



Re-conceptualizing Pedagogical Content Knowledge in Physical Education

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The Ohio State University's PCK–CK Research Program: 2005-2012

Major challenges / questions

- Establishing and validating operational definitions of CK (content knowledge) and PCK (pedagogical content knowledge)
- Examining the relationship between CK and PCK?
- Examining the relationship between PCK and student learning?
- What are the effects of changes in teacher's CK on their PCK

Ohio State's Research Program...

- **Conceptual debts**

- Early work influenced by Inez Rovegno's work
- Later work strongly influenced by Deborah Lowenberg Ball's work at University of Michigan in mathematics.

- **Researchers**

Shiri Ayvazo

Insook Kim

Weidong Li

Yun Soo Lee

Paul Stuhr

Sue Sutherland

Phillip Ward



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Pedagogical Content Knowledge is:



**The most powerful analogies,
illustrations, examples,
explanations and demonstrations –
in a word, the ways of representing
and formulating the subject that
makes it comprehensible to others
(Shulman, 1987, p.8)**

Three problems with the PCK construct

It is implicit in Shulman's definition (1986, 1987) and, in fact most definitions, that PCK leads to student learning.

- But this does not explain how PCK might be effective for some students and not for others.
- Nor does it explain varying ranges of PCK (e.g. not all instances of PCK are equal some can be better than others.
- Nor does it explain what is the opposite of PCK?

Distinguishing between PCK and CK

- If I ask you how to teach a handstand this is an example of **Content Knowledge**
- If I ask you how to teach a handstand to 6 year olds this is an example of **Pedagogical Content Knowledge**

One difference is **context**—PCK is context **rich**, content knowledge is context **neutral**.

Pedagogical Content Knowledge ...

– Is context specific

- Teaching beginners gymnastics in a well equipped gymnasium versus teaching them in a less equipped gymnasium

• Is content specific

- Teaching 14 years tennis versus teaching them Cricket

Pedagogical Content Knowledge ...

- We propose that PCK has two elements that can be observed.
 - **Representations of content** (e.g., demonstrations, instructions, concepts) that teachers provide to students
 - **Instructional tasks** (e.g., What the teacher asks students to do).
- Any event of PCK (e.g., task or representation) can be described along a continuum

PCK Effectiveness as a Continuum



(Ayvazo, 2007; Lee, 2009; Kim 2011)

Here are two examples of a teacher describing a log roll:

- “I want you to stay straight and roll to the side”.
- “Have you seen a log? It is straight, firm and long. Look at Trevor, he is lying like a log on the mat, his body is stretched, his arms and legs are together and straight. He is now going to roll like a log.”



Maturity of the teacher's representations (PCK) as a continuum



- Teachers need “**strong PCK**” Shulman (1987)
- “**Strong**”, “**weak**”, and “**immature**” PCK
(Ayvazo & Ward, (in press); Kim 2011; Chen, 2004; McCaughtry & Rovegno, 2003; Rovegno, 1992; Tsangaridou, 2002)

