



## **Unlock Research** Research for Physical Educators

### **Research Report of the Month** **APRIL 2004**

McCaughtry, N., & Rovegno, I. (2003).

#### **Development of pedagogical content knowledge: Moving from blaming students to predicting skillfulness, recognizing motor development, and understanding emotion.**

Journal of Teaching in Physical Education, 22, 355-368.

#### **Introduction**

This study can serve several valuable purposes. It can provide a clear and fine-grained picture of what can happen to young, novice PE teachers when they first encounter the difficulties of teaching public school students. If the image here is not entirely new to you, my guess is that it will nonetheless become one of the most vividly memorable. The very next time you hear a teacher talking about why a lesson went badly, it is going to be difficult not to hear the voices of the four participants in this study as they struggled to account for why their students could not perform, did not learn, and often disliked what they had been asked to do in PE class.

Also, the particular conceptual structure the investigators used to frame and understand what was going on (as beginning teachers tried to explain lesson plans that had bombed), may appeal to you as a really fruitful way to think about how teaching skills are learned. Within the context of the study, viewing the problems of learning to teach as a "developmental process" helped to answer the program supervisor's and cooperating teacher's most pressing question: "What can we do to help?" It may not be possible to replicate those mentors' success with every beginning teacher, but their way of thinking about the problem seems logical, had a comfortable fit with what actually was happening, and, in the sense that the theoretical frame suggested a clear course of action, – thinking "developmentally" worked.

Finally, if you want to learn about qualitative research, how it is done and how it can contribute to our fund of knowledge about teaching, this report offers a good place to begin. The research question and investigative procedures are made transparent through step-by-step organization of the report; the authors generally use plain language rather than popular jargon (the few technical terms seem justified by the need for economy and precision); the data are used effectively to support the resulting theoretical assertions; and although it required 14 pages of journal text to tell the whole story (with abstract and references), the account never seemed to drag and at the end I would have guessed it to have been no more than half a dozen pages in length! For this report, the gain is large and the pain is small – the very definition of good research reporting.

#### **The Study**

Two constructs are at the heart of this qualitative study: "pedagogical content knowledge (PCK)," and, although they do not use the exact term, what I think can be called, "developmental learning theory (DLT)." Both were employed to analyze a body of data reflecting what happened when four undergraduate PE majors team-taught a 20-lesson volleyball unit to a regularly scheduled PE class of 20 eighth-grade (middle school) girls. Put in formal terms, the purpose of the study was to observe, record, and understand how the majors' teaching skills and subject matter knowledge developed in response to meeting the realities of the teaching context.

To briefly define the two constructs used in the study, PCK refers to what a teacher knows about how a particular content is learned by students, and how that content can be presented and practiced to

facilitate the process. It includes: (1) knowing about teaching in general (pedagogical knowledge), (2) knowing about the content in general (content knowledge), and (3) knowing about students and how they learn, and then integrating the three kinds of knowing into an integrated whole. The end result is PCK. In sum, it amounts to knowing specifically how best to teach a particular content to particular learners. Some experienced PE teachers accumulate enormous volumes of PCK, and we all recognize such expert professionals when we see them at work; "She could teach a broomstick to polka!"

The second construct, DLT, presumes that when novices are immersed into a culture of practice and their knowledge collides with the demands of that task, the beginners' original notions about teaching are challenged – resulting in changes in what and how they think about students, content, and the process of teaching. When those shifts in thinking are distinctive, occur in a predictable sequence, and appear to be characteristic of an ongoing process of learning, it becomes possible to posit a DLT that orders and illuminates what is happening -- the process of learning to teach.

Descriptive and comparative studies have helped us to know a great deal about what constitutes the PCK that teaching experts have acquired, but we know rather less about the process by which beginners use experience to start their own personal fund of this powerful kind of instructional knowledge – and almost nothing about the pitfalls that slow or prevent such vital learning. This study was aimed directly at that latter gap in our research literature.

