THE OHIO STATE UNIVERSITY

Specialized Content Knowledge: One Cannot Teach What One Does Not Know!

Phillip Ward

14th International Sport Sciences Congress,
1-4 November, 2016 ● Antalya-Turkey

Main Argument

The improvement of teaching, in both pre-service and in-service settings, requires a *focus on the practice of teaching*.

*The **practice of teaching** should be grounded in the content to be taught relative to the needs of the students and state or national standards.*

Focusing on Practice of Teaching

Much of what we are doing in teacher education is neither empirically based nor is it working.

What we are doing too often is not focusing on the **practice of teaching,** but instead focusing on **theories of teaching that are unproven**.

- Not an argument to eliminate the study of theory, **but an argument for the application of theories that are validated**.

Focusing on Practice of Teaching

A focus on the practice of teaching requires a much more sophisticated and precise understanding of the process of teaching and of teacher education.

Teaching exists to support student learning?

A common outcome of teaching physical education is that students do not become skillful or knowledgeable in the content that is taught.

The consequences of these outcomes…

are more profound than the failure to achieve commonly espoused rationales for physical education such as those focusing on

- health,
- academic, or
- economic outcomes.

The more significant consequences are that children and youth fail to encounter the **"joy of moving"** as a recurring experience from their participation in physical education.

Experiencing **joy of movement** is a precursor to achieving sustained outcomes.

But to experience joy moving in an instructional setting requires at least some degree of movement competence.

How to best serve children and youth?

There are only three ways to improve at scale student learning:

Elmore, Fiarman & Teitel 2010

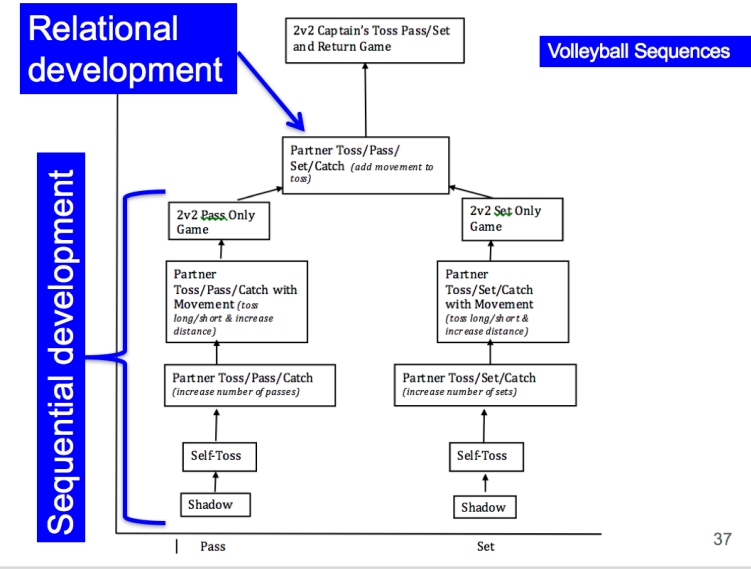
#1 Improving learning at scale

Increase the level of knowledge and skill that the teacher brings to the instructional process

- Knowledge and skills of evidence-based pedagogy and curricula
- Knowledge of the characteristics of students (learning, developmental and cultural characteristics)

#2 Improving learning at scale

- **Increase the level and complexity of the content that students learn.**
  - Improve the content knowledge of teachers
  - Create deeper understanding by teachers through the unpacking of content.



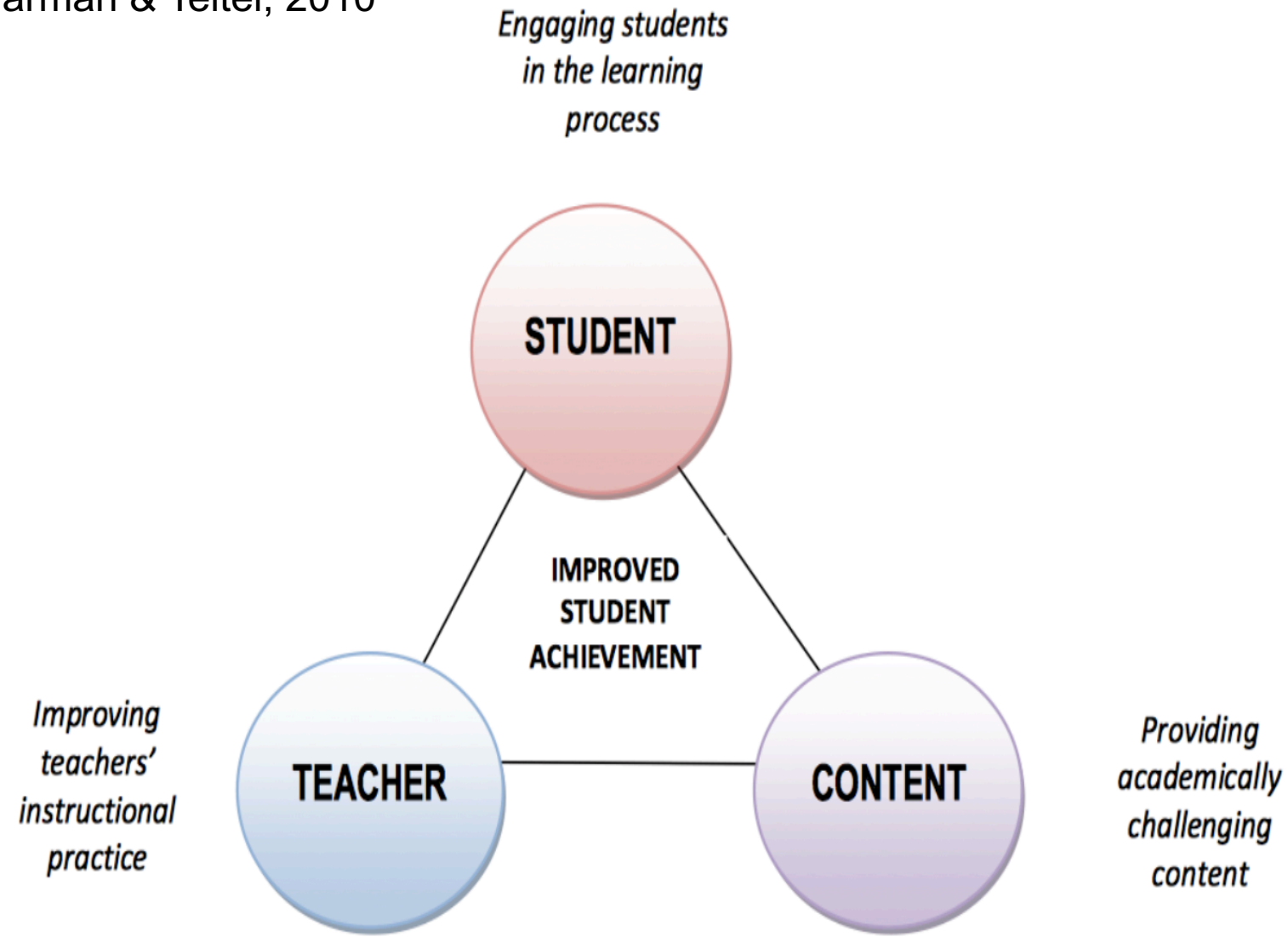
#3 Improving learning at scale

Change the role of the student in the instructional process

- Sport Education
- Play Practice
- Teaching Games for Understanding
- Adventure Based Learning

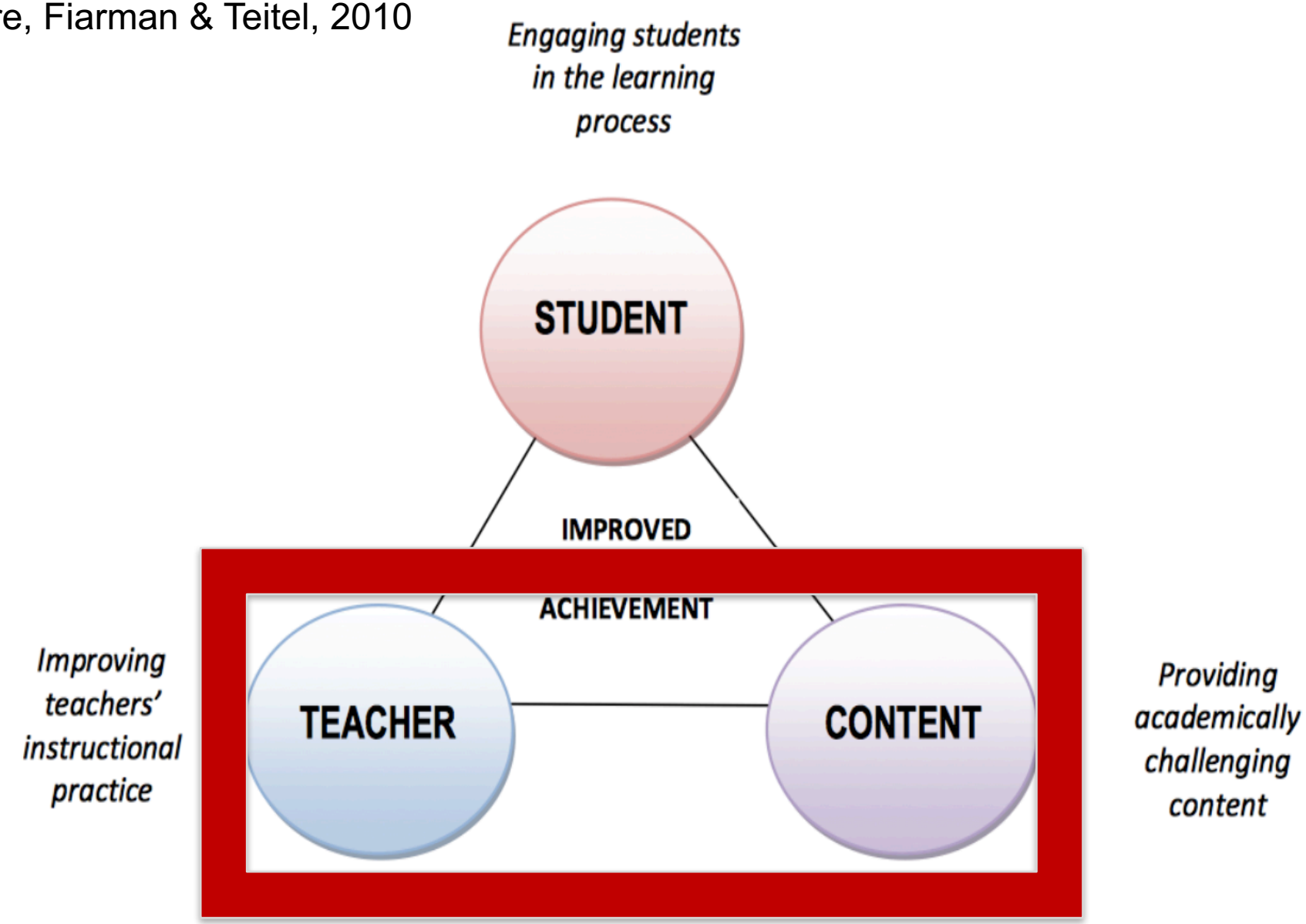
If you are not doing one of these three things, you are not improving instruction and learning

Elmore, Fiarman & Teitel, 2010



THE INSTRUCTIONAL CORE

Elmore, Fiarman & Teitel, 2010



An introductory task…

Consider the technique of the handstand!

