

# Central Lancashire Online Knowledge (CLoK)

Title	Investigating academy coaches' epistemological beliefs in red and white ball cricket
Туре	Article
URL	https://clok.uclan.ac.uk/id/eprint/43231/
DOI	https://doi.org/10.1080/21640629.2022.2101912
Date	2022
Citation	Crowther, Matthew, Collins, David John, Collins, Loel, Grecic, David and Carson, Howie orcid iconORCID: 0000-0002-3785-606X (2022) Investigating academy coaches' epistemological beliefs in red and white ball cricket. Sports Coaching Review. pp. 1-23. ISSN 2164-0629
Creators	Crowther, Matthew, Collins, David John, Collins, Loel, Grecic, David and Carson, Howie

It is advisable to refer to the publisher's version if you intend to cite from the work. https://doi.org/10.1080/21640629.2022.2101912

For information about Research at UCLan please go to <a href="http://www.uclan.ac.uk/research/">http://www.uclan.ac.uk/research/</a>

All outputs in CLoK are protected by Intellectual Property Rights law, including Copyright law. Copyright, IPR and Moral Rights for the works on this site are retained by the individual authors and/or other copyright owners. Terms and conditions for use of this material are defined in the <u>http://clok.uclan.ac.uk/policies/</u>

1	
2	
3	
4	
5	Investigating academy coaches' epistemological beliefs in red and white ball cricket
6	
7	Matt Crowther <sup>a*</sup> , Dave Collins <sup>b, c</sup> , Loel Collins <sup>b, c</sup> , David Grecic <sup>a</sup> and Howie Carson <sup>c</sup>
8	
9	
10	<sup>a</sup> Institute of Coaching and Performance, University of Central Lancashire, Preston, UK;
11	<sup>b</sup> Grey Matters Performance Ltd, UK;
12	<sup>c</sup> Moray House School of Education and Sport, University of Edinburgh, UK.
13	
14	*Please direct all correspondence to the lead author via email; mcrowther1@uclan.ac.uk
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	

#### Abstract

32 Cricket and specifically cricket coaches are presented with challenges unlike many other 33 sports. Coaches are tasked with developing players' skills and abilities to play two distinct 34 and increasingly specialist formats of the game, namely red ball and white ball cricket. To 35 examine differences across these two styles, data collection used observations (n = 18), semi-36 structured interviews (n=23) and focus groups (n=2) with a group of coaches who actively 37 coached both styles to the same groups of players. Two storybook themes were developed 38 and represented a substantial and original contribution to the literature. These were; i) get 39 your head down, listen to me and you'll be right; in RBC as contrasted with ii) players getting stuck in to learning in WBC. Findings suggest coaches held different epistemological beliefs 40 41 and actioned different epistemological chains. Fundamentally, coaches' approaches were 42 considerably different across RBC and WBC. We conclude by considering the significant 43 implications of the findings in the form of an extension of the epistemology literature and the 44 ongoing opportunity for cricket coach development.

45 Keywords: Planning, Skill development, Coaching philosophy

46

47

48

49

## 5

52 53

# Investigating academy coaches' epistemological beliefs in red and white ball cricket Introduction

54 Cricket has seen a global growth in popularity (ICC, 2018), in part due to the increase in 55 volume of newer, shorter formats (ICC, 2020). These new forms offer a more exciting shorter 56 version of the traditional Red Ball Cricket (RBC) game; the traditional multiple day format 57 played with a red ball. It is well accepted (although perhaps anecdotally) by players, coaches 58 and administrators that RBC represents the *ultimate challenge*, for the *ultimate player*. 59 Historically, the greatest players have been crowned based on their performances and 60 longevity in RBC. This was also the place where players most regularly earned their living. The newer format, white-ball cricket (WBC) has three versions, (1) 50-over cricket 61 62 (scheduled to last c.8 hours) (2) 20-over cricket (scheduled to last c.3.5 hours) and (3) The 63 Hundred (scheduled to last 2.5 hours). Reflecting the name, all are played with a white ball. 64 As a result of its increasing popularity and the development of worldwide leagues, players are 65 increasingly able to earn their living playing only WBC. It should be noted that these' WBC 66 specialists are so far rare, with most players heavily involved across both formats. Notably, 67 however, in the recent and prestigious RBC test series between England and Australia (the 68 Ashes 2021-22), England's 'demise' was attributed to a lack of balance between the two 69 formats, with a great deal of consequent comment and soul searching (Sky, 2022). In short, 70 developing players towards performance in both is an important (if perhaps difficult) dream 71 goal for the sport and all involved in it.

The different formats lead to a range of demands on both players and coaches,
specifically in relation to the development of players' skills at an earlier stage in the pathway.
One relevant example here is a player's competitive schedule. Developing players are
involved in both RBC and WBC competition (i.e. fixtures) within the same season.
Addressing the micro-level, a players' week may consist of WBC at the beginning of the

77 week (i.e. Monday), followed by RBC in the days that follow (i.e. Tuesday – Friday) prior to 78 a second WBC commitment as the week closes (i.e. Sunday). Consequently, players are 79 required to perform a multitude of skills across RBC and WBC within a very short space of 80 time. Factor in that these players are balancing their training needs alongside their education 81 and the potential strain on players and coaches becomes clearer. Consequently, how is it that 82 coaches are going about developing the RBC and WBC skills of young players given the 83 complexity of the cricketing landscape? The ways in which coaches action learning these 84 skills from an epistemological perspective is worthy of exploration especially, as is the case 85 in this study, coaching in both styles is often provided by the same coaches to the same 86 players.

87 Accordingly, and building on earlier work by Crowther et al. (2018), this study 88 explored the epistemology of coaches working with the next generation of players in the 89 talent pathway. We aimed, firstly, to critically examine the epistemological beliefs of coaches 90 involved in coaching RBC and WBC and secondly, to develop a framework that presents an 91 epistemological basis for both forms of the game.

## 92

93

# What is epistemology and how is it defined?

94 Epistemology is a branch of philosophy that aids coaches to clarify motives and provide 95 direction to their practice (Kretchmar, 1994). Early work around epistemology plotted 96 epistemological development on a continuum between naïve and sophisticated (Perry (1968). 97 Naïve epistemological beliefs view knowledge as simple, clear, and specific; handed down 98 from authority rather than developed from reason. This position is premised on an assumption 99 that knowledge is certain and unchanging. Thus, concepts are learned quickly or not at all, 100 whilst learning ability is innate and fixed (Grecic & Collins, 2013). In contrast, a 101 sophisticated epistemological position views knowledge as complex, uncertain, and tentative-102 learned gradually through reasoning, reflection and construction (Howard et al., 2000).