To sum up their strategy in a brief statement, the investigators used the second construct, DLT, to frame what was going on in the gym as the participants discovered that what they thought they knew about teaching (the novice brand of PCK) *wasn't working*. By encouraging more sophisticated PCK, their mentors helped them get unstuck from dysfunctional ideas about what was going wrong, and continue their development toward the goal of maturity as skillful teachers.

### **The Participants and Context**

The study took place in an urban middle school used as a clinical teaching site for a nearby university teacher preparation program. The context was a regularly scheduled eighth-grade PE class. Each instructional period was 98 minutes long and all were conducted on an alternate day MWF/TTH schedule to complete a volleyball unit of 20 consecutive meetings. The novice teachers (all had volunteered in return for independent study credits) were assigned to provide both management and instruction during each class. They collaboratively planned the volleyball unit in advance and, after each lesson, met as a group to plan learning activities for the next class.

The undergraduate participants were preservice PE majors (3 females and 1 male) who had completed field-based elementary and secondary methods courses, a volleyball-teaching course, and were awaiting full-time student teaching in the subsequent semester. Two of them had played competitive volleyball, and the other two had played in recreational settings as well as in required college skill courses. The primary investigator and first author (McCaughtry) was an experienced teacher who, at the time of the study, was completing a doctoral program. The second author (Rovegno) served as the preservice program's field supervisor throughout the study. Finally, an experienced cooperating teacher from the middle school PE staff (who was present for each of the 20 classes) completed the research team.

### **Data Collection and Analysis**

Data were collected through interviews and field notes accumulated during observation. The novice teachers were interviewed individually prior to the study (to obtain their perceptions of teaching), and after the study (to probe how they thought their knowledge and teaching skills had evolved). As a group, they also were interviewed after each lesson. In addition, small-group interviews were conducted with three or four students after every other lesson. All interviews were recorded and then fully transcribed. McCaughtry conducted all of the interviews and (as a non-participant observer) wrote field notes while observing both the novices' planning sessions and the 20 class sessions.

Interview transcripts and field notes were then coded so as to identify segments containing particular elements of content (instructional move, pupil response, teacher comment, etc.). Segments of material with similar codes were then progressively sorted (and resorted) into descriptive categories that seemed to capture what was happening. Concurrently with data collection, the primary investigator has been developing case study documents that described the problems encountered by each teacher, the interventions of the two mentors, and how each novice began to rethink what they were doing.

Finally, with both the case studies and the descriptive data analysis in hand, the investigators could identify three primary themes that were supported by the qualitative data:

1. Understanding the importance of matching tasks to students' skill levels.
2. Understanding the details of motor skill development.
3. Understanding the impact of student emotion.

In turn, each of the themes had three component parts: (a) a serious problem in teaching that appeared to arise from inadequate PCK, (b) the novices' explanations for the teaching problem, and (c) the changes that appeared in the novices' teaching strategies, explanations, and personal grasp of PCK – *after being given assistance by the two mentors.*

### The Results

If you place the three component parts under one of the major theme statements and then try to imagine what happened in the study, it will not be difficult to invent a scenario – particularly if you have served as a supervisor or cooperating teacher. What the report can add, however, is the rich detail displayed in the data, and the impact created by the sometimes-bewildered comments of the novice teachers.

As suggested by the framework of DLT, there was a recurring pattern to what happened. For example, relative to the first theme of matching tasks to skills, (1) the novice teachers would make inaccurate predictions of their pupils' skill level (wildly overestimating what they could do), (2) the classes would go badly with poor performance and little evidence of learning, (3) the teachers would blame the students ("They don't care what they are doing wrong because they don't want to be there, and don't even want to try."), (4) the mentors would help the novices devise easier learning activities and encourage them to match their lesson plans more carefully to pupil ability, and (5) there would be an evident shift in PCK to include (among several changes) the proposition that problems with pupil learning are an indication of inadequate instruction.

As one novice admitted, "I really got it wrong. I just figured they would be skilled like I had been. I didn't do a good job of anticipating – and the biggest problem was that we didn't see it, we thought it was all them and not us."

