




Basketball Content Knowledge as a Function of Play, Coaching, and Teaching Experience




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Content Knowledge

- Content knowledge as a foundation of effective teaching.
 - Pre-service and in-service teachers do not know their content well enough to impact student learning.
 - This problem can also be found in other subject areas (e.g., math and science) where content knowledge has been shown to have a major impact on student learning (Kleickmann et al., 2013)
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What do teachers know?


- Assessing Teacher Knowledge as a priority research focus in many subject areas (Hill et al 2005; Kleickmann et al 2013).
 - PE: Primarily focus on Health-related Fitness (HRF) knowledge rather than other content areas (dance, individual and team sports, individual movement forms such as yoga, martial arts)
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How to assess the content knowledge of teachers?

- The Health Related Fitness Knowledge and Knowledge Tests for Sports
 - Typically assess only Common Content knowledge in Domains 1 (rules, etiquette and safety) and 2 (factual knowledge of HRF or technique and tactics) in the case of sports.
 - Praxis 2
 - Moving towards adding more specialized content knowledge questions in all subjects
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Do teachers know their content?


A summary of previous research.

- Miller and Housner (1998)
 - Pre (n=54) and in-service (n=23) HRF knowledge
 - All scored below 66%.
 - Castelli and Williams (2007)
 - 73 middle school teachers HRF knowledge
 - Did not meet the standards to pass 9th grade test
 - Santiago, Morales, Disch, and Gaus (2012)
 - Pre-service (n= 89) and in-service (n=61)
 - All scored below 66%.
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Studies in General Education

- Mewborn (2001)
 - “The studies cited above lead to the conclusion that many elementary teachers do in fact lack a conceptual understanding of the mathematics they are expected to teach” (p.30)
- Hill et al. (2004) Assessed CCK and SCK 1552 Elementary school math teachers
 - Common content knowledge and Specialized content knowledge are not equivalent –knowing CCK does not imply know SCK
- Krauss et al., (2008) assessed CK German mathematics teachers (N=198).
 - Teachers trained in SCK outscored those teachers who did not receive the training.


Gaps in the Literature

- Lack of valid and reliable measurement of Content Knowledge in PE.
 - Most tests focus on CCK rather than SCK.
 - What factors affect an individual's acquisition of content knowledge?
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Research Purposes

- Validate a basketball content knowledge test guided by Ward's conceptualization of content knowledge among a sample of 277 adults.
 - Investigate how content knowledge would vary as a function of playing, coaching and teaching experience.
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Research Hypotheses

- BCK would be a valid and reliable test to measure an individual's content knowledge in basketball
 - The more playing, coaching, and teaching experience, the higher scores participants would obtain on the BCK test.
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Methods

- 277 Participants
 - 101 females and 176 males
 - 238 White, 15 black, and 24 others
 - 224 students, 22 student/coach, 6 student/teacher, 5 student/teacher/coach, 15 teacher, 5 teacher/coach
 - 261 physical education and 16 other majors (i.e., accounting, business, recreation)
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Methods

- BCK Development
 - Researchers
 - Experts for face and content validity
 - A small sample of participants for language check
 - 21 questions
 - Domain 1
 - Domain 2
 - Domain 3
 - Domain 4


Methods

- Procedure
 - Convenience sample
 - Contacted 23 PETE programs requesting their coordinators give their 3rd and 4th year PE students login information to complete the online survey.
 - Varied response rates in programs
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Method

- Data Analysis
 - Descriptive statistics such as means and standard deviations are provided in Table 1.
 - To validate the psychometric quality of BCKT items, a two-facet Rasch analysis was conducted. The Rasch analysis was completed with the FACETS computer program (Linacre, 2009; Version 3.66).

Method


- Data Analysis
 - ANOVA was conducted to examine how participants' overall basketball knowledge would vary as a function of gender, years of playing (Pick-up and recreation basketball), years of coaching (recreation and school basketball), and teaching physical education experience.
 - We also further examined how specific types of coaching, playing, and teaching experience would affect participants' basketball knowledge.
 - The assumptions of normality and homogenous variances by gender were checked.
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Results

- Descriptive Statistics

		N	M	SD
Overall Playing		269	9.61	9.00
Overall Coaching		274	0.92	2.03
Basketball Knowledge	Overall	277	9.84	2.85
	Male	176	10.22	2.70
	Female	101	9.17	3.00
Play Pick-up		272	4.73	6.17
Play League		272	4.81	4.76
Coach School		276	0.38	1.12
Coach Recreation		275	0.56	1.28
Teaching PE		273	0.42	1.31

Results

- Two-facet Rasch analysis
 - Showed good model-data fit with both Infit and Outfit statistics within the (0.5, 1.5) range except for two items with outfit statistics of 1.93 and 1.77, respectively.
 - According to Lincare (2002) items with outfit statistics within the (1.5, 2) range do not distort the overall measurement and are likely due to random guessing by the participants.
 - The findings indicate that the Rasch calibration did not signal any items as misfit. In other words, all participants replied to the items as expected, with high scoring participants being more likely to answer the difficult items correctly.
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Results

- ANOVAs
 - The first model showed that participants' overall basketball knowledge was significantly affected by their overall coaching, $f(1, 259)=19.97$, $p<.0001$, $\text{Eta}=.04$, and playing experience, $f(1, 259)=11.22$, $p<.0009$, $\text{eta}=.07$.


Results

- ANOVAs
 - The second model analysis showed that participants' overall basketball knowledge was significantly affected by their years of playing experience in basketball league, $f(1, 250)=35.44$, $p<.0001$, $\eta^2=.12$, and gender, $f(1, 250)=13.26$, $p<.0003$, $\eta^2=.05$. Years of coaching school basketball was marginally significantly predictor of participants' overall basketball knowledge, $f(1, 250)=3.62$, $p<.058$, $\eta^2=.01$.

Discussion

- BCKT is a valid and reliable measure of four CK domains in basketball.
 - Males scored better on basketball knowledge test than females.
 - Participants with more league playing experience scored better on the basketball knowledge test.
 - More coaching experience in school scored better on knowledge test. However marginally significant.
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Discussion

- Provide guidance of designing criteria on types of prerequisite sports experiences undergraduate students need to have for PETE program admission.
 - Identify strengths and weaknesses of pre-service and in-service teachers' basketball CK knowledge, thus facilitating the development and refinement of effective interventions to increase their teaching effectiveness.
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Future Research

- Domain lemma
- Knowledge interventions

Thank you and Questions