103 Schommer (1993; 1994) and Schommer-Aikins and Easter (2009) identified five specific 104 dimensions that make up an individuals' epistemological beliefs; i) Omniscient Authority -105 beliefs about the validity and source of knowledge ii) Certain Knowledge - beliefs about the 106 reliability of knowledge iii) Simple Knowledge – beliefs about the structure of knowledge iv) 107 Quick Learning – beliefs about the speed of learning v) Innate Ability – beliefs about 108 capacity for learning. We share the view that epistemology includes beliefs about learning 109 and is viewed as a system of more-or-less independent beliefs (Elby, 2001; Schommer-110 Aikins, 2004; Schommer, 1994). These are hypothesised as distinct dimensions that may or 111 may not develop in synchrony (Schommer, 1994) and are best characterised by "frequency 112 distributions as opposed to continuums with extreme poles" (Schommer-Aikins, 2002, p. 78). 113 The extent to which epistemological beliefs remain constant or differ across different 114 domains is a point of debate. Schommer and Walker (1995) suggest that the beliefs of 115 students in education were similar across academic domains. In contrast, Beers (1988), Roth 116 and Roychoudhury (1994) and Mori (1999) suggest that epistemological views were context 117 specific. 118 The impact of epistemological beliefs on cricket coaching through the epistemological 119 chain

120 Several studies have identified a link between the coaches' epistemology and their 121 coaching practices - this has been termed the Epistemological Chain (EC) (Grecic & Collins, 122 2013). Similar studies in education confirm a strong connection across teachers' beliefs, their 123 classroom behaviours, and the learning environment they create (e.g., Hofer, 2002; Hofer & 124 Pintrich, 1997; Nespor, 1987; Soleimani, 2020; Tarmo, 2016). Findings from studies that 125 have taken place within golf (Grecic & Collins, 2012), adventure sports coaching (Collins et 126 al., 2015) and football (Olsson et al., 2017).indicated that an EC was manifested in the 127 coaches planning, decision making and critical reflection (Figure 1, Crowther et al. (2018).



128 Figure 1. Factors influencing coach Decision making (Crowther et al., 2018, p. 69) 129 In showcasing the relevance of the EC framework by Grecic and Collins (2013), it 130 importantly acknowledges the macro to micro level application of epistemology via six 131 interconnected stages; i) Environment ii) Relationship Built iii) Goal Setting iv) Methods v) Judgements Made vi) Future Direction. This framework is relevant for our research given it 132 133 incorporates aspects of the coach decision making model (Muir et al., 2011) such as who the 134 coach is working with, what the coach is working on and how the coach is going to work on. Finally, it reflects an accepted definition of personal epistemology - that epistemological 135 136 beliefs mature at different rates (Schommer, 1994). In drawing this section to a close, Table 1 offers a summary of the EC framework along with the application of increasingly naïve and 137 138 sophisticated epistemological beliefs.

139 Table 1. The Epistemological Chain (EC) of naïve and sophisticated sports coaches (Grecic

140 & Collins, 2013 p.155)

141

Naïve	Epistemology	Sophisticated
Guru and discipline, rules to follow, autocratic, disciplined, power relationship, dominating coach, compliant athlete, failure to perform is highlighted	Environment	Learning environment created, where athlete can experiment safely without fear of ridicule, two-way discussions and flow of ideas
Transactional, Power roles, dictating behaviours	Relationship built	Trusting, caring, nurturing, autonomy-supportive behaviours demonstrated
Coach prescribed, subjective to coach's beliefs, constant reliance on the coach	Goal setting	Athlete led in discussion with coach
Learn - drill – do, follow set practice regime	Methods	Challenges set for the athlete, creating learning episodes
Success or failure determined by tangible markers or results (e.g. changes in technique, improvement in coach's measure/statistics	Judgements made	Dependent on how the player develops as an athlete and person with life skills, whilst working towards the athlete led targets. Decisions based on "is the athlete now an autonomous decision maker confident in their own ability?"
Constant coach's revision of targets, technique, results. Coach led modifications to be practiced, re-learned and embedded	Future direction	Future path determined by how self-reliant the player feels. Possibilities include requests for future guidance/mentoring, or removal from the coaching process if it is no longer needed

142

Finally, the context for the investigation. Academy level cricket is the final stage(s) of the player pathway to turning professional. Commonly, a *selected* group of adolescent players (c.14-18 years old) receive additional support and increased coaching. Players involved in these programmes turn professional, are released from the academy group and performance pathway) or remain in the academy context for a number of years. Specifically, academy cricket centres on a stable performance group, an increased control in variables, long-term objectives and extensive intervention and interpersonal contact over a long period of time (Lyle & Cushion, 2016). Fundamentally, the ultimate goal of the academy context is to produce professional cricketers. So, with a focus on the academy stage and reflecting the points made above, we were keen to address our objectives through a careful and triangulated consideration of coaches' beliefs, thinking and behaviours across the two styles of RBC and WBC.

155

#### Method

#### 156 Research Design

Following ethical approval (BAHSS318) we utilised a pragmatic research philosophy with a focus and emphasis on creating practical solutions to applied research questions (Bryant, 2009; Giacobbi et al., 2005). The pragmatic approach was positioned within a relativist ontology and hence, constructivist epistemology. Relativism outlines there are multiple realities and experiences the interpretation of these experiences which ultimately leads to a personal truth (Brownlee, 2004; Guba, 1990). We support the premise that knowledge of reality lies with the social actors who experience it (Blaikie, 2007).

#### 164 **Participants**

To ensure depth and quality of data, a purposive sample (Battaglia, 2011) of male cricket coaches (n=17) aged 26-45 years old  $(M_{age} = 34, SD = 7.48)$  were recruited. Key criteria for inclusion were, (1) holding a minimum of the national governing body (NGB) 'advanced' or 'level 3' coaching award (2) working with high potential cricketers (aged between 12-18 years old) or academy level county cricket programmes and (3), having a willingness to examine their own coaching practices. Pseudonyms are used when discussing participants throughout the remainder of the work

## 172 Data Collection

173 Following informed consent, data collection took part in two phases. In phase one, a

174 subsample of participants (n=5) were 'naturalistically' observed (Mulhall, 2003) prior to an

- 175 initial semi-structured interview. Interviews lasted between 55 and 90 minutes (mean
- 176 *duration* = 72 *minutes*) and digitally recorded for later transcription by the first author. A
- 177 semi-structured interview approach allowed pertinent aspects of the interview to be unpacked
- 178 in greater depth as they emerged (Adams, 2015). Example questions included; 'How is it that
- 179 players become more knowledgeable?'; 'During your session, I observed that you...can you
- 180 give me more detail on why you did that?; 'How do you know that a player is learning? The
- 181 researcher followed any developments (i.e. changes) of coaches' approaches over that time.
- 182 Follow up semi structured interviews were conducted over the following 12 months (total n
- 183 *= 18*).

184 In phase 2, two semi-structured focus groups (Breen, 2006; Purdy, 2014) (FG, Group

185 1 n = 8; Group 2, n = 4) were conducted with a different subgroup of participants (n=12).

186 These focus groups where digitally recorded and lasted 24 and 28 minutes respectively. The

187 FG was facilitated using five sequential, pre-prepared cue cards to direct the focus (Nicholas

188 et al., 2010) and avoid response bias (Heary & Hennessy, 2002). An overview of the process

189 is presented in Table 2.