Developmental appropriateness of tasks

Immature

PCK



Mature

PCK

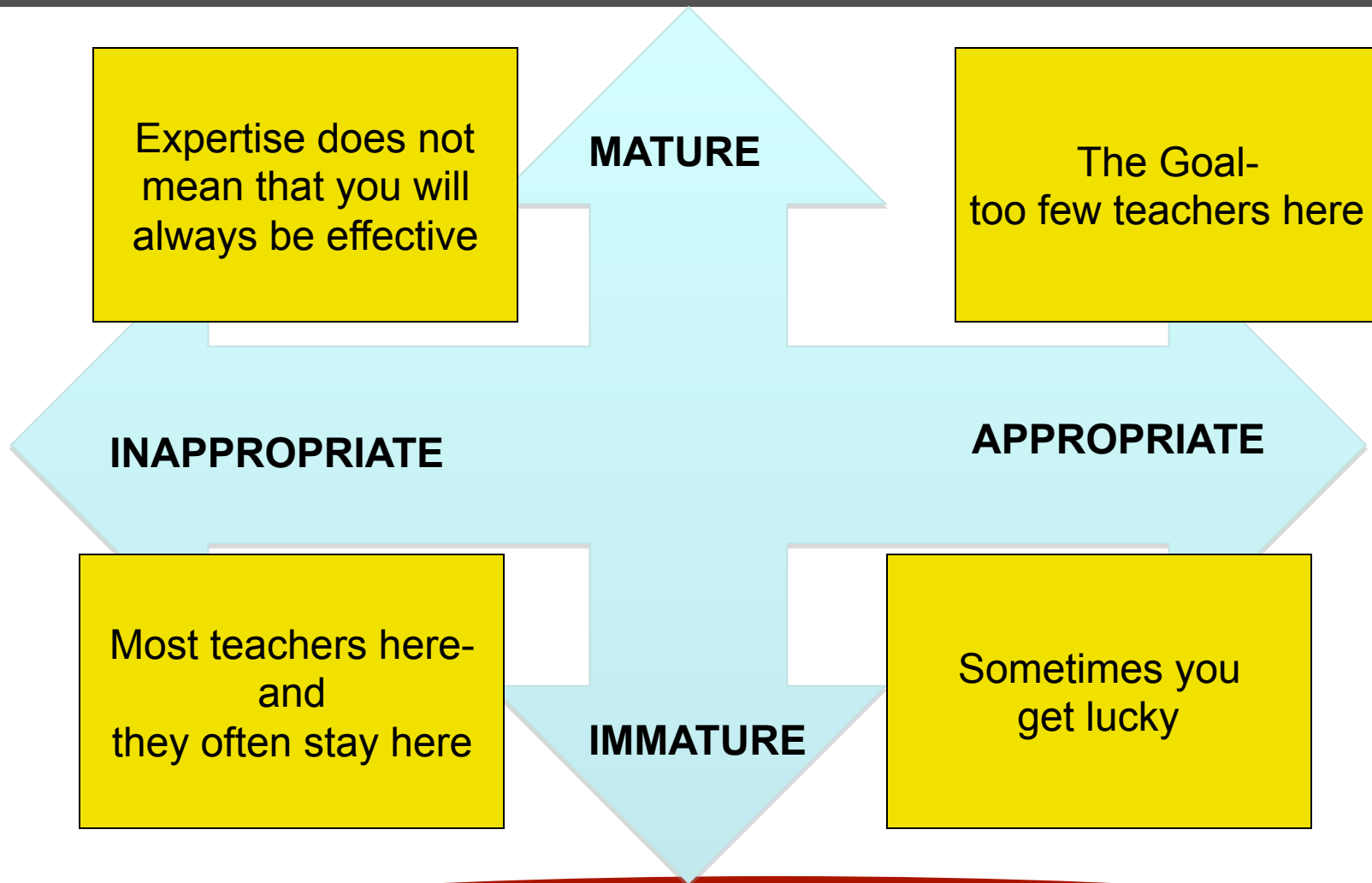
- Teaching throwing to 6-year olds; 10-year olds and 15 year olds.

AND

- Correctness of tasks (e.g., technically or tactically incorrect)

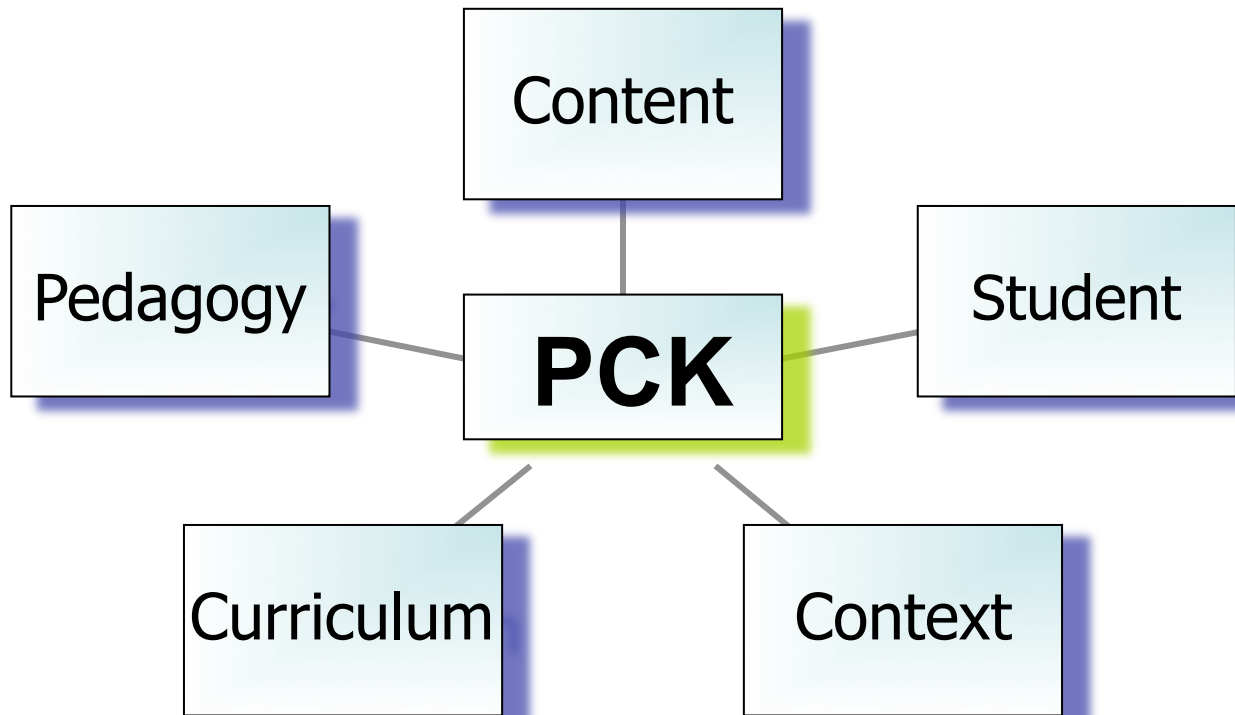
(Ayvazo, 2007; Cohen, 2007; Kim, 2011; Lee, 2010)

