnick & Klopfer, 1989). In concert with the education literature, the term constructivist is used here to highlight three ideas about learning and knowledge (cf. Prawat, 1992; Resnick & Klopfer, 1989).

First, knowledge is socially and culturally constructed and, although there is a world beyond individual experience, what we know of this reality we and others have created and continually re-create. In other words, our understanding of reality is socially constructed. Second, learners do not receive information (as in a teacher writing on a blank slate in the child's head), but actively seek, use, differentiate, elaborate, interpret, relate, adapt, and understand information in terms of: the learner's current capabilities, intentions, and understandings; the task; and the physical, social, and cultural resources at hand. Third, learners have prior understandings and experiences (ie., ways of knowing, relating, attending to, and searching information) that persist and can influence what and how they experience and approach new information and events.

Although the term constructivist technically refers to the learning process in the educational learning theory literature, it is the constructivist

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work examining teaching and learning as a joined system that concerns us in this paper. Within classroom literature, Piagetian constructivist principles have long informed curriculum work, although, as in physical education, behaviourist principles have predominated. The recent resurgence of cognitive research on constructivism has resulted in an understanding of learning and teaching that is a greatly expanded and more elaborated view than the older Piagetian-based notions. Resnick and Klopfer (1989) summarise this current research. Domain-specific knowledge is now recognised to play a central role in learning, thinking and expertise. Processes such as problem solving, critical thinking, and decision making are thought to be best taught in the context of domain-specific subject matter and skills. The motivation to learn and use learning strategies also increasingly considered to be inseparable from other aspects of the learning process. Learning in social communities and apprenticeship relationships more and more are a focus of research with the now familiar techniques of cooperative learning and scaffolding (conceptual structures) being examples described through this research (cf. Rogoff, 1990; Lave & Wenger, 1991).

In a similar fashion to ecological/situated approaches, current constructivist perspectives also suggest new, non-linear ways to represent transfer of learning and, in turn, sequence content. Prawat (1992) questions both vertical transfer (lower-order facts being prerequisites for higher-order, more complex knowledge and skills) and horizontal transfer (applying knowledge or skills learned in one situation to another) because these views rely on decontextualizing knowledge or a skill and have surprisingly little empirical support. He suggests that transfer is a function of connectedness and is best facilitated by building connections among concepts, and among concepts and contexts through use. Broad general goals and a set of 'big ideas' would serve as open-ended guides for what content would be studied.

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The specific outcomes would not be predetermined but would result from the interactions among learners, teachers, content and environment. The focus would be on exploring the connections among critical concepts of a subject domain rather than studying a series of smaller concepts in a linear, step-by-step progression toward a predetermined end.

The idea that teaching means helping learners to engage actively in independent thinking, problem solving, discovering, and open-ended, non-linear exploration of broad movement concepts is not new to physical education. As Barrett (1989) indicated, beginning in the late 1950's the decision-making aspects of the teaching and learning process were recognised in the curriculum textbook literature, most notably in the work of Bilborough and Jones (1963) in Britain, Mosston (1966) in the USA and in Australia, Swain and Le Maistre (1964). Based on the idea of an active, independent learner, Bilborough and Jones (1963) criticised the predominant method of teaching by telling and proposed the use of a range of methods. Problem solving, exploration, and having children answer questions and make decisions about content and learning became central to the new methodology (Bilborough & Jones, 1963).

Following Bilborough and Jones and Mosston, physical educators, like their classroom counterparts, developed approaches based on early constructivist principles. The approaches promoted teaching techniques such as setting problems and asking questions to facilitate skill acquisition and more in depth understanding of cognitive physical education content. Although physical education approaches that were based on early constructivist principles have continued to grow more sophisticated since the 1960's, in particular the movement approaches (cf. Graham et al., 1993; Logsdon, et al., 1984), the new wave of constructivist research has the potential to stimulate further efforts to base curriculum work on the joined system of

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teaching and learning. This might include exploring when and how to use cooperative learning techniques and with what content and which grade levels; detailing how scaffolding (ie., providing a structure or framework for children learning a skill or concept and then progressively removing the support structures as children acquire skill or knowledge) might be used in particular units; determining when to ask questions and what kinds of questions will facilitate learning; and determining the most appropriate ways to help students explore, discover, and construct knowledge about particular aspects of the various physical activities we teach.