Stage	Example Questions/Prompts		
STAGE 1	AGE 1 What are your experiences of being coached in red ball/longer format cricket?		
	You may want to consider areas such as the following:		
	• The 'goals' of the coaching – i.e. what were the intended outcomes for you as a player?		
	• The types of practice that you were taking part it. (e.g. technical drill practices,		
	exploration practices, net practice, 'scenario' practice etc.)		
STAGE 2	I'd like you to think about your red ball coaching. Consider a player that you have		
	worked with in the past		

190 Table 2. Example cue card questions used during FG

	<ul> <li>What were the 'goals' of your coaching with that player? (e.g. what was the point?)</li> <li>What types of things did you find yourself doing? Saying? How did you go about intervening and/or the feedback process? How did you 'go about' your coaching?</li> </ul>
STAGE 3	What are your experiences of being coached in white ball/shorter format cricket?         Repeat process from STAGE 1
STAGE 4	I'd like you to think about your white ball coaching. Consider a player that you have worked with in the past Repeat process from STAGE 2
STAGE 5	What similarities and differences do you see between the two formats of the game? Why do these happen?

#### 192 Data Analysis

Reflexive Thematic Analysis (RTA) was utilised with the aim to identify patterns across the
data sets (Braun et al., 2019). Importantly, the *reflexive orientation* adds a number of
important nuances to the analysis process which ultimately increase the philosophical
alignment throughout the research process. RTA (underpinned by a 'Big Q' approach (Kidder
& Fine, 1987), accepts multiple realities and acknowledges meaning is situated. This views
the researcher(s) as a valued resource during the process (Braun & Clarke, 2013; Braun et al.,
2019).

200 Interview and FG were fully transcribed and the six-stage RTA method was applied,

201 as identified by Braun and Clarke (2013) including semantic and latent aspects of coding

202 (Braun et al., 2017). The final step in the analysis was the creation of 'storybook themes',

aimed at tying the researchers analytic observations together (Clarke, 2017). Storybook

204 themes engage readers as they explain large portions of the data and importantly, are analytic

205 outputs, grounded in the data.

We adopted a relative approach to rigor and trustworthiness (e.g., Burke, 2016; Smith
& Caddick, 2012; Smith & McGannon, 2018; Smith et al., 2014). We utilised internal

208	markers of quality such as the experiences and background of both the researcher and the
209	reader. Specifically, i) substantive contribution ii) worthy topic iii) rich rigor iv) transparency
210	(Smith & McGannon, 2018). These measures were based on the study's start point, the
211	research environment and the research question (Smith & McGannon, 2018).
212	Results
213	Raw data clusters were developed which encapsulated commonalities across the codes
214	assigned through the initial coding process and led to the development of lower order themes
215	(n=12). Next, mid order themes $(n=6)$ were created, culminating in the storybook themes
216	(n=2), i) get your head down, listen to me and you'll be right; in RBC ii) players getting
217	stuck in to learning in WBC. Organising concepts identified by the research team that
218	underpinned the reflexive thematic analysis (i.e., Braun et al., 2019) were; i) Macro level
219	organisational alignment ii) Coaching practice and pedagogy iii) Power relationships in the
220	coaching process. (Table 3).
221	Get your head down, listen to me and you'll be right (in RBC)
222	This was created based on three mid-order themes; i) participants as passive recipients ii)
223	players seeking coaches iii) discipline needed.
224	In RBC, coaches viewed players as passive recipients of learning and knowledge.
225	Coaches commonly and proactively gave technical solutions to players. Evan discussed how
226	they went about 'equipping' the player with the skill(s) as a result of using a skill de-
227	composition approach:
228 229 230 231 232	he knows he needs to be able to play off the back foot against seam bowling because he's going to get bounced every time and he's learnt how to pull over the winterwe've just reverse chained that from right, tennis balls, end position, pull, pull, pull to bowling machine, know where it's going to be, start outside the line of the body because that's a bit more comfortable, pull, pull, pull then working on the

line of the body because that's a little bit more uncomfortable because when he gets it
in the ribs we don't like it to then flicking with an incredi-ball so it was a bit more

Examples of Raw Data Clusters	Lower Order Themes	Mid Order Themes	Storybook Themes
Younger players 'don't know their game' Working with the coach to drive practice Learning from (other) experts Coach giving the player technical change Coach leading the technical change (and then player buying in) Technical input decreases as you progress Young players who are able to drive their own practice are a rarity	Knowledge passed down from experts to novice in RBC	Players as passive	
Times where coaches prescribe technique to players Use of sports science to identify the 'right way' Coach instructing based on the demands on the next phase of the pathway	Coach giving technical solutions	recipients	
Using experts (recently retired players) to deliver/explore skill sets Using professional players as a reference points Using the expert with real world experience to drive the 'model'	Using experts in the coaching process		Get your head down, listen to me and you'll be right; in RBC
Players needing/wanting coach input Players will come to coaches when they are struggling Players want more structure from the management Good players are the ones who listen	Players wanting/needing coaches	Players seeking coaches	
Consistency of skill (more) important in RBC [Red ball game more technical that white ball] Red ball about longevity, patience and concentration RBC is about discipline [Historical approach to batting] 'bat time, bat all day' Batters get judged more in red ball (no hiding place) More pressure in RBC	Mental requirements of RBC	Discipline needed	

In the past WBC was 'an add on', modern day players learn white ball first Attitude to T20 has changed over the last 15-20 years Change in expectations of the players Change in repercussions for players getting out in WBC	Change in attitudes and expectations – breaking with tradition	A culture shift	
Coaches letting players figure out scenarios for themselves Putting players in difficult situations to enable them to learn Players need to figure it out in competition so need to in training too The importance of players 'finding a way'	Players need to 'figure it out'		
Creating situations for players to make decisions about their own practice Individual players responsible for getting something out of it After exploring new shots, players are responsible for their continued progress Players to pick out key learning that works for them	Players have the responsibility	Players take the lead	
Learning coming from the players rather than the coach Asking questions might take a lot longer to help players learn but this is 'better' Trying to reduce coach input to encourage player learning	Reducing coach input		
Players learning through trial and error Freedom/no repercussion practice 'Have a go' practice – Invent something Exposing players to new skills and letting them 'have a go'	Players learning by 'having a go'		Players getting stuck in to learning in WBC
Game related practice - more outcome based Using scenarios in WBC Practice with a game outcome (e.g. hit to the boundary) White ball practice with a game 'angle' on it	Open/Game related white ball practice	Learning by having a go	
Specificity of (batting) practice – blocked practice Repetition of shots (in practice) to justify applying skill in a game Increase in specificity in recent history (e.g., ball striking)	Repetitive white ball Practice		