Combining the Continuums



Pedagogical Content Knowledge (PCK)

Informed by:



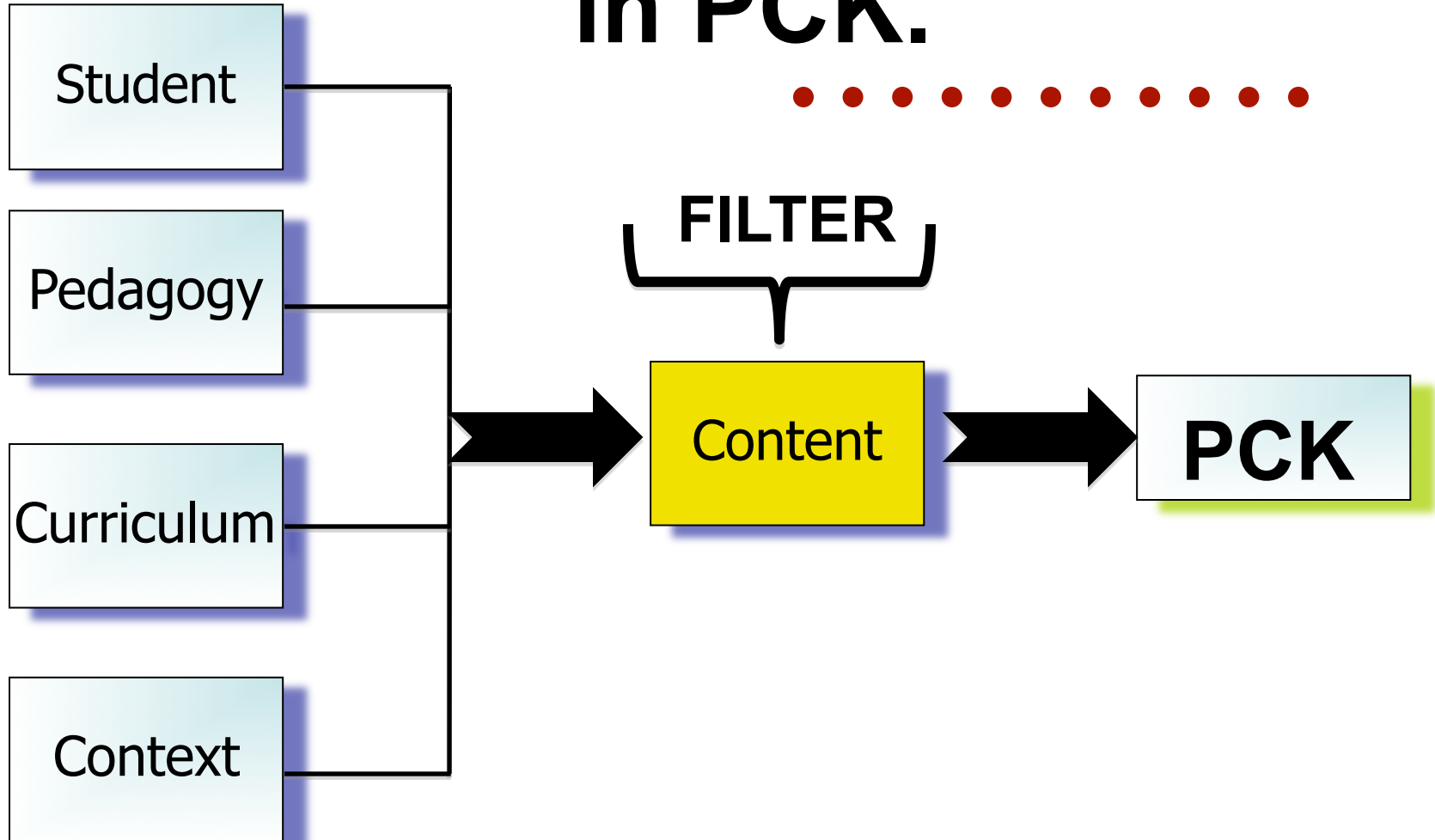
Grossman (1990)