Consider the sequence of task progressions for teaching the handstand from initial weight bearing to performing the handstand unassisted!

Which task progressions would you exclude if you were teaching 14 yr-olds (8th grade) who had at least one previous unit of gymnastics in school?

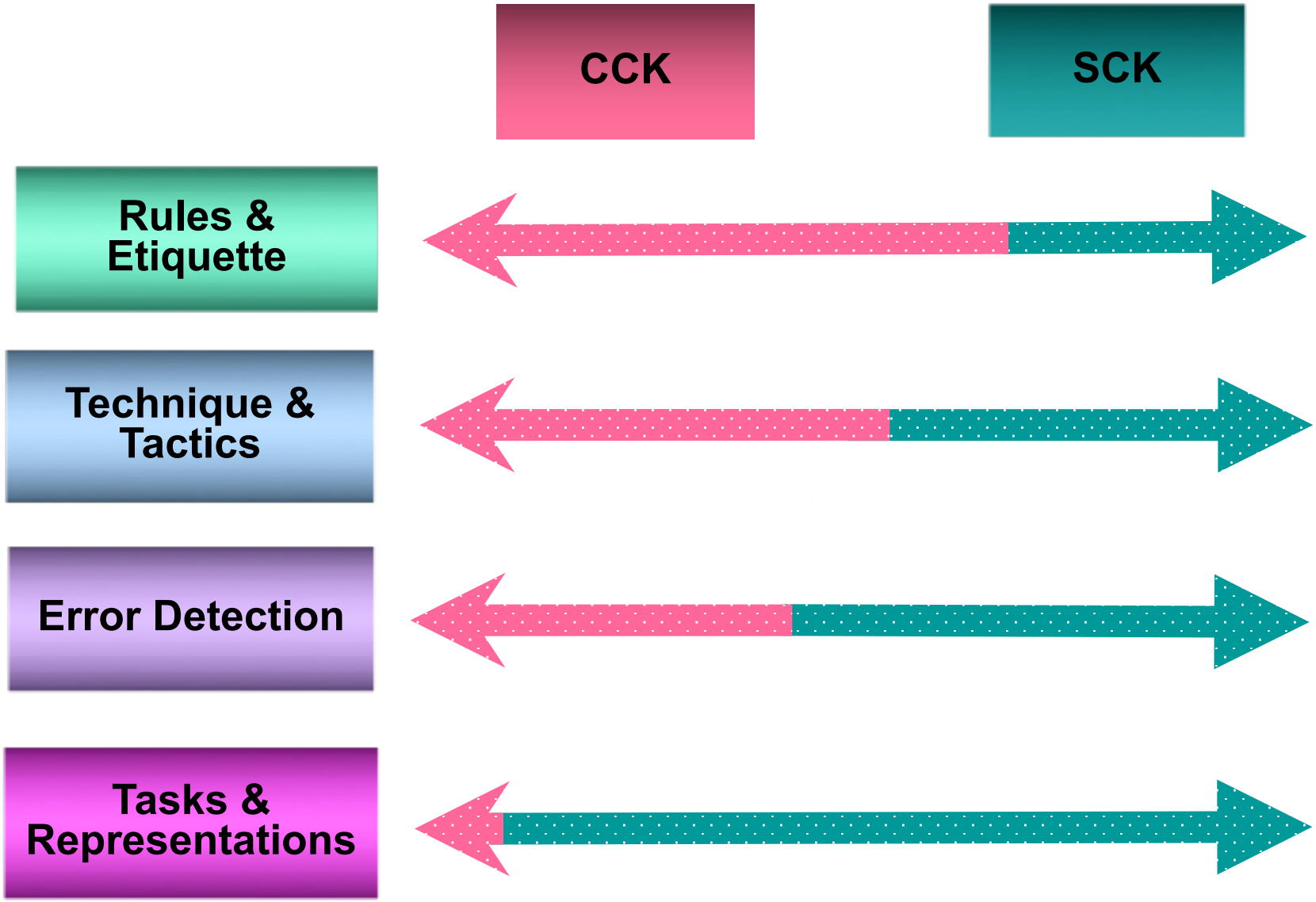
Which task progressions would you exclude if you were teaching 6 year olds (1st grade) who had little experience with weight bearing on their hands?

What kinds of knowledge did you just use?

Common Content Knowledge (CCK)

Specialized Content Knowledge (SCK)

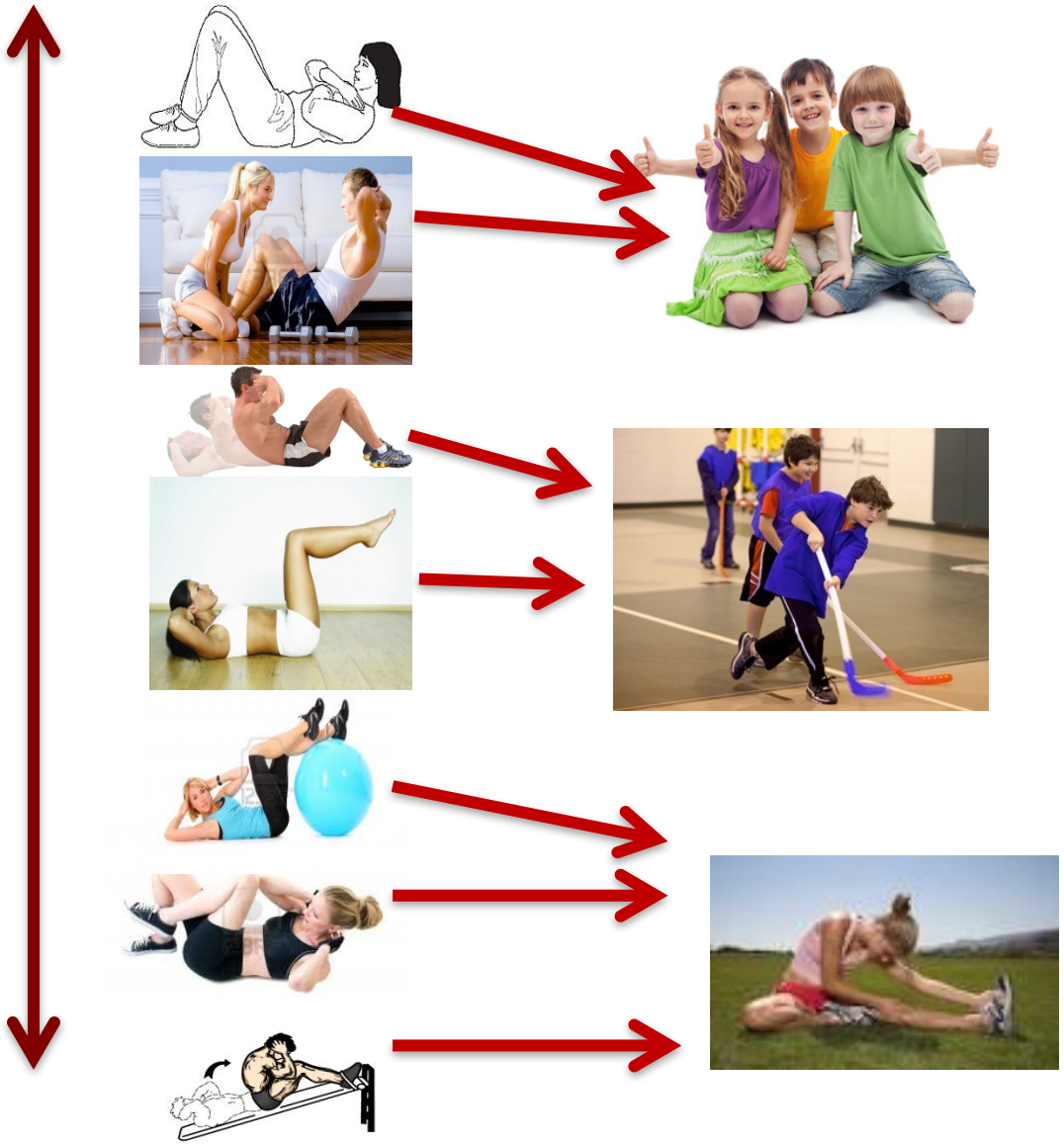
Ball, Thames & Phelps (2008)


CCK
SCK
Rules & Etiquette
Technique & Tactics
Error Detection
Tasks & Representations

Fitness Exercise Content Knowledge

Common Content Knowledge | **Specialized Content Knowledge** | **Pedagogical Content Knowledge**

Lie on your back on the floor, bend your knees 90 degrees, and plant your feet flat. Tuck your chin slightly toward your chest…..