- variable but he could (have) confidence that actually if he got it wrong it was an
  incredi-ball not a cricket ball so those sorts of things so he's gone through a process of
  real breaking it down to start with to its simplest form...to just ramping that up over
  the period of a winter.
- 241 Evan is certain of the knowledge that the player *needs* in relation to RBC. The technical
- solution (known as the pull shot) has clearly been identified as *the right* solution, with
- 243 coaching approaches used to explicitly allow the player to acquire the required knowledge in
- a step-by-step manner (i.e. reverse chaining). This idea is well-supported by Stuart who
- 245 suggests;
- I think they need direction. So like you say an u14, knowing what is required for red
  ball training...so I still believe you need to be led. Led towards what a batsman looks
  like because I think it will be too late for them. Because I think we need to accelerate
  their learning.
- 250 In many aspects of RBC, there was an accepted use of discipline specific 'experts' to work
- 251 with players. This reinforces the players' position and role as *passive* receivers in the learning
- 252 process. Rob outlines, former, international players as examples of this process, working with
- 253 players who are developing their batting skills against spin bowling:
- 254 we'd just try and expand and expand his boundaries a little bit and what he's capable 255 of, then bring in some experts, so *(former international captain)*, we got him on board 256 and *(former international player)* who both played spin really well...and they spent 257 time *(with him)* and it's just a case of reinforcing that.
- 258 The *players seeking coaches* in RBC, reflected coaches' beliefs that it was in fact players
- who wanted and needed coaches. Rob suggests, "I think they'll come to you because again
- 260 going back to that example with (player), he's struggling against spin...I'm really struggling
- 261 can you help me?" Evan indicates that at times it can be those players who are less
- 262 experienced who will seek out coaches, further supporting the perception that players require
- 263 technical support from coaches:



266 267	reinforcement, I mean [he's asking himself] 'I feel alright does it actually look alright?'
268	Finally; discipline (is) needed in RBC. In this instance, Jimmy clearly highlights the
269	importance of players' psychological characteristics and, more specifically, the discipline
270	required by players in RBC given the increased amount of time required and opportunities
271	available to players:
272 273 274 275 276 277	The main difference between red and white ball is the buzz-word 'discipline'. That's always something we come back to, right we've got to hold our discipline or hold our length, whatever it may be. With the bat, bat time, discipline I think that's the big difference between the two forms of the gamethe discipline of being able to hold your nerve, your skill for that longer period – that's the main message that most coaches try and get across.
278	Coaches support this as being an important characteristic which can make the difference
279	between success and failure in RBC. This finding supports similar views expressed by
280	Gucciardi and Jones (2012) and ongoing work using the Psychological Characteristics of
281	Developing Excellent (PCDE) (MacNamara et al., 2010). The essence here is the premise that
282	players are required to avoid 'straying from the plan' in RBC. Having explored the findings
283	in relation to RBC, we now turn to the findings in relation to WBC.
284	Players getting stuck in to learning (in WBC)
285	This theme was created by three mid-order themes; i) a culture shift ii) learning by having a
286	go iii) players take the lead.
287 288	A culture shift
289	Coaches were clear that there had been a change in attitudes and expectations – a breaking
290	with tradition in WBC. As Jason outlined:
291 292 293 294	Fifteen years ago if someone said, off-spinner is on, I want you to go to 6 <sup>th</sup> or 5 <sup>th</sup> leg stump, outside and open up that and it's a freebie if it's at you, if it's at the stumps it's through the off-side then I wouldn't do it but now that's common place because when we first started you'd have thought someone was bonkers for saying that

Jimmy considers a players' perspective on the implications of the changes from a wider
socio-cultural-political cricket view. Jimmy also considered a macro-level aspect, connected
to players' potential career trajectories.

The idea of the form of the game has probably changed for players as well hasn't it, so *(in the past)* it was all about the longer form and you've got to be successful in that to get anywhere in the game whereas that's changed hasn't it, the whole outlook of cricket has changed and I think that leads into every other facet doesn't it, whether it's practice or match play

303 What was clear was that these developments were a significant shift in relation to WBC. In

304 working these changes through, this created the opportunity to replicate this, breaking with

305 tradition.

## 306 Players take the lead

307 Coaches discussed how it was important that their players were at the forefront of the

308 learning process, in order for them to 'figure it out'. James outlined a training activity with

309 specified contextual information relating to the state of a hypothetical game providing a

310 purposefully non-pressurised context where players were required, as a stepping-stone

311 towards competition play, to independently complete a batting task.

The [training] scenario that we did a couple of weeks ago...the team was seventy for two after twenty, twenty-five overs in a 40 over game and you're chasing 150, that's the target. There wasn't really anything else from us in terms of well you need to do this, you need to do that, it was right, there you go...that's your target, you've got to try and chase your target down.

317 James referred to the cognitive demands associated with players figuring it out, using coaches

- 318 as a support mechanism. Athletes were encouraged to spend time reflecting, both
- 319 immediately and sometime after the event, on the skills that were being learnt.

I suppose trying things and coaches suggesting different things. I suppose coaches
spotting things that might work, or might work better and suggesting it, giving the
player the opportunity to try it, to think about it, go away and have a think. . . that
kind of thing.

Players creating their own knowledge, and learning reflected the notion that they have the responsibility in the process. Evan is discussing the delivery of a white ball coaching session based around different ways to score runs. The coach describes a session which included the explicit identification, by the coach, of a number of approaches; subsequently, however, encouraging players to choose, on an individual basis, the batting skill version to practice that they (i.e., the player) thought was most beneficial to their performance.

We went through 8 or 9 different options to the same delivery in WBC against a leftarm spinner running the ball into the batter. So this is what you could do now, you've been exposed to it, seen it, if you take it on and maybe look at spending more time with each individual option that works for you.

334 James articulates the necessity for players to take responsibility regarding the technical and

tactical deployment of bowling skills: "rather than say, this is a slower ball, you must be able

- to do this, this is when you're going to use it [we] let them learn and take ownership of that".
- 337 Finally, the idea of reducing coach input emerged as a key construct in players 338 creating their own knowledge and learning in WBC. Building from the perceived strength of 339 the coach-athlete relationship, coaches felt comfortable in taking a more hands-off approach 340 to their involvement in player development at times. As an example, Richard explains an 341 expressed understanding of expectations from players with regards to the general coaching approach within the academy: "I think it's very much how I operate. (At) Academy level they 342 343 understand the process, they understand me, they understand hang on a minute, I'm not going 344 to give you the answers, you have to work".

#### 345 *Learning by having a go*

346 In this theme, coaches were focused on the physical nature of players' attempts at skill

- 347 learning (i.e. players *literally* having a go!) Reflecting this notion, Rob explained an
- 348 acceptance, and in fact desire, for errors to be apparent within the development process. Rob

349	outlines: "I want you to be more skilful, I want you to try things, I want you to get stuff
350	wrong, I want him to experiment otherwise where's our next WBCers coming from?"