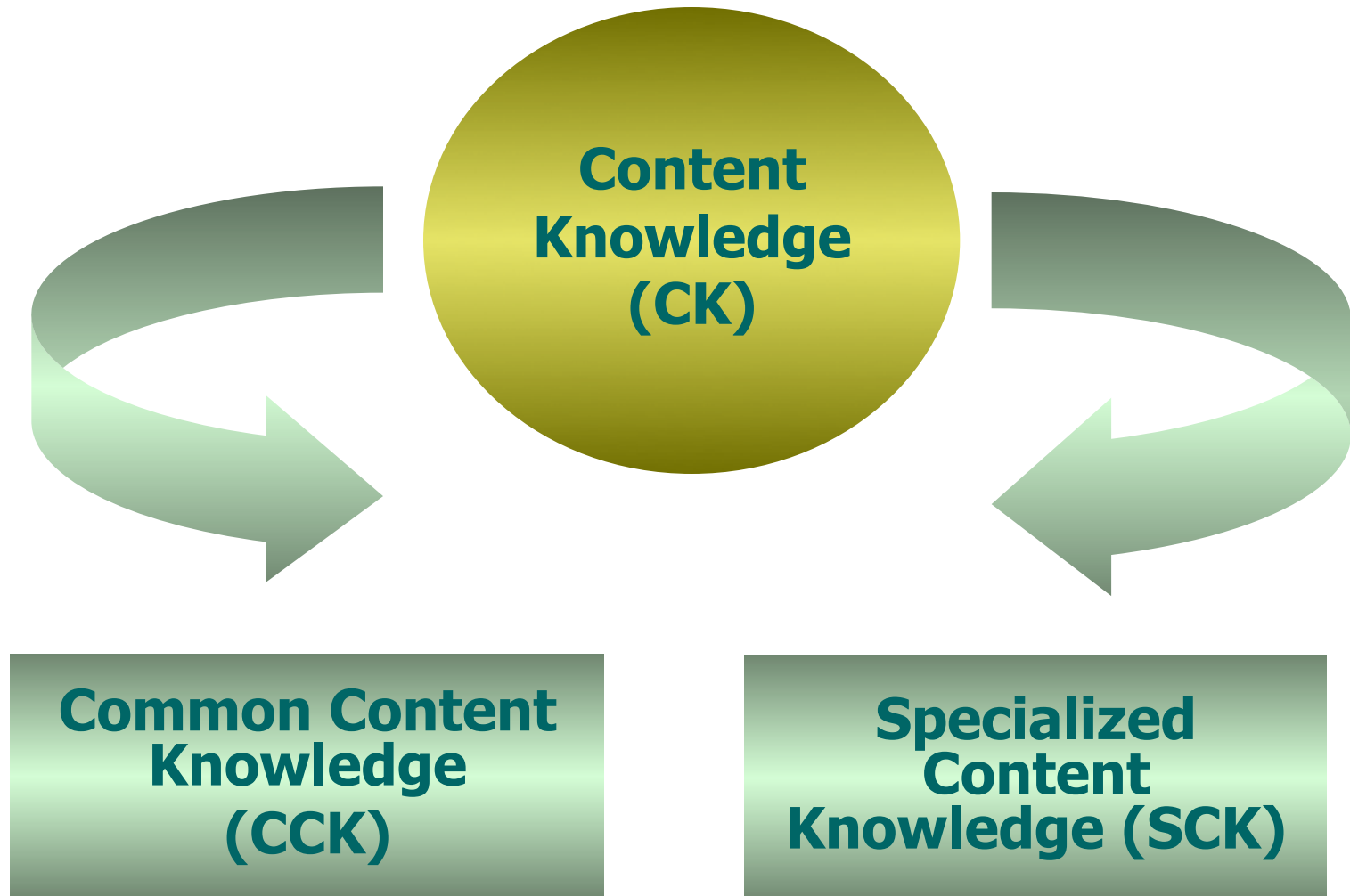
A working definition of PCK

PCK is a focal point, a locus, defined as such as an **event in time** (and therefore specific contextually) where teachers make **decisions in terms of content** based on their understandings of a **number of knowledge bases** (e.g., pedagogy, students, content, curriculum)