Basketball Content Knowledge

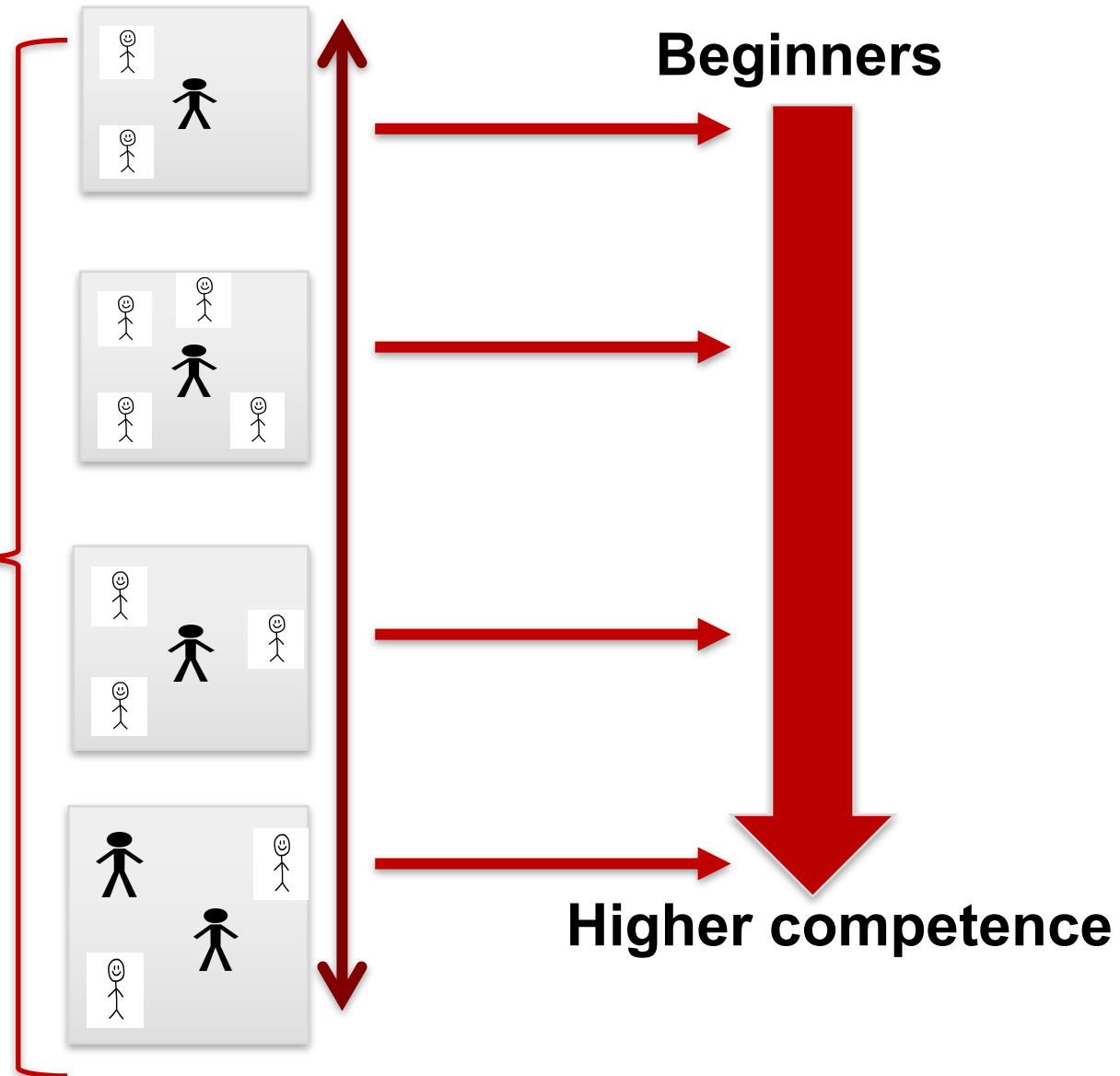
Common Content Knowledge | **Specialized Content Knowledge** | **Pedagogical Content Knowledge**

- Off the ball players: **move away from the defender**
- On the ball players: **Pass to the open player**

Defense walks no interceptions

Defense jogs no interceptions

Defense runs and intercepts



Checking for understanding..

The critical elements - the technique of the handstand!

The sequence of task progressions for the teaching the handstand from initial weight bearing to performing the handstand unassisted!

Which task progressions would you exclude if you were teaching 8th graders who had at least two previous units of gymnastics?

Which task progressions would you exclude if you were teaching 1st graders who little experience with weight bearing on their hands?

Common Content Knowledge (CCK)

Specialized Content Knowledge (SCK)

Pedagogical Content Knowledge (PCK)

Checking for understanding..

The critical elements- technique of the handstand!

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Common Content Knowledge (CCK)

Specialized Content Knowledge (SCK)

Pedagogical Content Knowledge (PCK)

Common Content Knowledge? Measurement: Knowledge Tests

Specialized Content Knowledge?
Measurement:
Depth of Content Knowledge

Content Development, Rink (1979)

Informing tasks

- The initial task in a sequence of instruction

Extending tasks

- Tasks that make the initial task more difficult or easier.

Refining tasks

- Tasks that focus on improving the technique or tactics

Applying tasks

- Games and assessment tasks.

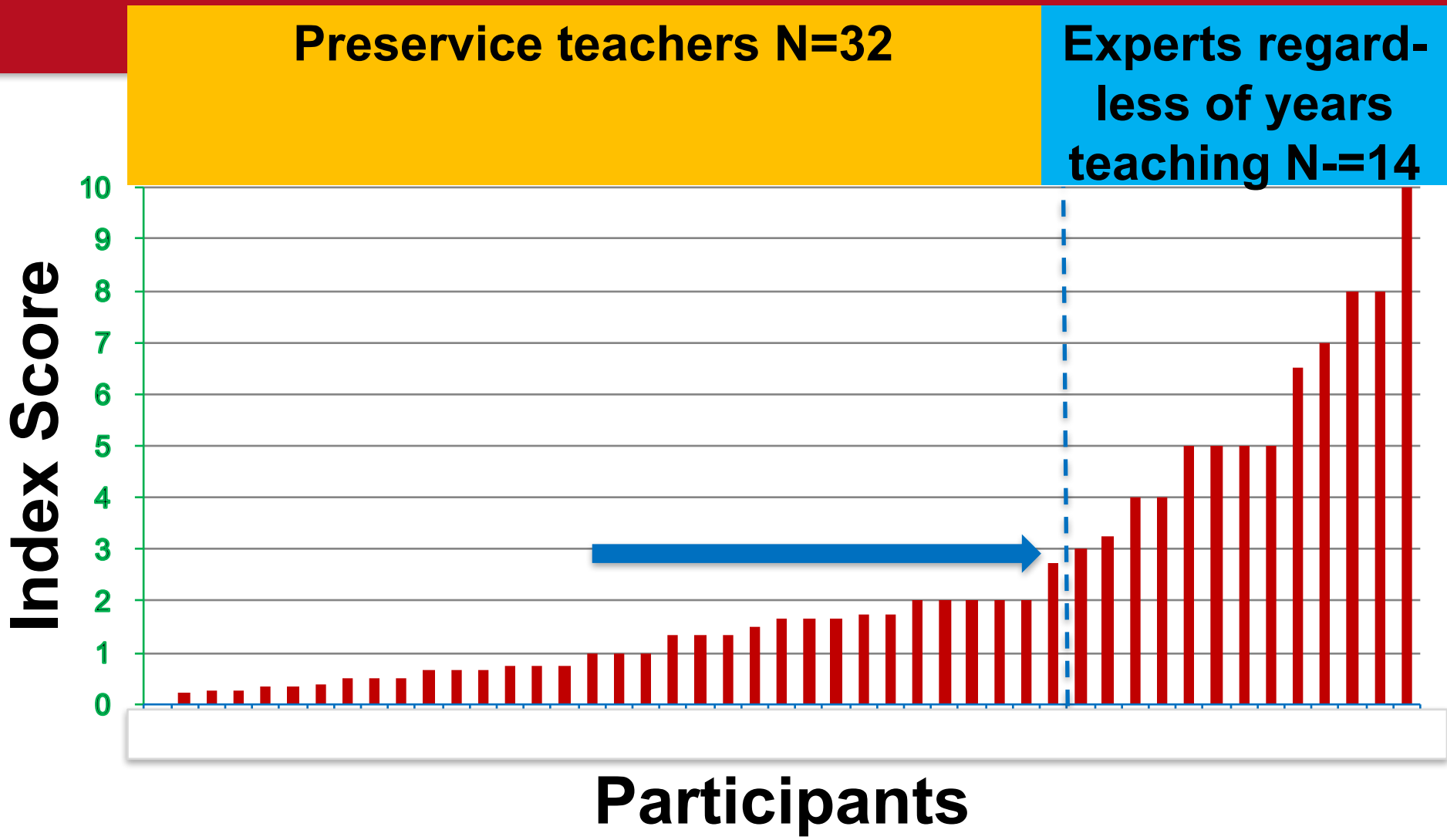
Depth of Content Development

$$\frac{Extending + Refining + Applying}{Informing\ tasks}$$

$$\frac{\text{3 Extending + 0 Refining+ 1 Applying}}{\text{4 Informing tasks}} = \text{1.0}$$

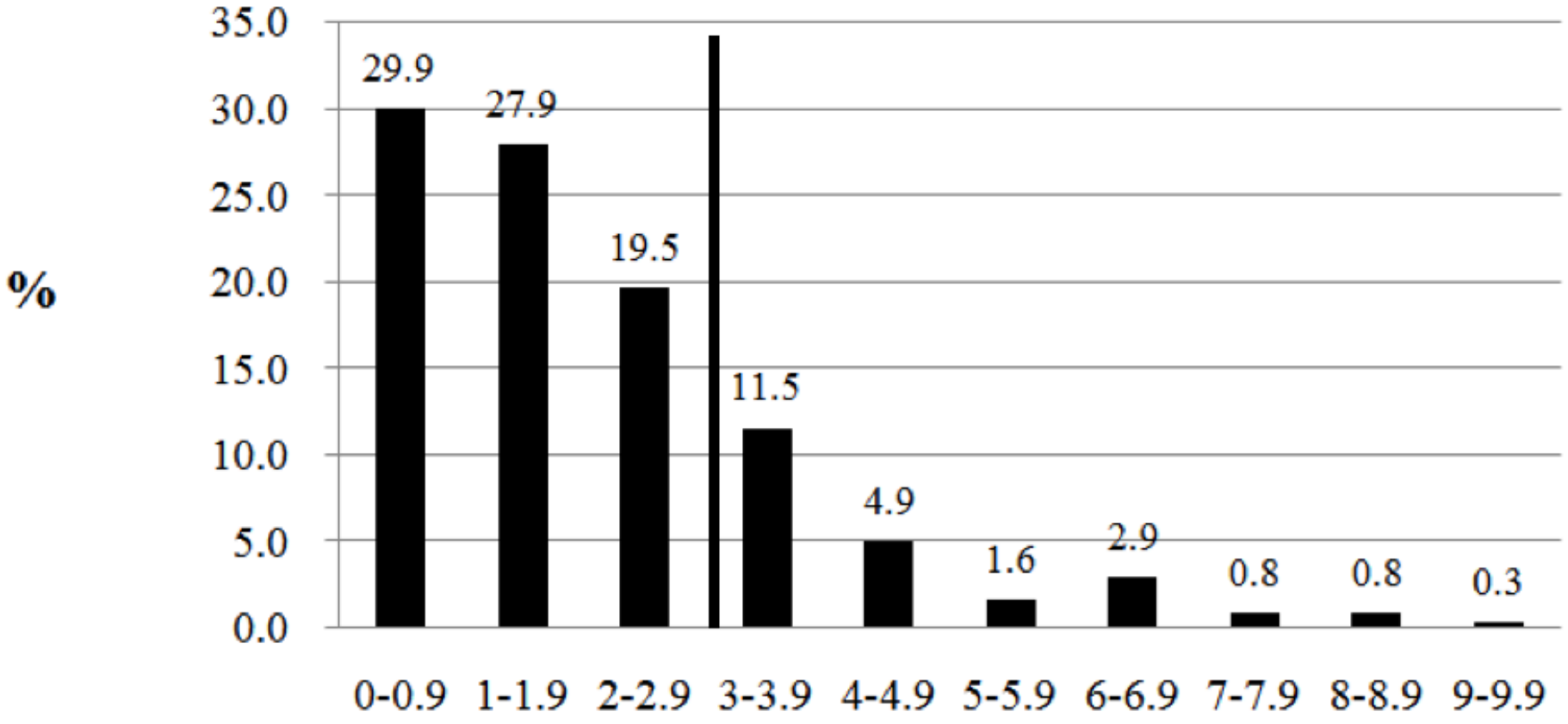
$$\frac{\text{5 Extending + 4 Refining + 3 Applying}}{\text{4 Informing tasks}} = \text{3.0}$$

SCK Index Scores Low to High Expertise



Ward, Dervent, Lee, Ko, Kim, & Tao, (in press)

Depth of Specialized Content Knowledge of Soccer - 384 secondary PE teachers



Ward, He; Wang, & Li, in review

Four Problematic Assumptions

1. Teachers have good CCK as a result of their sporting and activity experiences, from their teacher education program and from experience teaching?
2. Teachers have acquired good SCK from K-12 and extra curricula sporting experiences in their youth.
3. Teachers acquire SCK in their teacher education program.
4. Teachers acquire SCK through experience.