351	Coaches reflected on the types of practices at a micro level. Coaches suggested that
352	open/game related practices took place in WBC; however, this was supported by the need for
353	repetitive practice for players to be able to execute their skills in gameplay. Importantly for
354	readers to note, the lower-order theme game related practice is not 'games-based practice'
355	(e.g., GBA; Teaching Games for Understanding (TGfU); Game sense etc.; Kinnerk et al.,
356	2018). It is clear that a range of considerations of the game were being made by coaches and
357	players when practicing and that practice was structured in many ways. Sean incorporates
358	both of these themes (i.e., open/game related practice and repetitive practice):
359	So I reckon some of mine would be to do with specifically how I might approach the

So I reckon some of mine would be to do with specifically how I might approach the game so a contact drill so I'd often lose focus on contact and try and get balls in specific areas so...there's no fielders there and just think about...just trying to have good contact, strong contact and then take elements from there and right, now you've got those can you now be more specific in your practice in terms of where you're trying to get those, the gaps or areas you're trying to hit, whether it's fours or twos.

365 Stuart supports the use of 'layering on' match outcomes (i.e. game related practice) when

366 practicing in WBC.

we do that thing where you have to get it to the boundary, no fielders but you have to
hit it so clean that the ball would go to the boundary, because that's an outcome isn't
it, that's hitting it cleanly.

370 Coaches discussed the need for repetitive practice which is positioned in line with the earlier

- 371 identified theme of breaking with tradition:
- 372 Sid: Coaching-wise, do you think it's shot specific practice now? Whole sessions on
  373 ramping it, reverse sweeping it.
- 374Jimmy: (Yeah). And that comes from that acceptance that they are options to be375played, I think that probably wasn't the acceptance years ago. It was right, make sure376you bat your 100 balls and you'll be 85 and now if you're batting that long you want377to be 160 (runs) don't you.

378 These contentions illustrate an interesting contrast. Whilst modern and innovative approaches 379 to skill acquisition are being used by coaches (e.g., Non Linear Pedagogy), there are times 380 where the use of traditional approaches remain, such as de-contextualised, blocked practice 381 (Shea & Morgan, 1979). Aspects of game play are being considered within these practices. 382 Whilst this does not lead directly to changes in practice structure, it is suggestive of a move 383 towards a 'match-fit' technique, i.e. technique that is adaptive to the challenges of the 384 performance environment (Chow et al., 2016) in contrast to the fixed technique that is 385 historically sought in RBC.

386

#### Discussion

As an important context to the discussion of results, we should stress again that all coaches interviewed were involved in coaching the same group of players, across both forms of the game. In short, any differences between RBC and WBC perceptions are within subject! As such, the data indicate an important and clearly impactful difference in approach across these experienced coaches. The key question is, of course, why this has occurred. The discussion addresses the significant differences in coach epistemology, an exploration of the sociocultural underpinnings of epistemology and the original contribution our work has made.

394 395

#### Epistemology as red and white!

When coaching RBC, results firmly indicate the coaches engaged in more traditional, coach led practices. In linking to the epistemological dimension of 'omniscient authority', coaches increasingly held epistemological positions based on the premise that learning and knowledge in this format was passed down from expert to novice (Schommer, 1994). A second epistemological dimension also came to the fore, that of 'certain knowledge'. Coaches seemingly viewed there to be one, increasingly unquestioned, black and white approach to RBC, compared to a critical weighing up of options and a personally relevant solution being

403 sought in WBC. Fundamentally, coaches viewed there to be an increasingly right way to do 404 RBC (i.e., certain knowledge), and hence passed this down to their players (i.e., omniscient 405 authority). In continuing the discussion in relation to developing players' expertise, the 406 increasingly naïve positions held by coaches across these two dimensions ultimately led to 407 approaches which developed 'competent' players (Epstein & Hundert, 2002). That is, players 408 who were capable of following routines or instructions, as opposed to creating novel 409 solutions to performance problems. These approaches have been challenged when applied 410 directly to those involved in dynamic and interactive sports. The question then is the 411 appropriateness of focusing on players progression towards one, universal 'correct' 412 technique, when players need to execute their skills in highly changeable contexts (Light et 413 al., 2014).

414 In contrast, when coaching WBC, the findings showed that coaches engaged in less 415 traditional (less linear?) coaching approaches, often driven and/or agreed between player and 416 coach. In linking again to the epistemological dimensions, coaches appeared to be viewing 417 the learning process significantly differently from 'omniscient authority' and 'certain 418 knowledge'. In often stark contrast to RBC, these approaches appeared to be aimed at 419 developing expert players (Epstein & Hundert, 2002). That is, developing players capable of 420 creating individualised solutions without a step-by-step guide on how to do so. Coaches were 421 more regularly utilising increasingly cognitive and social constructivist approaches in their 422 coaching. From a cognitive constructivism perspective, coaches were appreciating what their 423 players 'brought to the table'. From a social constructivism perspective, coaches viewed 424 learning as multidirectional, placed similar importance on the role of the coach and the player 425 (Lave & Wenger, 1991) and made learners active in the process (Newmann, 1994).

426 Figures 2 and 3 summarise the coaching process of RBC (i.e., Figure 2) and WBC
427 (i.e., Figure 3) from an EC perspective.



*Figure 2*. The epistemological chain and coaching process in RBC





435 *Figure 3*. The epistemological chain and coaching process in WBC

436 In continuing the discussion, we interrogate the socio-cultural aspects influencing coaches'

437 epistemological beliefs.

# 438 Epistemology as a representation of the socio-cultural context and coach education439

440 In briefly unpacking the development of coaches' epistemological beliefs, there are a number

441 of areas of consideration. Firstly, epistemological views are said to be developed as a result

- 442 of home and education life (Anderson, 1984). Whilst coaches' upbringing will certainly have
- 443 exerted an influence, there are also other relevant considerations underpinning coaches'
- 444 epistemological positions. Firstly, the socio-cultural nuances underpinning the coaching
- 445 context, and secondly, the role of coach education.

446 Our previous work has positioned coaching as a process involving both cognitive and 447 socio-cultural processes (Crowther et al., 2018). Importantly, it is acknowledged that 448 coaching is a non-linear process which involves the challenging and negotiating of contextual 449 issues (Jones & Wallace, 2005, 2006) and that coaches' decisions and approaches are socially 450 contested within temporal boundaries (Jones, Edwards, & Viotto Filho, 2016). Similarly, that 451 coaches' pedagogy is underpinned by a range of sociocultural factors present within the 452 environment (Hardman, 2008). Our attention here turns to addressing a number of these 453 socio-cultural aspects. Importantly, these apply at both the micro and the macro level. In 454 clarifying, the micro level is the coaches' own, individual context (i.e. their 455 organisation/employer). The macro level is the broader 'game of cricket' viewed as a whole. 456 In addressing the micro-level socio-cultural nuances of the coaches' context, one of 457 these nuances is the unique *culture* of their organisation. This is undoubtedly an influencing 458 factor as coaches have been educated in their organisational culture (e.g., Anderson (1984) on 459 the development of coaches' epistemological beliefs). Importantly, each culture is informed 460 by many facets. Examples often include organisational structure, the socio-economic status of 461 the population alongside the cultural position of cricket within each organisation's locality. 462 Perhaps unsurprisingly, these aspects can all influence key aspects of the EC such as the 463 types of environment created and relationships built at the micro level. Continued research 464 utilising an in-depth case study approach would continue to shed light on the specific factors 465 which influence the epistemology of coaches within their individual contexts. 466 In addressing the macro-level socio-cultural nuance, attention turns specifically to the 467 education of cricket coaches. Much has been made of the role of coach education. The 468 question remains regarding the quality of these experiences as *educational* and the extent to 469 which coaches are indeed educated or in fact trained (Lyle & Cushion, 2016). Issues have