Ward 2009

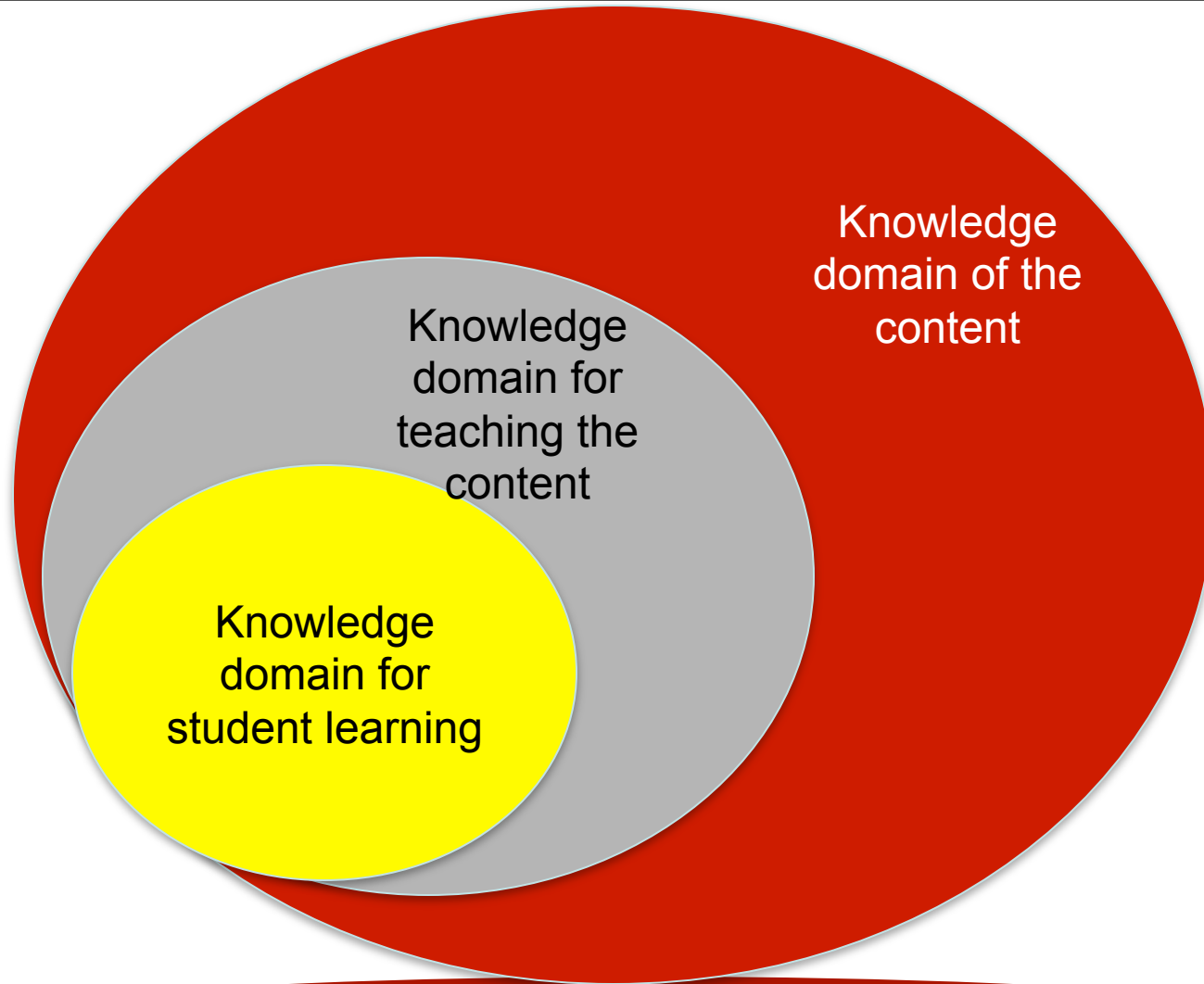
Centrality of content knowledge in PCK.





Ball, Thames & Phelps (2008)

COMMON CONTENT KNOWLEDGE



Physical Education CK Domains

Ward (2005; 2009)



- Rules, Etiquette, Safety
- Technique and Tactics
- Visual discrimination of correct and incorrect performance
- Representation of the content (e.g., demonstration & descriptions) and instructional tasks