Applications of Contextually Sensitive Learning Theories

The following physical education curriculum initiatives, Games for Understanding, Sport Education, and the Board of Senior Secondary School Studies Trial Physical Education Syllabus, exemplify aspects of ecological/situated, developmental and constructivist approaches to learning.

Teaching Games for Understanding

Traditional methods for teaching games have concentrated on specific motor responses, such as skills and techniques, but have failed to account for the contextual nature of games (Bunker & Thorpe, 1982). The focus has been on how to , rather than when and why. For example, what we see in practice is students learning a spike in a volleyball unit without necessarily understanding the game context in which the spike should be used. Bunker and Thorpe (1982) have claimed that approaches which have focused on the teaching of so-called "fundamental sport skills" have led to many students knowing very little about games, having achieved little success, and failed to develop decision-making capacities and independence as learners.

Underpinning the Games for Understanding (GFU) approach to teaching games is the premise that games playing centrally involves tactical understanding and implementation. GFU is also predicated on the belief that

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much of the pleasure associated with playing games is derived from making successful, strategic decisions. Specific techniques are developed, but in the context of the students appreciating the tactical necessity to do so, thereby retaining the students' interest and involvement.

In tandem with the focus on tactics is a classification system of games according to their tactical qualities. Three main categories are invasion games (egs. soccer, hockey, netball), striking/fielding games (egs. cricket, softball), and net/racquet games (egs. tennis, volleyball). Within each category, the games share similar tactical considerations, and thus GFU encourages teachers to maximize learning opportunities by teaching the generic principles underpinning each of the categories (Spackman, 1983).

The model (Bunker & Thorpe, 1982) below represents the sequence of activities to be followed. Students work through the six phases focusing on one game form before beginning the cycle with a more complex form. The starting point is usually a modified form of a game suited to their backgrounds, maturation and skills, rather than expecting students to contend with the adult form. Once the students are actively participating in a game using simple rules, "slight modifications to rules and the playing environment can encourage refinement and development of new strategies" (Tinning, Kirk & Evans, 1993, p.103). After the players have determined what works best given the particular purpose and structure of the game, the next step might be to refine the specific skills that will enable them to enact their strategies more effectively.

(1) GAME

(2) GAME APPRECIATION(6) PERFORMANCE

LEARNER

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(3) TACTICAL AWARENESS(5) SKILL EXECUTION

(4) MAKING APPROPRIATE DECISIONS

What to do? How to do?

GFU approach emphasies cognitive understandings; going beyond isolated facts or skills to an orientation that means something which is significant to the learners and which facilitates the seeing of inter-relationships and differentiations (Kirk, 1983). In his model of educational objectives for physical education, Arnold (1985) also favours the centrality of situationally dependent decision-making. He argues that underpinning learning in physical activity are contextual objectives which "embrace those tactics and strategies that allow the intelligent application of prerequisite skills in the performance of the whole activity" (Kirk, 1988, p.76). Thus, the notion of intelligent performance is also relevant here (see Entwistle in Kirk, 1983, 1988) as it is a useful way in which to talk about skilled and ingenious reactions to the unpredictable contexts encountered in games playing.

Learning from doing, sharing in learning, student ownership of learning, and developing independent learners, the principles which underpin GFU,

reflect several dimensions of the abovementioned theoretical approaches to learning.

1. In keeping with the ecological and situated approaches, the learner (with her/his game skills and understandings), the immediate task or demand in the game, and the broader context or environment in which the task is to be executed, represent an irreducible unit.

2. The learner is placed in a situation in which they must continually extract information from the flow of the game (the environment) resulting in

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the environment creating the demand for student learning.
3. Learning tactics and skills are strategic responses, from a number of alternatives (Newell, 1992), to the intentions and actions of others (egs. teammates, opponents).
4. Learning occurs within the social community shaped by exploration of the game by members of the class.
5. Teaching GFU is an act of guiding the attention of learners (Gough, 1989; Halverson, 1966) through the provision of structured tasks and cues within the context of modified games.
6. Modified games are used in order to match the development of the learners.
7. With a focus on the categorization of games according to shared strategic qualities, learners are encouraged to build on prior understandings (scaffolding) when they meet a new game.

Sport Education

Sport Education (SE) has recently come to mean a particular pedagogical approach for teaching students games (sports) within the secondary school physical education curriculum. Like GFU, it recognises the centrality of context and was generated out of dissatisfaction with the teaching of games as a series of isolated skills. However, while GFU focuses on the context of the game as the cornerstone for learning, the cornerstone for SE is the social context of sport.