470 also been raised in relation to coach education indoctrinating coaches in set ways of thinking

471 and doing (Nelson et al., 2006). The question then, from an epistemological perspective is; to 472 what extent are cricket coaches simply reproducing the epistemology of their coach 473 education? This can be considered from both the micro delivery of the coach educators 474 delivering course content but also reflecting the epistemological position of the wider 475 cricketing landscape. In being clear and referring to the history books, the first recorded game 476 of RBC was in 1877. The first recorded game of WBC was in 1971. As a result, the perceived 477 knowledge base in relation to RBC is seemingly significantly larger than that in WBC. 478 Consequently, it is perhaps unsurprising that the development of coaches, which although not 479 explicitly labelled, has traditionally and unconsciously focused on RBC principles. 480 Accordingly, the development of coaches has been focused on the reproduction of 481 knowledge. As an important caveat to this historical aspect and referring back to coach educator delivery, this can also occur as a result of coach educators perceiving that to behave 482 483 in any other manner as a threat to their authority and expertise (Cushion, 2013; Light & Evans, 2013). 484

485 All these considerations notwithstanding, however, there remains the reality of our 486 data, showing that the same individuals, working in the same contexts, can hold and operate 487 two completely contrasting, even contradictory epistemologies with the same group of 488 players. We would suggest that the driving forces behind these differences (of which the 489 coaches seemed unaware) are more psychological than social. That is more within than 490 between coach. Undoubtedly, the thinking underpinning this key difference is worthy of 491 further investigation. In drawing the discussion to a close, the final section considers the 492 unique contribution our work has made to the existing evidence base.

- 493 An original contribution to the literature
- 494

The findings of the study, and the identification of the inter-connected nature of the two epistemological dimensions; omniscient authority and certain knowledge, extends the previous literature. It has been presented (including at the beginning of this work), that epistemology is made up on five, *more or-less independent beliefs* (Schommer, 1994). After the exploration of cricket coaches' epistemological beliefs in RBC and WBC it seems clear that these two dimensions are in fact connected.

501 The existing literature also presented competing ideas about the extent to which 502 epistemology is similar across domains (e.g., Beers, 1988; Mori, 1999; Roth & 503 Roychoudhury, 1994; Schommer & Walker, 1995). Our findings continue to contribute to 504 this ongoing debate and offer insight into a new context. They strongly suggest cricket 505 coaches hold different epistemological beliefs across different contexts. In exploring more 506 deeply the unique contribution to the literature, there are two distinct differences when 507 considering the findings in relation to the previous research around the similarity of 508 epistemological beliefs across domains. Firstly, our work developed a richer and thicker 509 understanding (Schultze & Avital, 2011) of epistemology given the increasingly interpretive 510 approach used. This is in contrast to the predominantly positivist approach much of the 511 research that was actioned by Schommer in the 1990's. Secondly, much of the previous 512 research focused on the learner. Our research focused on the epistemological views of those 513 who were tasked with helping the learner (i.e. the coach). Whilst this has been starting to 514 take place within other contexts, once again predominantly within education (e.g., Soleimani, 515 2020) there is little evidence of this within sport, and specifically cricket.

516 517

#### Next Steps for Practice and Research

- 518 There are a number of next steps for both coaches and researchers. The study has had an
- 519 explicit focus on the epistemology and the EC of individual coaches working with developing

athletes. As a result, work would be welcomed which investigates the epistemological beliefs
of players within this context. Doing so would continue to add a unique contribution to the
existing literature and open up the opportunity to increase the alignment, and hence
effectiveness of the coach-athlete relationship, specifically in relation to the learning of new
skills.

In focusing on RBC, continued work which attempted to unpack the premise of coaches developing *competent* (Epstein & Hundert, 2002) red ball cricketers would be welcomed. There are close links here with other, similar ideas such as developing *docile* players incorporating the perspective of power-knowledge relations (Avner et al., 2021; Denison et al., 2017). As such, exploring this premise, specifically in RBC, through the lens of power-knowledge relations is an area worthy of exploration and has been addressed at the academy-level in other sports (Avner et al., 2021).

532 In offering a final recommendation for practice, our research has worked with 533 individual cricket coaches. It is important however to acknowledge that there are often many 534 coaches who are involved in helping cricket players learn and develop (e.g. a 'head' coach, 535 an assistant coach, specialist technical coaches, strength and conditioning coaches etc.) 536 Consequently, there is a clear rationale for the coaching group within each organisation to 537 address the issue of epistemological alignment and misalignment. As opposed to engaging in 538 direct comparison, coaches can become more informed as a result of reflecting on their own 539 beliefs as a result of hearing others around them express their own. We view the unique 540 models of cricket coaching developed within this study (i.e. Figure 2 and 3) to be of real 541 value in this process as a reflective aid. The ambition for coaching teams should(!) be to 542 identify the limits of variation amongst the coaching group and create a clear picture of what 543 is and isn't going to occur (Webb et al., 2016).

544	Acknowledgements
545	The authors would like to acknowledge Dr. Tim Holder in his willingness to be a 'cricket
546	sounding board' at the outset of the research process.
547	Declaration of interest statement
548	The authors report there are no competing interests to declare
549 550	Data availability statement
551	The data that support the findings of this study are available on request from the
552	corresponding author [MC]. The data are not publicly available due to restrictions (e.g. their
553	containing information that could compromise the privacy of research participants and
554	current positions of employment).
555 556	References
557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576	<ul> <li>Adams, W. (2015). Conducting Semi-Structured Interviews. In K. Newcomer, H. Hatry, &amp; J. Wholey (Eds.), <i>Handbook of Practical Program Evaluation</i> (4 ed.). Jossey-Bass. <u>https://doi.org/10.1002/9781119171386.ch19</u></li> <li>Anderson, R. C. (1984). Some reflections on the acquisition of knowledge. <i>Educational Researcher</i>, <i>13</i>(9), 5-10. <u>https://doi.org/10.3102/0013189X013009005</u></li> <li>Avner, Z., Denison, J., Jones, L., Boocock, E., &amp; Hall, E. T. (2021). Beat the Game: a Foucauldian exploration of coaching differently in an elite rugby academy. <i>Sport, Education and Society</i>, <i>26</i>(6), 676-691. <u>https://doi.org/10.1080/13573322.2020.1782881</u></li> <li>Battaglia, P. (2011). Purposive Sample. In P. J. Lavrakas (Ed.), <i>Encyclopedia of Survey Research Methods</i> (pp. 645-647). Sage Publications, Inc.</li> <li>Beers, S. E. (1988). Epistemological assumptions and college teaching: Interactions in the college classroom. <i>Journal of Research &amp; Development in Education</i>, <i>21</i>(4), 87-94.</li> <li>Blaikie, N. (2007). <i>Approaches to Social Inquiry</i> (2nd ed.). Polity.</li> <li>Braun, V., &amp; Clarke, V. (2013). <i>Successful qualitative research : a practical guide for beginners</i>. SAGE.</li> <li>Braun, V., Clarke, V., Hayfield, N., &amp; Terry, G. (2019). Thematic Analysis. In P. Liamputtong (Ed.), <i>Handbook of Research Methods in Health Social Sciences</i> (pp. 843-860). Springer Singapore. <u>https://doi.org/10.1007/978-981-10-5251-4_103</u></li> <li>Braun, V., Clarke, V., &amp; Weate, P. (2017). Using Thematic Analysis in Sport and Exercise</li> </ul>