Assumption 1.

Teachers have good CCK as a result of their sporting and activity experiences, from their teacher education program and from experience teaching?

Three CCK studies across two decades

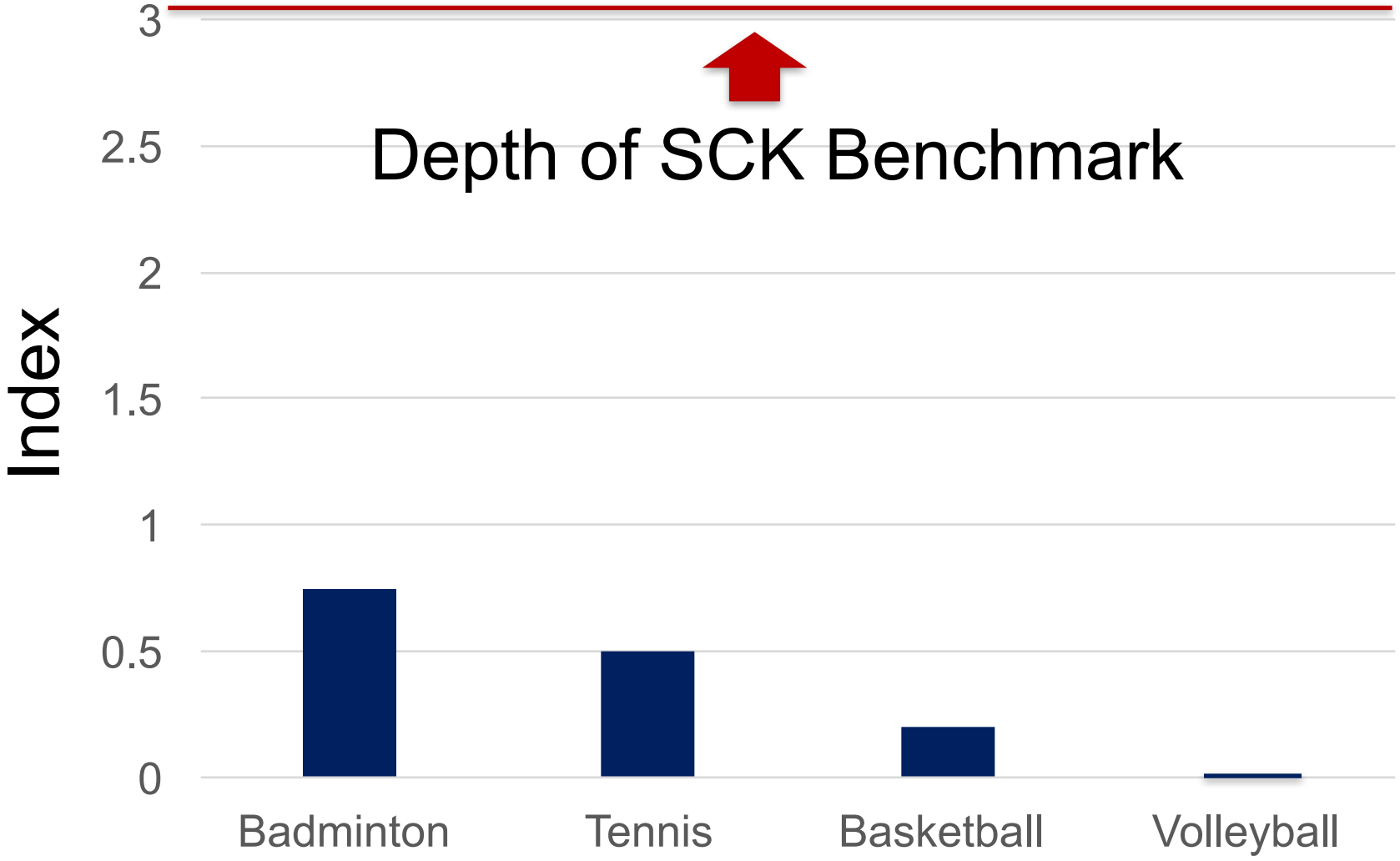
- **Miller and Housner (1998)**
  - Health-related fitness knowledge among inservice and preservice teachers (N=54).
  - In-service and pre-service teachers scored poorly on the 40-item knowledge test with mean scores below 66%.
- **Castelli and Williams (2007)**
  - 73 middle school PE teachers who reported being very confident in their knowledge of health-related fitness.
  - 45 (62%) of the teachers failed the 9th grade test.
- **Disch, Santiago, and Morales (2012)**
  - 40-item health-related fitness knowledge instrument.
  - Pre-service (N=89) and in-service (N=61) teachers.
  - Scores of 54.8% and 57.5% respectively.

Assumption 2.

Teachers have acquired substantive SCK from K-12 and extra curricula sporting experiences in their youth.

Specialized Content Knowledge

190 Undergraduate students PE= 72; Other Majors N= 119

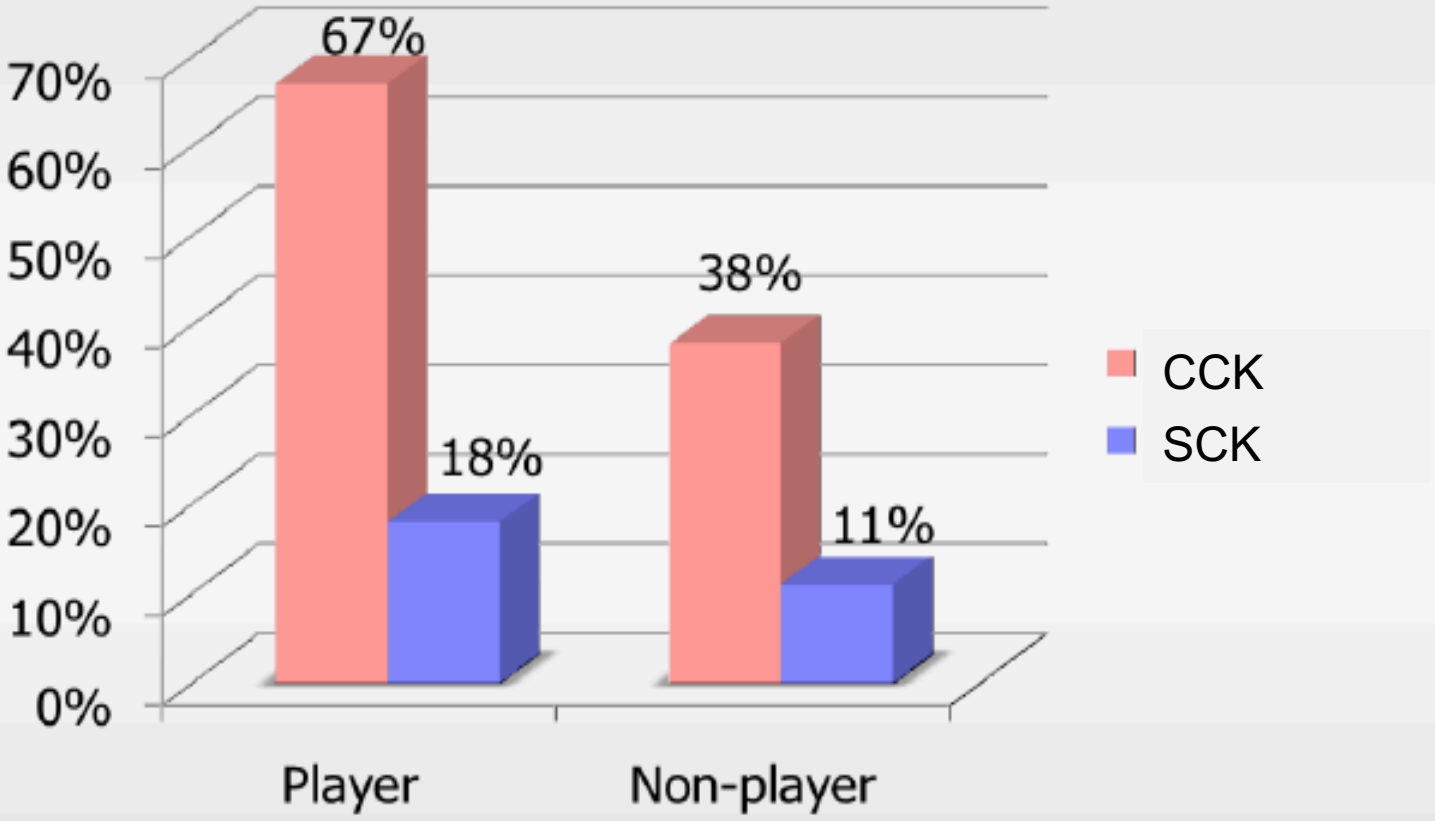


Ward, Tsuda, Dervent, & Devrilmez, In review

Assumption 3.

Teachers acquire CCK and SCK in their teacher education program.