CCK

SCK

Rules & Etiquette

Technique & Tactics

Error Detection

Tasks & Representations

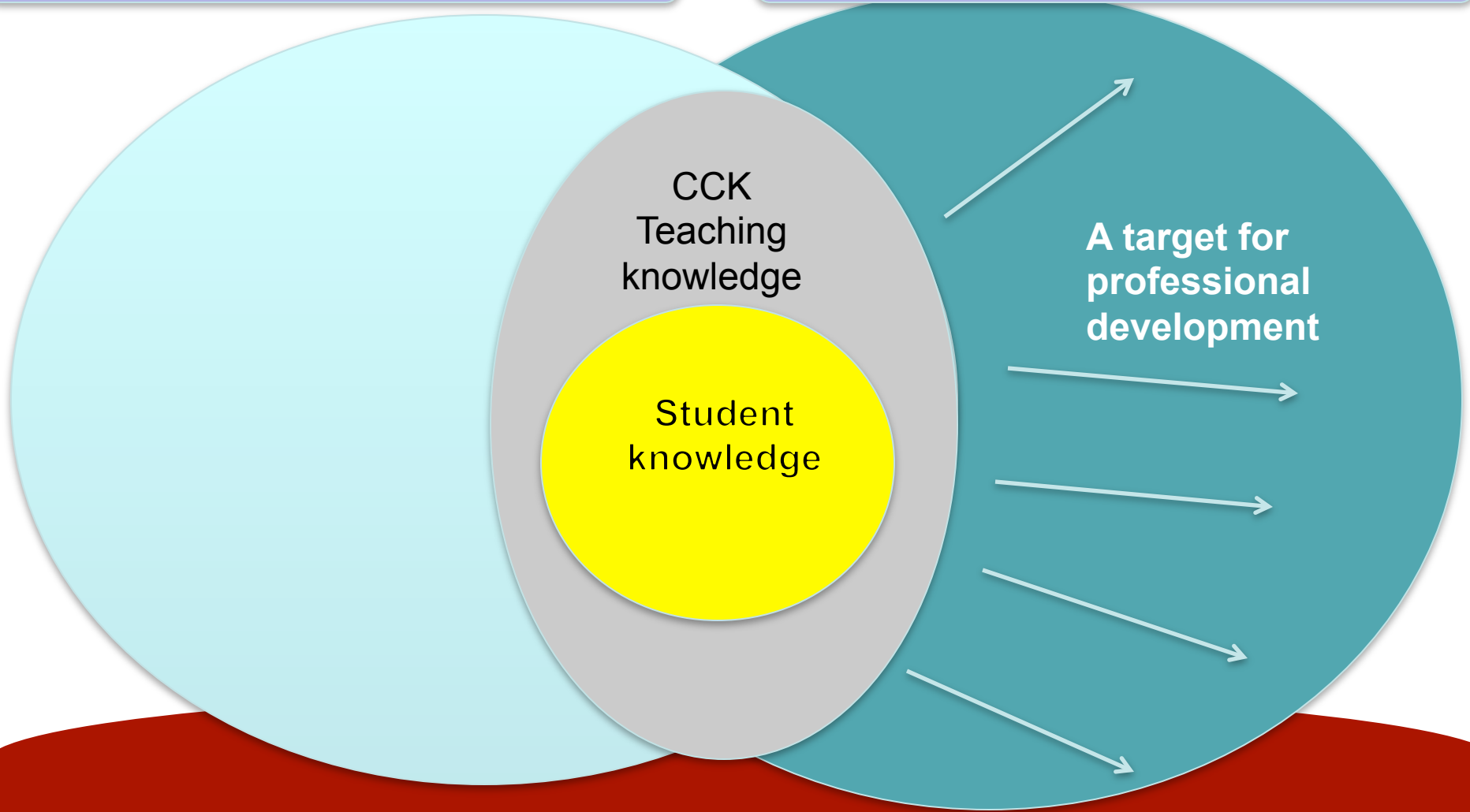


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CONTENT KNOWLEDGE

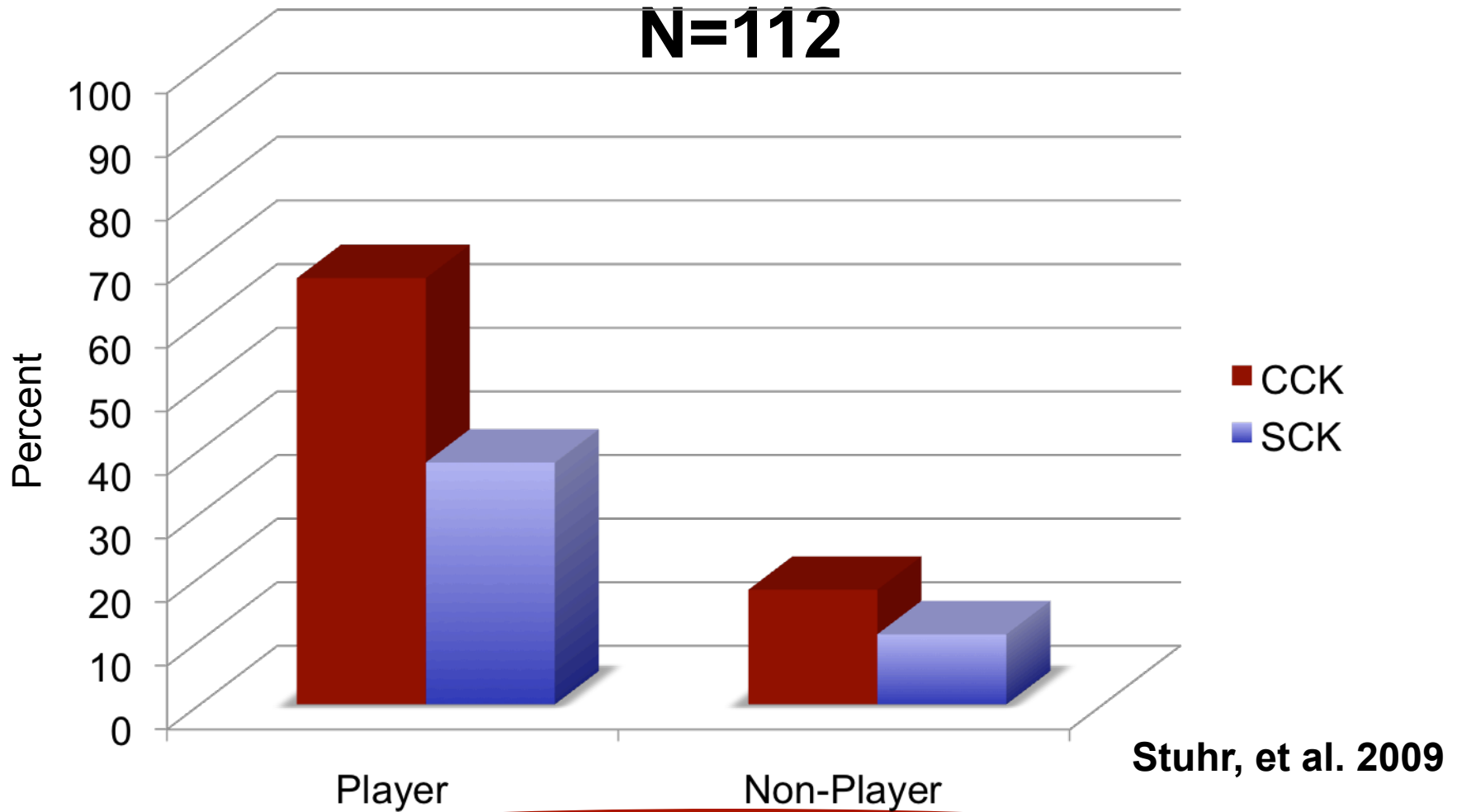
Common Content Knowledge (CCK)