- Breen, R. L. (2006). A Practical Guide to Focus-Group Research. Journal of Geography in Higher Education, 30(3), 463-475. <u>https://doi.org/10.1080/03098260600927575</u>
- Brownlee, J. (2004). Teacher education students' epistemological beliefs: Developing a
   relational model of teaching. *Research in Education*, 72.
   <u>https://doi.org/10.7227/RIE.72.1</u>
- Bryant, A. (2009). Grounded theory and pragmatism: The curious case of Anselm Strauss.
   *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research, 10.* <u>http://nbn-resolving.de/urn:nbn:de:0114-fqs090325</u>
- Burke, S. (2016). Rethinking Validity and Trustworthiness in qualitative inquiry. In B. Smith
  & A. Sparkes (Eds.), *Routledge Handbook of Qualitative Research in Sport and Exercise* (pp. 330-339). Routledge.
- 590 Chow, J., Davids, K., Button, C., & Renshaw, I. (2016). Nonlinear pedagogy in skill
   591 acquisition an introduction. Routledge.
- 592 Clarke, V. (2017). What is Thematic Analysis? University of West of England Guest Lecture,
   593 Bristol.
- Collins, L., Collins, D., & Grecic, D. (2015). The epistemological chain in high-level
   adventure sports coaches *Journal of Adventure Education and Outdoor Learning*,
   *15*(3), 224-238. <u>https://doi.org/10.1080/14729679.2014.950592</u>
- 597 Crowther, M., Collins, D., & Holder, T. (2018). What you think What you do What you
   598 get? Exploring the link between epistemology and PJDM in cricket coaches. *Sports* 599 *Coaching Review*, 7(1), 63-81. <u>https://doi.org/10.1080/21640629.2017.1361165</u>
- Denison, J., Mills, J. P., & Konoval, T. (2017). Sports' disciplinary legacy and the challenge
  of 'coaching differently'. *Sport, Education and Society*, 22(6), 772-783.
  https://doi.org/10.1080/13573322.2015.1061986
- Elby, A. (2001). Helping physics students learn how to learn. *American journal of physics*,
  604 69, 54-64. <u>https://doi.org/10.1119/1.1377283</u>
- Epstein, R. M., & Hundert, E. M. (2002). Defining and assessing professional competence.
   *Journal of the american medicine association 287*(2), 226-235.
   <u>https://doi.org/10.1001/jama.287.2.226</u>
- 608 Giacobbi, P., Poczwardowski, A., & Hager, P. (2005). A Pragmatic Research Philosophy for
  609 Sport and Exercise Psychology. *The sport psychologist*, 19(1), 18-31.
  610 https://doi.org/10.1123/tsp.19.1.18
- 611 Grecic, D., & Collins, D. (2012). A qualitative investigation of elite golf coaches' knowledge
  612 and the epistemological chain. *Journal of qualitative research in sports studies*, 6(1),
  613 49-70.
- 614 Grecic, D., & Collins, D. (2013). The epistemological chain: practical applications in sports.
   615 *Quest*, 65(2), 151-168. <u>https://doi.org/10.1080/00336297.2013.773525</u>
- 616 Guba, E. G. (1990). *The paradigm dialog*. Sage.
- Gucciardi, D., & Jones, M. (2012). Beyond Optimal Performance: Mental Toughness Profiles
   and Developmental Success in Adolescent Cricketers. *Journal of Sport and Exercise Psychology*, 34, 16-36. <u>https://doi.org/10.1123/jsep.34.1.16</u>
- Hardman, J. (2008). Researching pedagogy: An activity theory approach. *Journal of education*, 45, 65-95.
- Heary, C. M., & Hennessy, E. (2002). The use of focus group interviews in pediatric health
  care research. *Journal of Pediatric Psychology*, 27(1), 47-57.
  https://doi.org/10.1093/jpepsy/27.1.47
- Hofer, B. K. (2002). Epistemological world views of teachers: From beliefs to practice
  [Article]. *Issues in Education*, 8(2), 167.