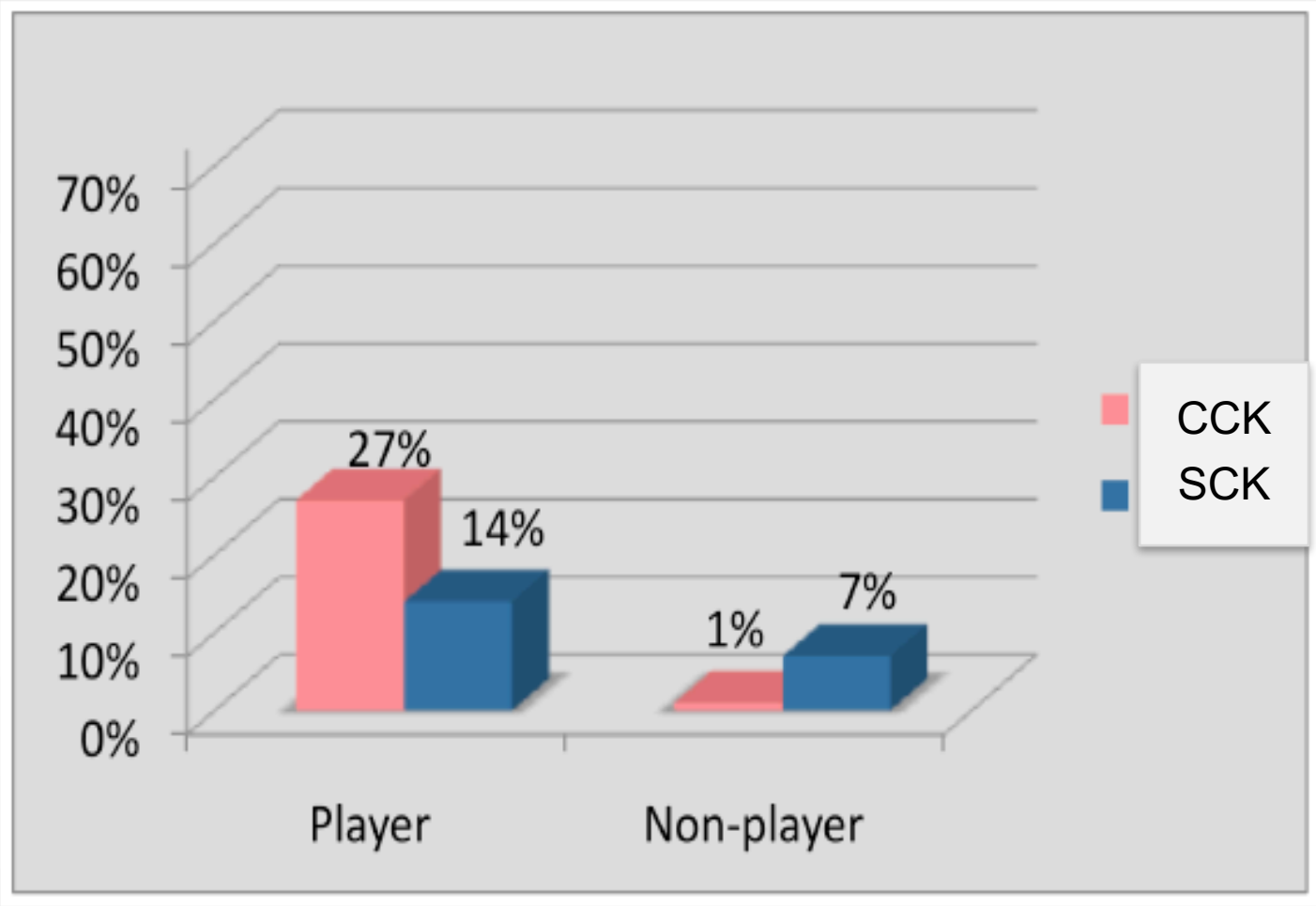
Basketball Knowledge Comparison



116 Physical Education Teachers. 24 item MC test

(Stuhr, et al., 2009)

Soccer Knowledge Comparison



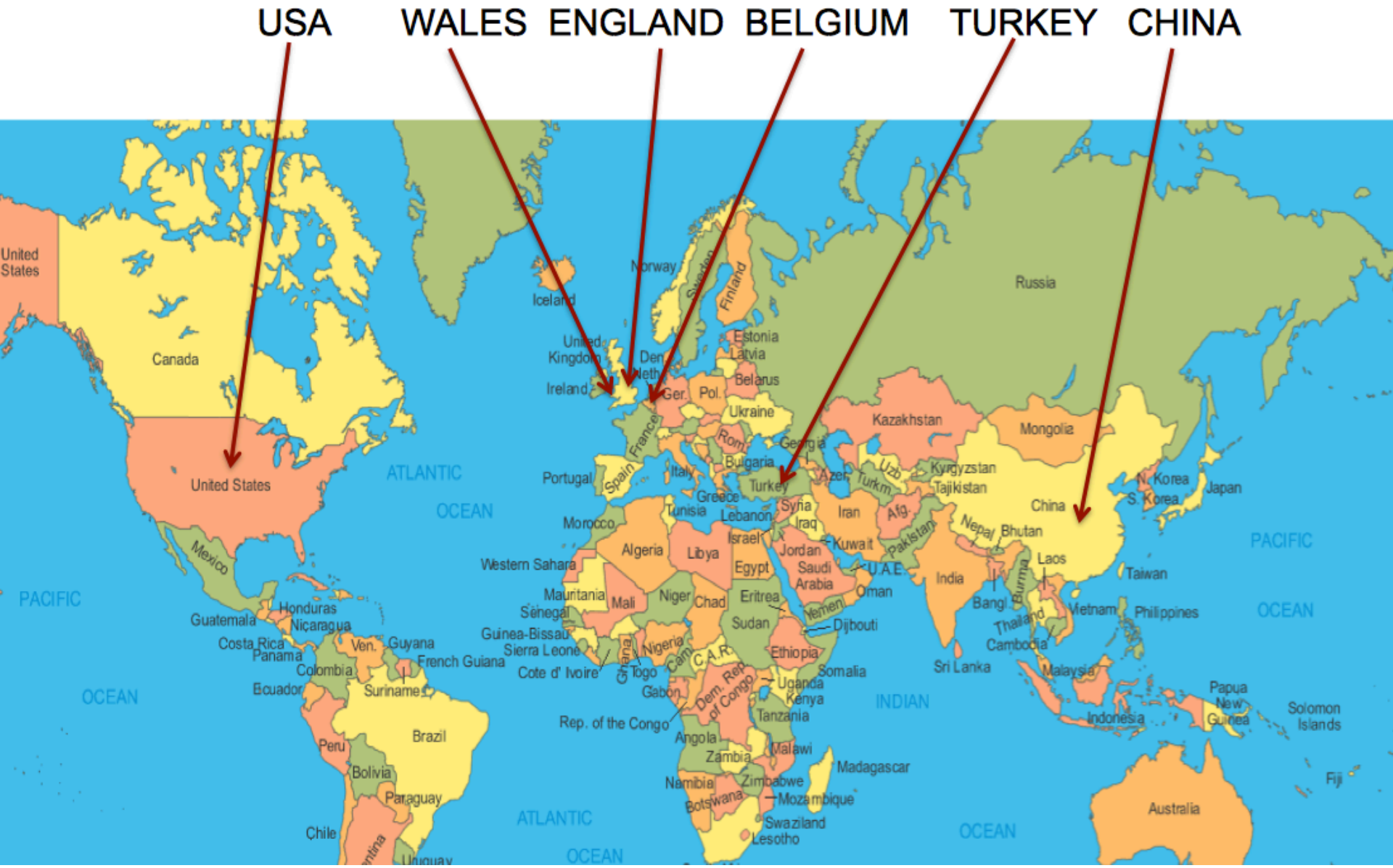
Stuhr, et al., 2009

All Teacher Education Programs in the state of Ohio, USA and in the country of South Korea

- All universities in South Korea with a PE program (N =28).
- All universities in Ohio with a PE program (N=24)
- Examined course content using syllabi
- Predominate focus in both settings:
  - Mostly CCK, little SCK
  - Korean universities (17 CCK courses) much more CCK than Ohio universities (1-7 CCK courses)

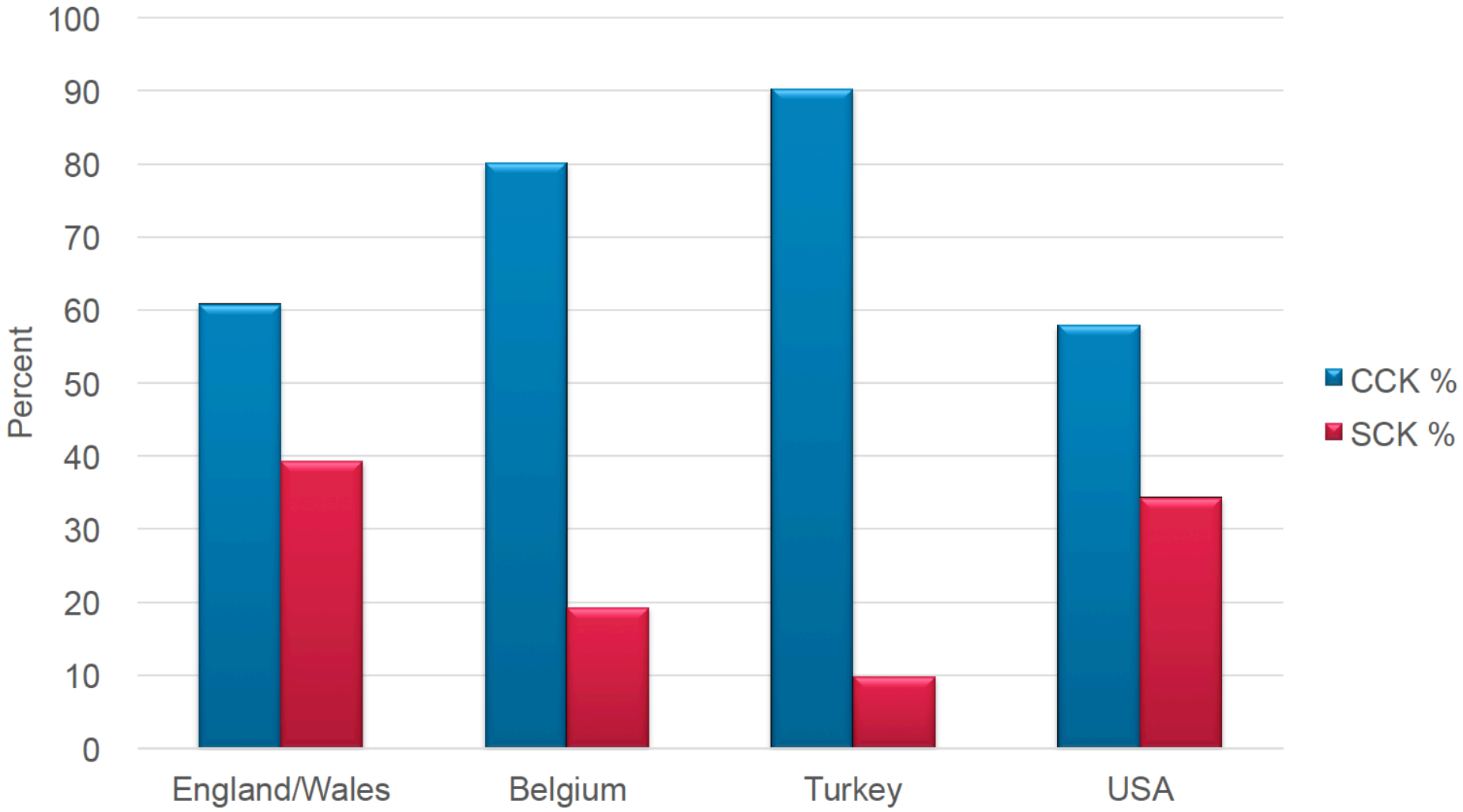
(Ward, Li, Kim & Lee, 2012)