The model of SE which is currently being trialled throughout Australia had its genesis in the work of Siedentop, Mand and Taggart (1986). They argued that much of the teaching of sport within physical education programs lacked the characteristics that give meaning to sport in our community/culture. Skills were not taught within the context of game-like situations, rituals and traditions of sport were not mentioned, team affiliation was not encouraged, nor were the highlights of a sports season considered.
By reproducing the following characteristics of community sport in the physical education program, they argued that physical education would

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be
enjoyable, relevant and rewarding for students.

The six characteristics of SE are:
1. SE involves seasons rather than units;
2. In SE students become members of teams;
3. SE requires modified games during practice and competition;
4. SE provides a formal schedule of competition;
5. In SE records are kept and published;

6. In SE there is a festive culminating event.
(Sport and Physical Activity Research Centre, 1994)

These characteristics are directed towards students becoming players in the
full sense of the word. Siedentop (1994) considers players are competent
sportspeople who have developed skills and strategies appropriate to the
complexity of play, are sports literate in that they understand the rules,
rituals and traditions from the perspective of participant or spectator, and
are enthusiastic about protecting and enhancing the sport culture. Long

term the goals are to have more students, regardless of their backgrounds,
committed to participation in physical activity, to the benefit of those
participants.

Organizational strategies shaping SE are the structures of seasons and roles.
By having seasons, rather than conventional units, more time is available
for students to feel confident and competent in various aspects of the sport.
Students have greater opportunities to refine their skills and team tactics
and become attuned to the traditions of the game in order to achieve their
shared goal. In addition to all students being participants in the games, they
also take on other roles which are reflective of the organization of
community sport (egs. coach, captain, team manager, publicity officer,
umpire, first aid officer). In learning about and fulfilling these roles, the
students progressively become more independent of the teacher as the
manager of their learning.

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SE reflects the contextually-dependent theoretical approaches to learning in ways similar to GFU. Again, the SE goals of student independence, personal relevance and enjoyment are prominent in the three contextually-dependent approaches to understanding learning. In particular, SE clearly reflects the following dimensions of the learning theories.

1. SE draws upon the students' interest in sport as it is represented in the community and the media (attractors) (Ennis, 1992).
2. SE aims to be sensitive to developmental learning by modifying the games, the students' roles, the structure of competition etc. in accordance with the learners' cultural, material, and physical experiences.
3. SE has the flexibility in its structure to facilitate individual differences and preferences amongst learners (Halverson et al., 1982).
4. Social interaction amongst the students as they move through the sports season together shapes the nature of the students' co-operative learning.
5. The SE model anticipates that once a student has taken on board the metacognitive processes underpinning being a "player" in one sport, that they may carry these understandings to participation in a variety of sports.

Queensland Senior Trial Physical Education

For the past two years, selected schools in Queensland have been trialling a new physical education (PE) syllabus for senior (year 11 and 12) students.
The "Global Aims" of the syllabus are for students:

*To develop skills and behaviours, knowledge and understanding, attitudes and values in physical activity through the thoughtful manipulation of information in and about physical activity.

*To develop understanding and appreciation of the intellectual, physical, social, cultural and emotional factors which influence participation in physical activity.

*To accept increasing responsibility for their intellectual, physical, social and emotional development.

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(Board of Senior Secondary School Studies, 1992, p.2)

The syllabus is based on the premise that physical activity is the cornerstone upon which physical educatedness is developed. The rationale for the syllabus (which is based on Arnold, 1985) emphasises the inter-relatedness of "learning in physical activity" and "learning about physical activity". Physical activity is conceptualised as both an intellectual and physical pursuit and the syllabus is underpinned by the notion that thought and action are dialectically related. The teaching and learning processes are expected to provide students with experiences that integrate the "in" and "about" dimensions of physical activity.

These learning experiences are to be focused through four different physical activities and each activity organised around one of three "core content themes" which are characterised by the following elements:
1.Learning, understanding, acquiring, performing and evaluating physical skills (including biomechanical principles, psychology of performance).

2.Understanding, acquiring and evaluating physical fitness (including energy for physical activity, relationships between training and physical fitness, socio-cultural influences on attitudes towards physical fitness).

3.Historical, socio-cultural and political influences on physical activity (including contemporary issues in physical activity).
The syllabus emphasises not only the process involved in the learning and performance of the physical skills but the fitness that supports those skills,

and the contexts in which the skills are performed.