- Hofer, B. K., & Pintrich, P. R. (1997). The development of epistemological theories: Beliefs
  about knowledge and knowing and their relation to learning. *Review of Educational Research*, 67(1), 88-140. <u>https://doi.org/10.2307/1170620</u>
- Howard, B., McGee, S., Schwartz, N., & Purcell, S. (2000). The experience of
  constructivism. *Journal of Research on Computing in Education*, *32*(4), 455-465.
  https://doi.org/10.1080/08886504.2000.10782291
- 633 ICC. (2018). First global market research project unveils more than one billion cricket fans.
   634 <u>https://www.icc-cricket.com/media-releases/759733</u>
- 635 ICC. (2020). *T20 International Cricket drives significant growth in 2019*. <u>https://www.icc-</u>
   636 <u>cricket.com/media-releases/1607399</u>
- Jones, R. L., & Wallace, M. (2005). Another bad day at the training ground: Coping with
   ambiguity in the coaching context *Sport, Education and Society*, *10*(1), 119-134.
   https://doi.org/10.1080/1357332052000308792
- Jones, R. L., & Wallace, M. (2006). The coach as orchestrator In R. L. Jones (Ed.), *The sports coach as educator: Re-conceptualising sports coaching* (pp. 51-64). Routledge.
- Kidder, L. H., & Fine, M. (1987). Qualitative and quantitative methods: When stories
  converge. *New Directions for Program Evaluation*, *1987*(35), 57-75.
  <u>https://doi.org/https://doi.org/10.1002/ev.1459</u>
- Kinnerk, P., Harvey, S., MacDonncha, C., & Lyons, M. (2018). A Review of the GameBased Approaches to Coaching Literature in Competitive Team Sport Settings. *Quest*,
  70(4), 401-418. https://doi.org/10.1080/00336297.2018.1439390
- 648 Kretchmar, S. (1994). *Practical philosophy of sport*. Human Kinetics
- Lave, J., & Wenger, E. (1991). *Situated learing Legitimate peripheral participation*.
  Cambridge University Press.
- Light, R., Harvey, S., & Mouchet, A. (2014). Improving 'at-action' decision-making in team
  sports through a holistic coaching approach. *Sport, Education and Society*, *19*(3), 258<u>https://doi.org/10.1080/13573322.2012.665803</u>
- Lyle, J., & Cushion, C. (2016). Sport Coaching Concepts : A Framework for Coaching
   *Practice*. Routledge.
- MacNamara, A., Button, A., & Collins, D. (2010). The Role of Psychological Characteristics
  in Facilitating the Pathway to Elite Performance Part 1: Identifying Mental Skills and
  Behaviors. 24(1), 52. <u>https://doi.org/10.1123/tsp.24.1.52</u> 10.1123/tsp.24.1.52
  10.1123/tsp.24.1.52 10.1123/tsp.24.1.52
- Mori, Y. (1999). Epistemological Beliefs and Language Learning Beliefs: What Do
   Language Learners Believe About Their Learning? *Language Learning*, 49(3), 377 <u>https://doi.org/10.1111/0023-8333.00094</u>
- Muir, B., Morgan, G., Abraham, A., & Morley, M. (2011). Developmentally appropriate
  approaches to coaching children. In I. Stafford (Ed.), *Coaching children in sport* (pp. 17-37). Routledge.
- Mulhall, A. (2003). In the field: notes on observation in qualitative research. *Journal of Advanced Nursing*, 41(3), 306-313. https://doi.org/10.1046/j.1365-2648.2003.02514.x
- Nelson, L. J., Cushion, C. J., & Potrac, P. (2006). Formal, Nonformal and Informal Coach
  Learning: A Holistic Conceptualisation. *International Journal of Sports Science & Coaching*, 1(3), 247-259. <u>https://doi.org/10.1260/174795406778604627</u>
- Nespor, J. (1987). The role of beliefs in the practice of teaching *Journal of Curriculum Studies*, *19*(4), 317-328. <u>https://doi.org/10.1080/0022027870190403</u>
- Newmann, F. (1994). School-wide professional community. Madison, WI: Office of
   Educational Research and Improvement
- Nicholas, D. B., Lach, L., King, G., Scott, M., Boydell, K., Sawatzky, B. J., . . . Young, N. L.
  (2010). Contrasting internet and face-to-face focus groups for children with chronic

677	health conditions: Outcomes and participant experiences. International Journal of
678	Qualitative Methods, 9(1), 105-121. https://doi.org/10.1177/160940691000900102
679	Olsson, C., Cruickshank, A., & Collins, D. (2017). Making Mentoring Work: The Need for
680	Rewiring Epistemology. Quest, 69(1), 50-64.
681	https://doi.org/10.1080/00336297.2016.1152194
682	Perry, W. G. (1968). Patterns of development in thought and values of students in a liberal
683	arts college: A validation of a scheme. Bureau of study counsel, Harvard University.
684	Purdy, L. (2014). Interviews. In L. Nelson, R. Groom, & P. Potrac (Eds.), Research Methods
685	in Sports Coaching (pp. 161-170). Taylor & Francis Group.
686	Roth, WM., & Roychoudhury, A. (1994). Physics students' epistemologies and views about
687	knowing and learning. Journal of Research in Science Teaching, 31(1), 5-30.
688	https://doi.org/10.1002/tea.3660310104
689	Schommer-Aikins, M. (2002). An Evolving Theoretical Framework for an Epistemological
690	Belief System. In B. K. Hofer & P. R. Pintrich (Eds.), Personal epistemology : the
691	psychology of beliefs about knowledge and knowing (pp. 77-87). L. Erlbaum.
692	Schommer-Aikins, M. (2004). Explaining the Epistemological Belief System: Introducing the
693	Embedded Systemic Model and Coordinated Research Approach. Educational
694	Psychologist, 39(1), 19-29, https://doi.org/10.1207/s15326985ep3901_3
695	Schommer-Aikins, M., & Easter, M. (2009). Ways of Knowing and Willingness to Argue.
696	The Journal of Psychology, 143(2), 117-132, https://doi.org/10.3200/JRLP.143.2.117-
697	132
698	Schommer, M. (1994). Synthesizing epistemological belief research: Tentative
699	understandings and provocative confusions. <i>Educational Psychology Review</i> , 6(4),
700	293-319. https://doi.org/10.1007/BF02213418
701	Schommer, M., & Walker, K. (1995). Are epistemological beliefs similar across domains?
702	Journal of Educational Psychology, 87(3), 424-432. https://doi.org/10.1037/0022-
703	0663.87.3.424
704	Schultze, U., & Avital, M. (2011). Designing interviews to generate rich data for information
705	systems research. Information and Organization, 21(1), 1-16.
706	https://doi.org/https://doi.org/10.1016/j.infoandorg.2010.11.001
707	Shea, J. B., & Morgan, R. L. (1979). Contextual interference effects on the acquisition,
708	retention, and transfer of a motor skill. Journal of Experimental Psychology: Human
709	Learning and Memory, 5(2), 179-187. https://doi.org/10.1037/0278-7393.5.2.179
710	Sky. (2022). The Ashes: Sir Alastair Cook says England's thrashing in Australia has to be
711	their 'rock bottom'. Retrieved 15/01/2022 from
712	https://www.skysports.com/cricket/news/12173/12517584/the-ashes-sir-alastair-cook-
713	says-englands-thrashing-in-australia-has-to-be-their-rock-bottom
714	Smith, B., & Caddick, N. (2012). Qualitative methods in sport: a concise overview for
715	guiding social scientific sport research. Asia Pacific Journal of Sport and Social
716	Science, 1(1), 60-73. https://doi.org/10.1080/21640599.2012.701373
717	Smith, B., & McGannon, K. R. (2018). Developing rigor in qualitative research: problems
718	and opportunities within sport and exercise psychology. International Review of Sport
719	and Exercise Psychology, 11(1), 101-121.
720	https://doi.org/10.1080/1750984X.2017.1317357
721	Smith, B., Sparkes, A., & Caddick, N. (2014). Judging qualitative research In L. Nelson, R.
722	Groom, & P. Potrac (Eds.), Research Methods in sports coaching (pp. 192-201).
723	Routledge.
724	Soleimani, N. (2020). ELT teachers' epistemological beliefs and dominant teaching style: a
725	mixed method research. Asian-Pacific Journal of Second and Foreign Language
726	Education, 5(1), 12. <u>https://doi.org/10.1186/s40862-020-00094-y</u>

- Tarmo, A. (2016). Pre-service science teachers' epistemological beliefs and teaching reforms
   in Tanzania. *Cogent Education*, 3(1), 1178457.
   https://doi.org/10.1080/2331186X.2016.1178457
- https://doi.org/10.1080/2331186X.2016.1178457
  Webb, V., Collins, D., & Cruickshank, A. (2016). Aligning the talent pathway: exploring the
- role and mechanisms of coherence in development. *Journal of Sports Sciences*,
- 732 *34*(19), 1799-1807. <u>https://doi.org/10.1080/02640414.2016.1139162</u>
- 733