The same pattern was evident in the second theme of dealing with the details of performance and skill learning. The novice teachers would explain a skill, demonstrate briefly, and then expect that with a little practice their pupils would acquire the skill. That such learning takes time, appropriately progressive practice activities, keen observation of performance errors, and ample quantities specific corrective feedback (all delivered in a patient, supportive manner), simply had not occurred to the teachers. One of the novice teachers complained that,

I tell them not to hit it so hard, but they do it anyway. That tells me they aren't listening. Whenever I tell them to aim it better, the ball goes all over the place. I just don't understand why they can't pay attention when I show them!

Again, the teachers had assumed that the pupils struggled because of "poor effort," and not because of their own incomplete knowledge of the subject matter and related pedagogy.

When the mentors realized that the teachers were again ensnared in the pitfall of blaming students, they spent time with each teacher while closely watching the details of skill execution, modeling specific corrective feedback for particular problems, and suggesting new learning tasks that addressed the small points of volleyball skills that are difficult for beginners to master.

Once again there is evidence that the teachers gradually adopted a different vision of how motor learning proceeds and why sound instruction demands much more than a surface analysis of skill. One of them acknowledged, "I thought they weren't trying. Now I realize that I was the one not paying enough attention. We were too stuck on seeing them as the problem to be able to break it down and pay attention to what they are doing wrong."

The necessity of attention to detail received this testimony in a final interview.

Yeah, it is not enough to tell them and expect them to do it. You have to break it down and pay attention to what they are doing wrong. The problem was that I didn't pay attention. I just wanted them to do it. I couldn't understand why they weren't.

The third theme (dealing with the importance of student emotion) involved the teachers' initial tendency to simply dismiss all pupil complaints about boring drills, dejection over lack of success, and negative feelings about the increasingly sour dispositions of their frustrated instructors. They chalked up such pupil responses to the usual suspects -- immaturity, bad attitude, and lack of effort. Their more experienced mentors urged attention to the natural problems created by repeated failure, the alienation created when student complaints were ignored or derided, and the vital importance of maintaining a supportive and positive demeanor.

Those points were really driven home, however, when small shows of pupil progress (rather than more strident exhortation) were persistently coupled with less resistance, greater enthusiasm, and a happier class environment. At that point there was a detectable (and prompt) shift in thinking about the connections between pupils' feelings and their capacity to learn. Here are three examples of how the teachers explained that change.

I don't blame them for hating our drills. They [the pupils] were not the problem, we were. They were just bored, but we couldn't figure out what was going wrong -- because it was volleyball.

I can definitely see now that our reactions [to pupil failure] made things worse. Not only were they hating what they were doing, but they hated us because we did not respond to the problem, we just blamed them. I can't believe that I called them a bunch of babies.

You have to find things they can be successful at because no one wants to do things they aren't good at. You don't want to swing at a ball all day if you're not going to hit it. They want some success, and that is what we should gear ourselves toward.

## Discussion

The authors suggest that when teaching fails, the beginner's tendency to blame students represents a (predictable) pitfall in the developmental process of learning to teach. They argue further, that if that response is not corrected, further development of teaching expertise may be stunted.

Both observations suggest a strong admonition for teacher educators. If there is to be a reasonably smooth transition from the novice's rudimentary fund of PCK to the more complex (and effective) understandings of a skilled teacher, both the potential pitfalls and the means to avoid them must be a central part of preparation. When instruction fails, beginning teachers should already have learned to look first at their own performance -- and not to the easy escape offered by blaming the students.

In their discussion of directions for future research, the authors take the position that the present study illustrates only a few of the major pitfalls and necessary shifts in thinking that beginning PE teachers must encounter during the early (and developmental) portion of their careers. That assertion suggests not only a fruitful line of inquiry for individuals and institutions with the capacity to pursue such research, but the need for engineering those results into the mechanisms of teacher preparation and inservice teacher development programs. That would be a big message from such a small study, but I urge you to read the original and see for yourself whether or not this report is a mouse that roars.