Specialized Content Knowledge (SCK)



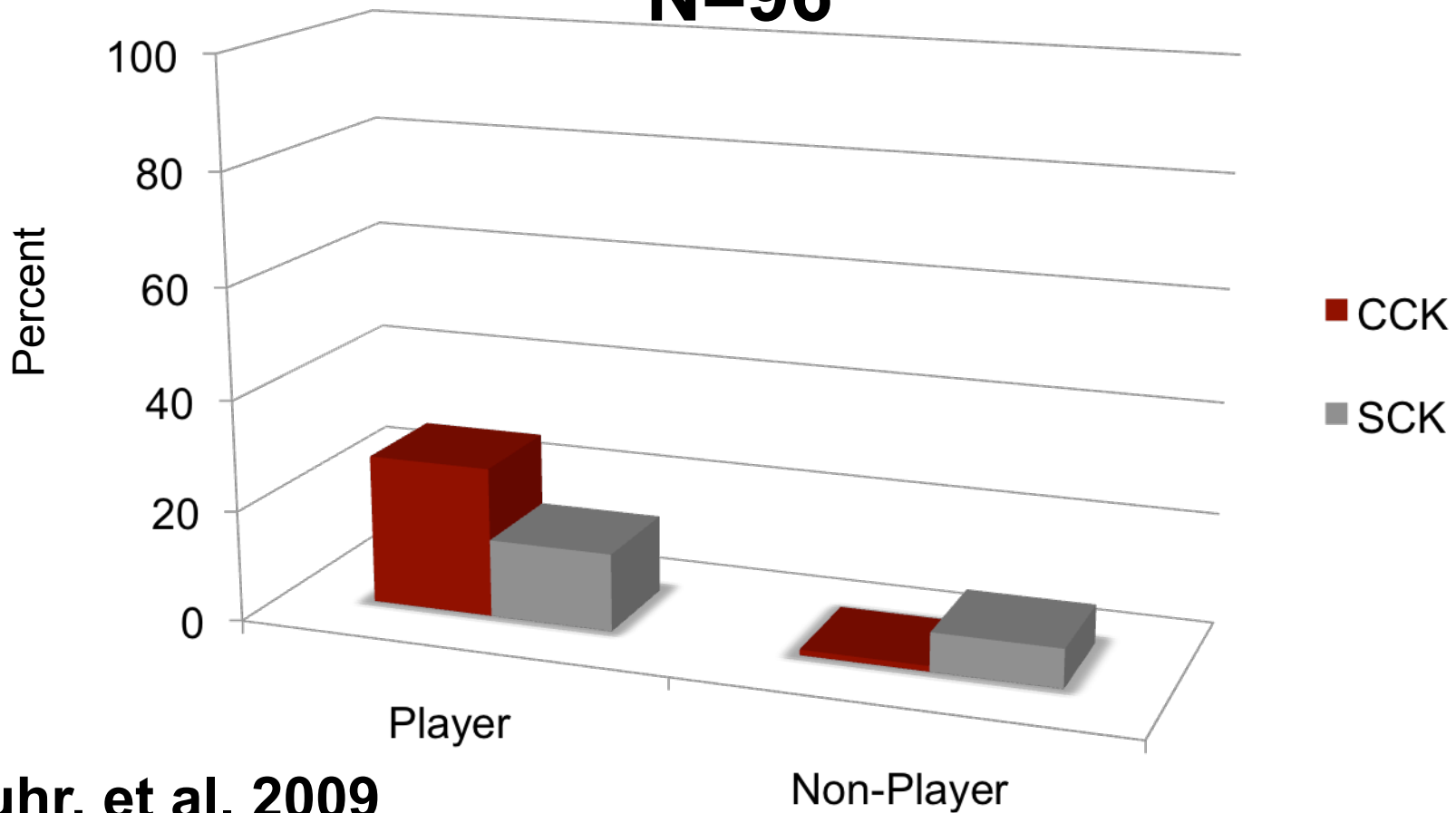
Content Knowledge of Basketball as a Function of Playing History