Our Study Locations



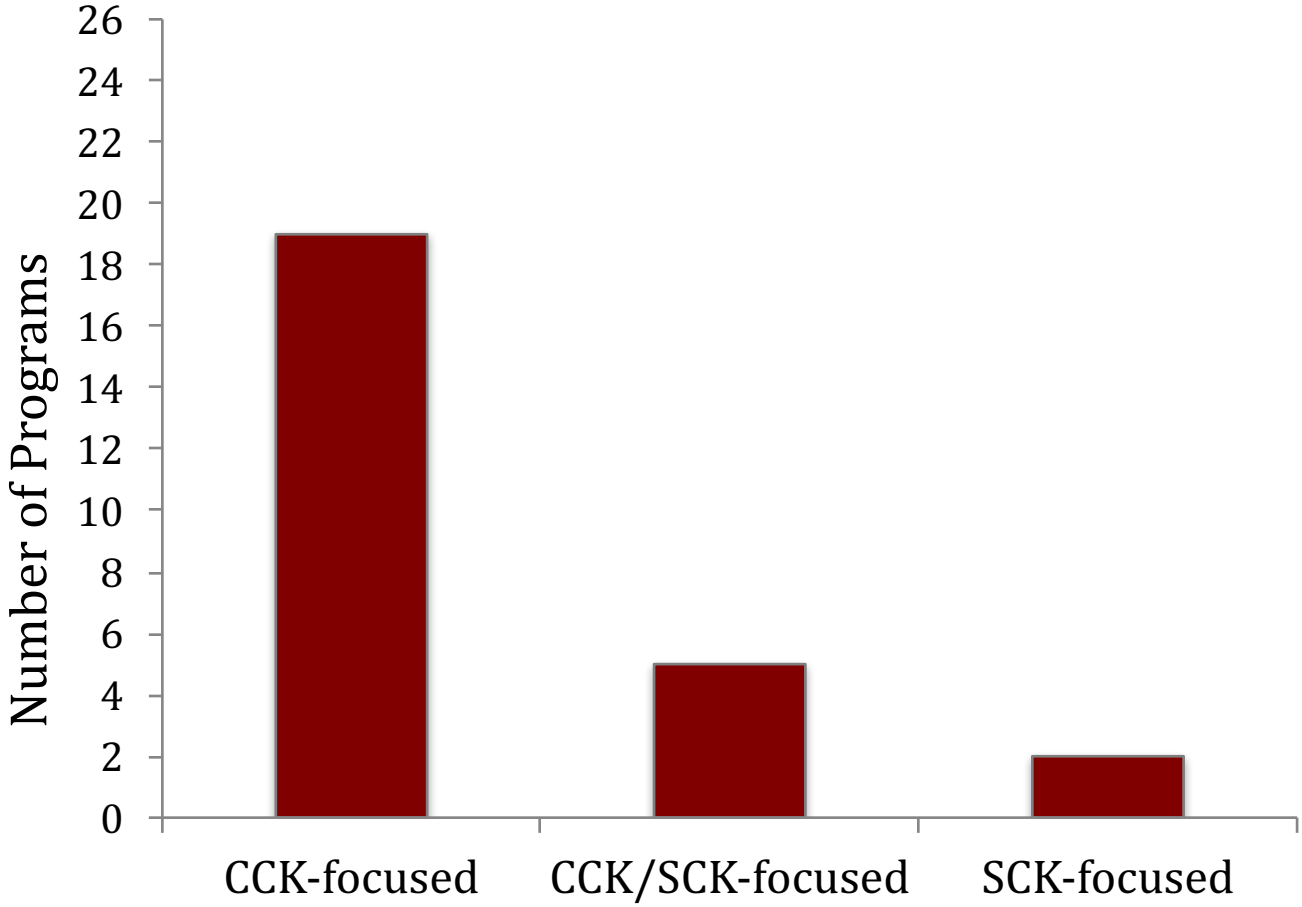
Ward, P., Ince L. M., Iserbyt, P., Kim, I., Lee, Y. S., Li, W., & Lui W. (2013).

Distribution of CCK vs. SCK in each country as reported in syllabi.



Ward, P., Ince L. M., Iserbyt, P., Kim, I., Lee, Y. S., Li, W., & Lui W. (2013).

A Sample of 26 US. PETE programs Date from Syllabi. 2 per institution



Kim, I., Lee, Y. S. Ward, P., & Li, W. (2015).

Assumption 4.

Teachers acquire SCK through the experiences of teaching

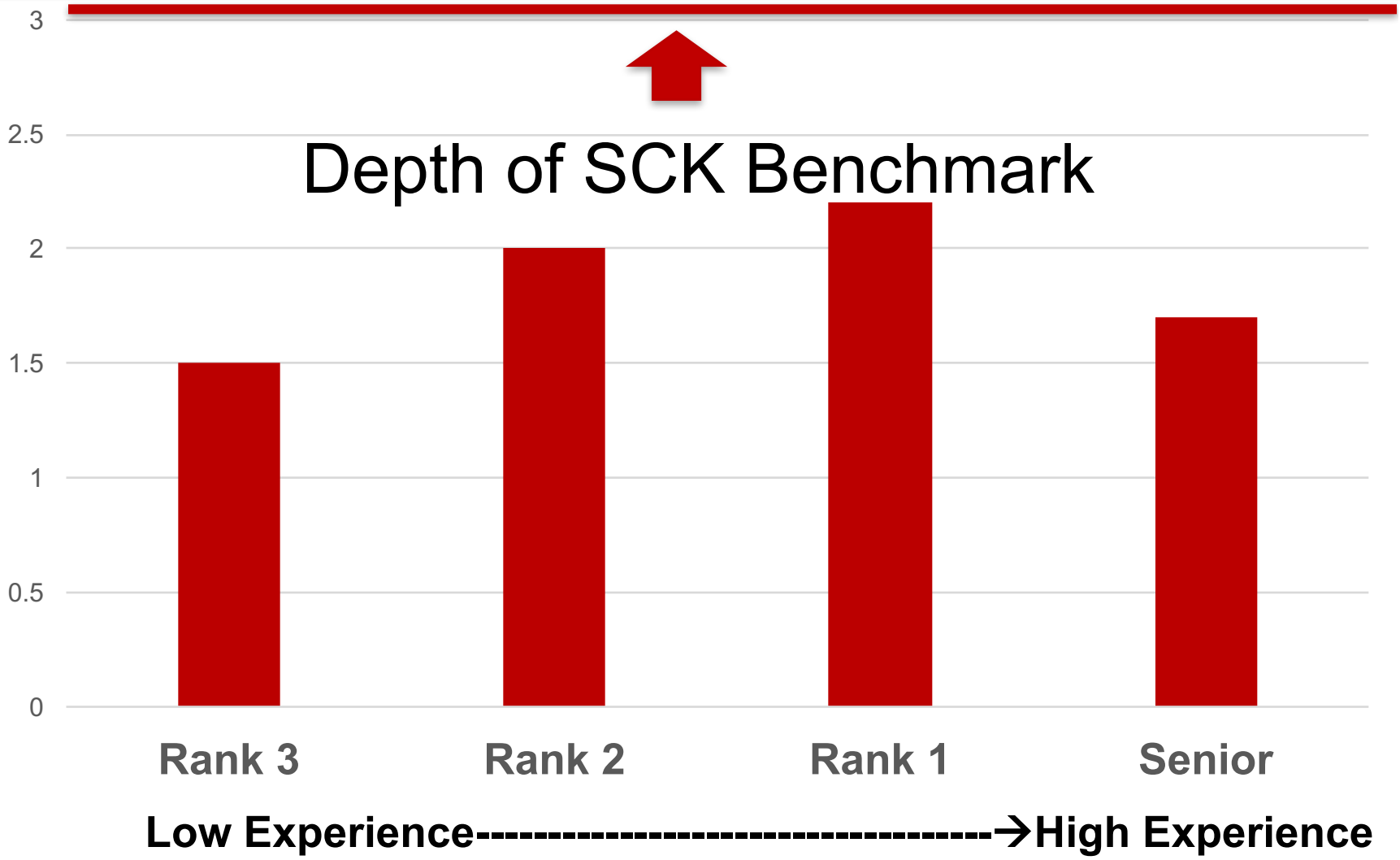
A Mid-Presentation Quiz:
Which of these correlate with deeper SCK?

- Educational background – degree type
- Content expertise in college-
- Age
- School- middle school or high school
- Gender
- Teaching rank young mid career late career
- Years playing soccer
- Number of soccer lessons taught per year
- Years of teaching
- Years of teaching soccer
- Number of professional development workshops

384 Chinese Secondary PE teachers

- No meaningful correlations for any variables.
- Small negative correlation:
  - for years teaching
  - teaching rank