To facilitate the intellectual and physical pursuit of integrating learning in and about physical activity through the three core content themes, the syllabus advocates a developmental approach to teaching and learning that enables the students to become "decision makers through the processing of information" (BSSSS, 1992, p.4). Drawing upon Bloom's Taxonomy of Cognitive Development, the syllabus has proposed four stages for the

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processing of information and concepts in and about physical activity for each of the three core content themes. These stages are:
1.gathering, sorting, and recording;
2.recalling and comprehending;
3.applying, analysing, synthesing, interpreting, and evaluating;
4.predicting, hypothesising, decision-making, designing and justifying.
These cognitive outcomes are to be demonstrated by students (in each of the four activities) in physical performance, written and oral tasks. To move students towards these outcomes, teachers are expected to facilitate learning and structure learning experiences that promote cognition, and increasingly self-directed and independent learning.

The intentions of the new PE trial syllabus articulate with the learning theories in a number of ways:
1. The opportunity exists for students to develop physical skils and understandings by exploring the relationships between individual capabilities and intentions, the task and the environment (Newell, 1986; Gough, 1989), and for teaching to be directed towards this end (Newell, 1992).
2. Learning of physical activity approximates a situated cognition approach where skills and understandings are developed in relation to a particular activity, the available resources and the broader socio-cultural context Brown, Collins, and Duguid, 1989; Lave, 1988).
3. The teaching and learning approach is more able to accomodate and respond to individual differences (Halverson, Roberton and Langendorfer, 1982; Roberton and Halverson, 1984).
4. An emphasis on domain-specific knowledge by focussing on the four stages of information processing for each of the physical activities.
5. Learning is based on a constructivist approach.

Conclusion

The purpose of this paper has been to begin to set out some theoretical perspectives on learning which might be incorporated into a socially critical approach to research and teaching as a means of enriching socially-critical work in ways which will increase its potency to contribute to the ongoing reform of school curricula. In focusing on teaching and learning in physical education we argued, following the lead of Smith (1991),

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that the

nature of the learner's experience of physical activities has been neglected by socially-critical and empirical-analytical researchers alike, in large part because they have lacked the conceptual tools to allow them to theorise the experiences of learners in relation to their research programs. We suggested that caring for and about the learner, and attending in more grounded, particularistic and empathetic ways to the sense-making actitivies of learners, promises to generate new ways of thinking about the learning process within a socially-critical approach to physical education.

Three theoretical approaches to learning which we believe can contribute to the development of such a perspective were reviewed. Ecological and situated approaches offer opportunities to theorise the environmental and social

dimensions of learning physical activities, and to understand in specific detail the ways in which contextual variables interact in any given learning episode. On the basis of these approaches we supported the view that we treat the individual (as a member of a community of practitioners), task and environment as an irreducible unit in our efforts to understand the nature of learning and in the curriculum work on which learning in school and other pedagogical settings is predicated. Developmental approaches offer opportunities to posit an active rather than a passive learner and to attend to the dynamic of change and stability which constitutes maturation. On the basis of these approaches, we are led to consider the process of developing physical competencies empirically, focusing on the nature of the change/stability dynamic itself rather than placing idealised, mature motor patterns at the centre of learning. Constructivist approaches offer opportunities to acknowledge the social construction of reality and the learner's active part in interpreting, using and generating information. On the basis of these

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approaches, we are able to explore the pathways between substantive (domain-specific) knowledge and generic (processual) knowledge, and the strategies which might be utilised to promote deep learning (Ramsden, 1992).

As our brief overview of GFU, Sport Education and the Queensland senior syllabus in physical education was intended to demonstrate, physical educators have already begun to implement approaches to learning physical activities which can inform and be informed by these theories of learning, and as we noted, there is a long tradition of practices consistent with ecological and situational, developmental and constructivist thinking which increasingly over the past twenty years has been marginalised. We suggest, in conclusion, that the theoretical approaches to learning outlined in this paper broaden the agenda of socially-critical work in physical education by including within analyses of social, cultural and temporal processes, a concern for individual meaning-making and cognitive development in, through and about the medium of organised physical activities. While anecdotal evidence indicates that the curriculum initiatives outlined in this paper have resulted in successful learning experiences in physical education, we suggest that the conceptual tools are now available to physical educators to begin to undertake research and development work which can contribute to the ongoing reform of physical and sport education programs in school and community sites.

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