N=112



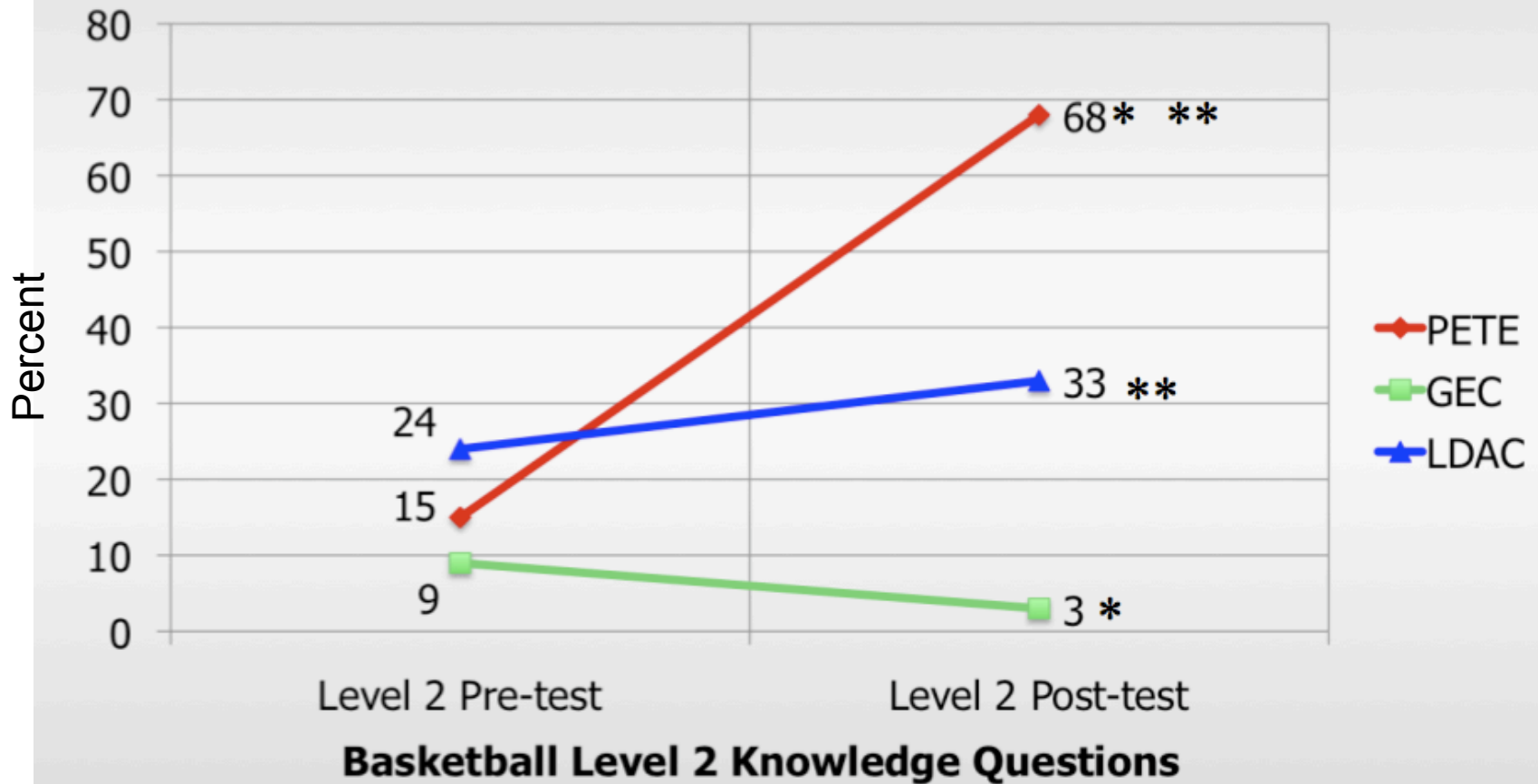
Content Knowledge of Soccer as a Function of Playing History

N=96



Stuhr, et al. 2009

Basketball Group Comparison



* $p < .001$ PETE vs GEC

** $p < .001$ PETE vs LDAC

Stuhr, et al, 2009

Conclusions

- Teaching physical education effectively requires **specialized content knowledge**.
- Specialized content knowledge requires a **special kind of instruction grounded in practice**.
- Teachers need opportunities to develop specialized content knowledge.



Thank you

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