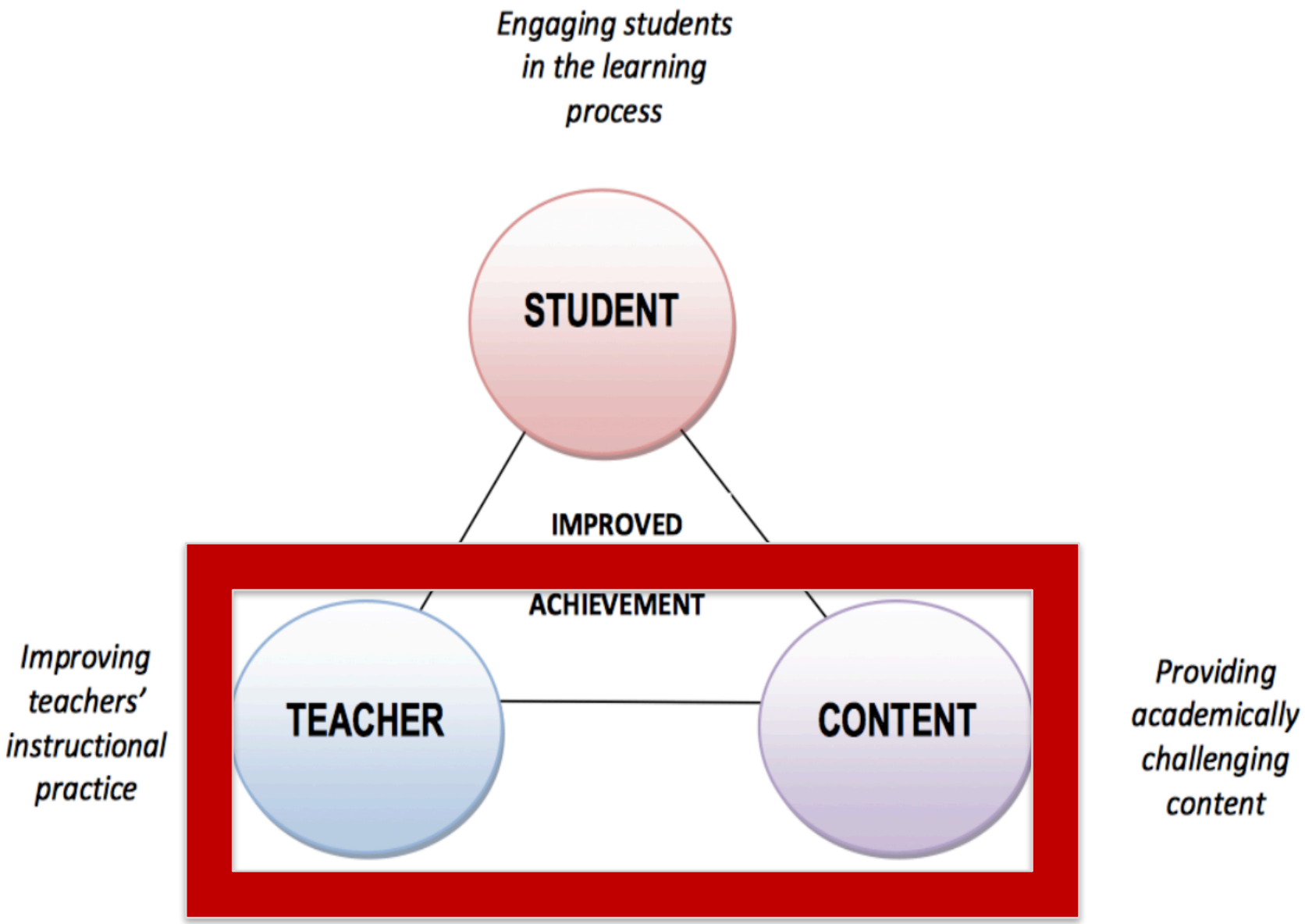
Specialized Content Knowledge of Soccer
384 Chinese PE teachers



Ward, He; Wang, & Li, in review

How to best serve children and youth?

THE INSTRUCTIONAL CORE



Changing Teacher SCK to impact PCK

Fitness Exercise Content Knowledge

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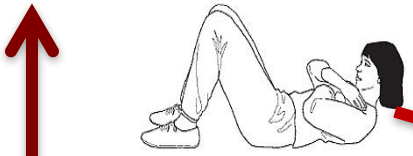
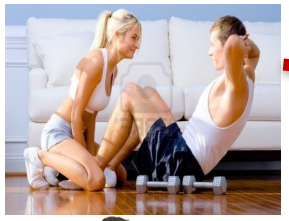
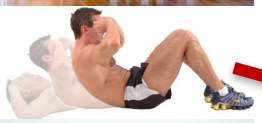
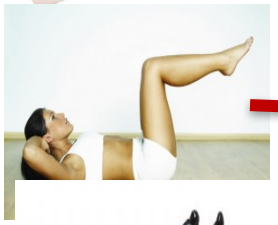
Lie on your back on the floor, bend your knees 90 degrees, and plant your feet flat. Tuck your chin slightly toward your chest…..

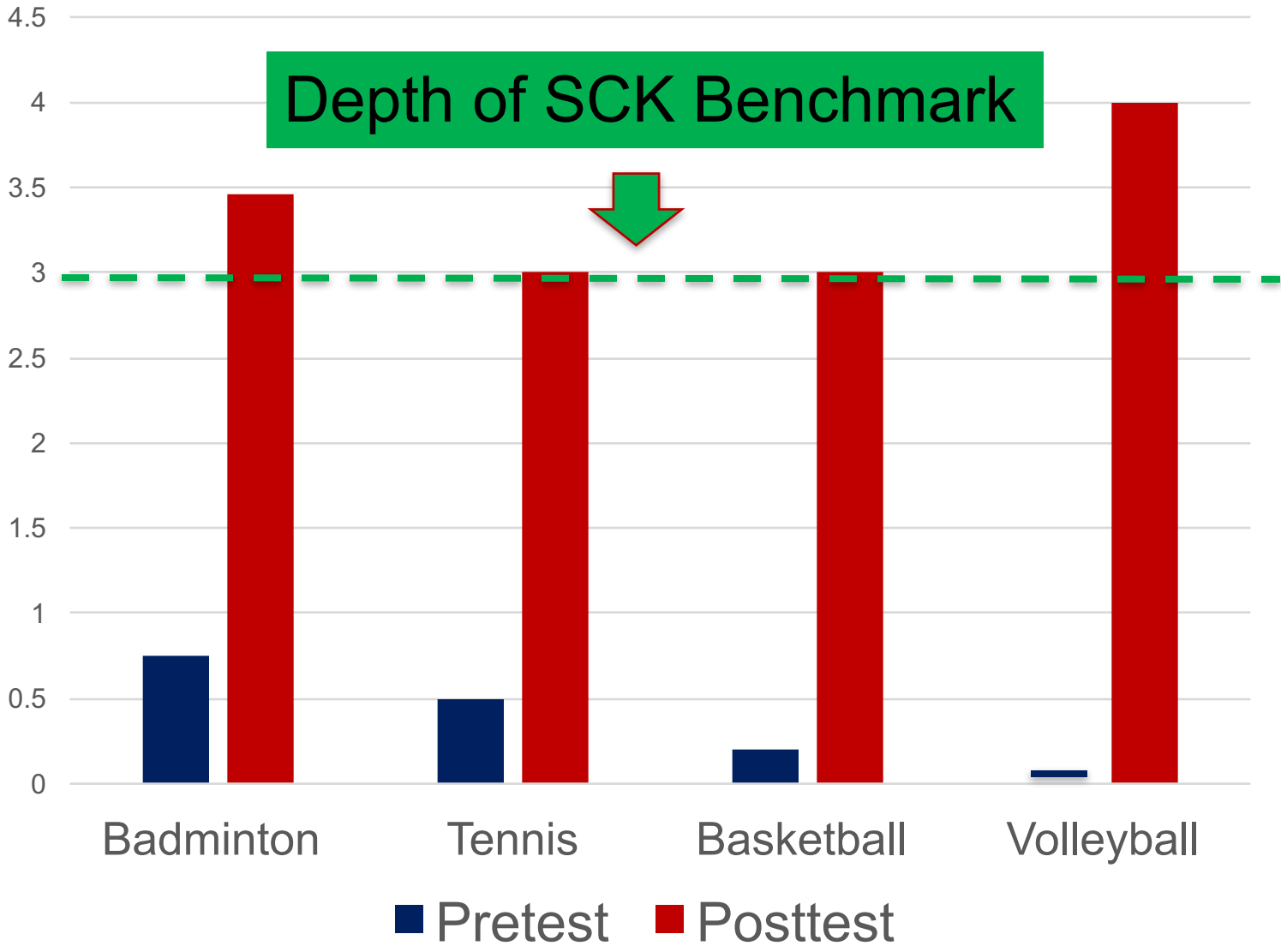






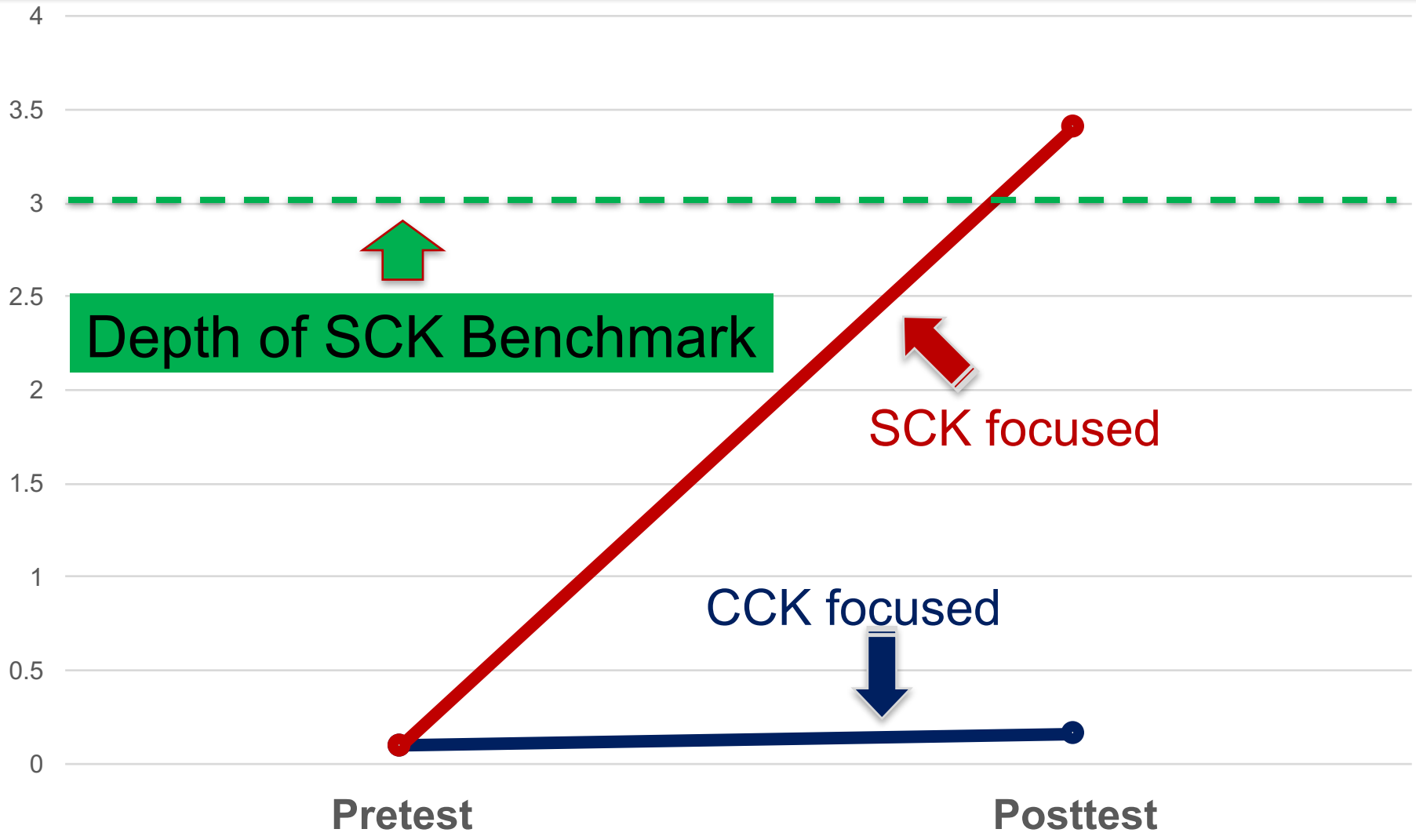


Specialized Content Knowledge
Preservice Teachers N= 72



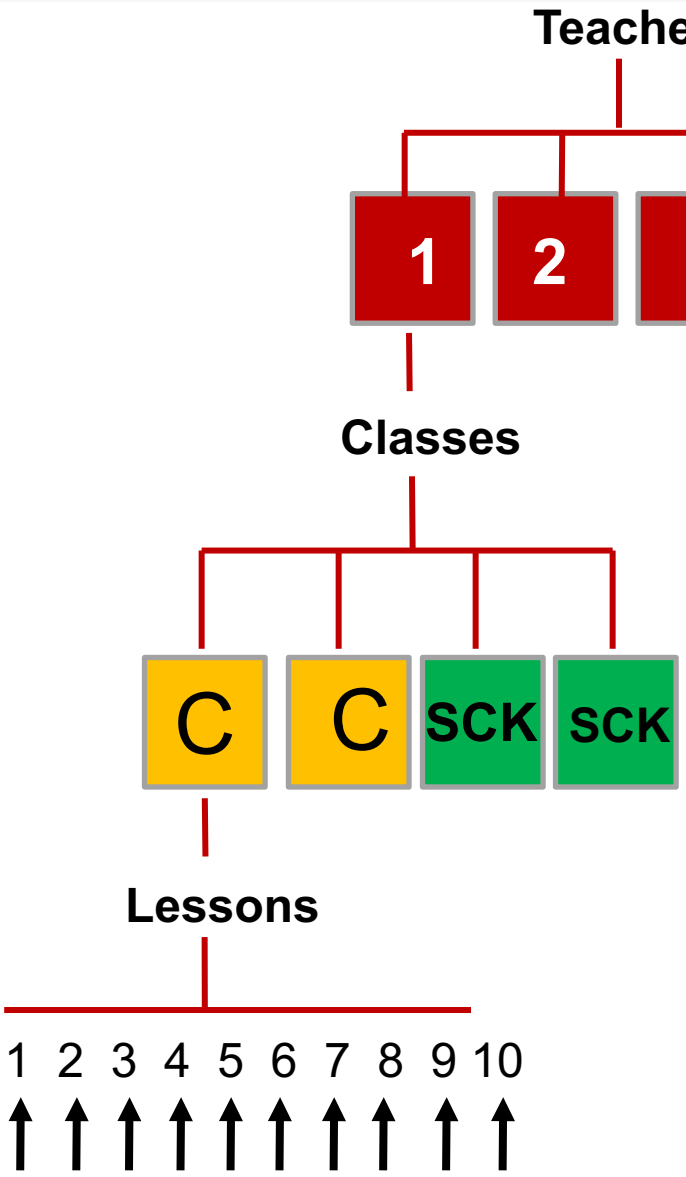
Ward, Tsuda, Dervent, & Devrilmez, In review

Specialized Content Knowledge Instructional Effects



Ward, Tsuda, Dervent, & Devrilmez, In review

RESEARCH DESIGN



Context:

- Badminton
- Middle School
- USA

Students sampled

- High average & low skilled male & females
- Every trial coded every lesson

Alabama

Physical Education and Sport Pedagogy, 2015
http://dx.doi.org/10.1080/17408989.2015.1043255

Routledge
Taylor & Francis Group

Changing beginning teachers' content knowledge and its effects on student learning

Oleg A. Sinelnikov[a*], Insook Kim[b], Phillip Ward[c], Mathew Curtner-Smith[a] and Weidong Li[c]

Belgium

Physical Education and Sport Pedagogy, 2015
http://dx.doi.org/10.1080/17408989.2015.1095868

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Effects of improved content knowledge on pedagogical content knowledge and student performance in physical education

Peter Iserbyt[a*], Phillip Ward[b] and Weidong Li[b]

Research Quarterly for Exercise and Sport, *00*, 1–10, 2014

ISSN 0270-1367 print/ISSN 2168-3824 online
DOI: 10.1080/02701367.2014.987908

Effects of Improving Teachers' Content Knowledge on Teaching and Student Learning in Physical Education

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Effect Sizes

Cohen (1988) proposed rules of thumb for interpreting effect sizes:

- a “small” effect size is **.20**
- a “medium” effect size is **.50**
- and a “large” effect size is **.80**

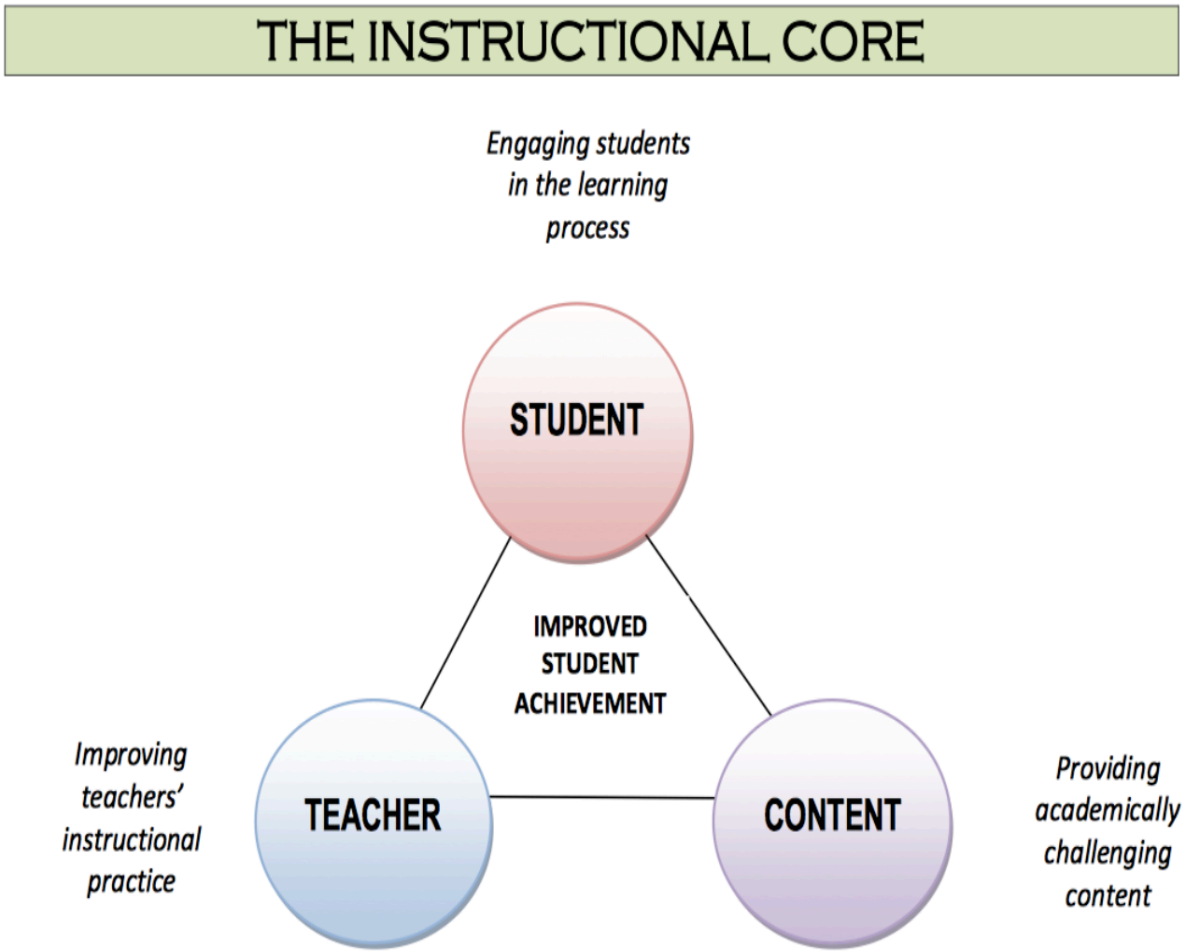
U.S. Department of Education’s What Works Clearinghouse uses **.25 as the criterion for** “substantively important” effect.

Cohen's *d* Effect Sizes per Variable Across Three Studies

Study	DESIGN	TEACHERS	CLASSES	Teacher: Task Selection	Teacher: Task Representation	Teacher: Task Adaptation	Teacher Content Development	Teacher PCK	Student: Correct Trials
Ward et al. (2015)	Quasi Exp	4	16	**5.94**	**4.57**	**7.57**	**2.19**	**4.78**	**2.83**
Iserbyt et al. (2015)	Quasi Exp	1	8	**8.80**	**2.26**	**1.77**	**3.72**	**2.31**	**1.53**
Sinelnikov et al. (2015)	Exp	2	8	**7.58**	**4.09**	**3.75**	**2.85**	**4.07**	**1.77**
Mean ES		7	32	**7.44**	**3.64**	**4.36**	**2.92**	**3.72**	**2.04**

Main Argument-revisited

The improvement of teaching requires a ***focus on the practice of teaching…***



The Ohio State University Learning to Teach Physical Education Research Program Teams

Turkey: M. Levent Ince, Fatih Dervent, Erhan Devrilmez

China (a) Xiaozan Wang, Yao He; (b) Wang Tao, Ma Xiangcheng, Qin Jian, Zhang Xin, Zhao Jing, Li Xin, Xiao Fei, Zhang Dongjie, Jie Chengran, Li Rui, Zhang Hui, Chen Xiaoxi, Zhang Yuchen,

USA: Seung Ho Chang, Matt Curtner-Smith, Kelsey Higginson, Insook Kim, Bomna Ko, Harry Lehwald, Jihyun Lee, Wediong, Li, Yilin Li, Jose Santiago, Jim Ressler, Oleg Sinelnikov, Paul Stuhr, Su Jianzhen, Emi Tsuda.

Korea: Mihye Cho, Yun Soo Lee, Han J Lee.

Belgium: Rosalie Coolkens, Peter Iserybt.

THE OHIO STATE UNIVERSITY

Teşekkür Ederim

Thank You





An effect size of…	Would increase percentile scores from:
+0.10	50 to 54
+0.20	50 to 58
+0.30	50 to 62
+0.40	50 to 66
+0.50	50 to 69
+0.60	50 to 73
+0.70	50 to 76
+0.80	50 to 79
+0.90	50 to 82
+1.00	50 to 84