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6   **Developing the Triad of Knowledge in Coaching:**

7   **Think Aloud as a Reflective Tool within a Category 1 Football Academy**

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10   **Date of Submission: 25/11/2020**

11   **Date of acceptance: 15/05/2021**

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Abstract

The current study aimed to explore the perceptions of football academy coaches on their use of a novel reflective tool (Think Aloud) and to understand if this can support the development of knowledge within coaches. Eight male coaches (*M* age = 36) employed full time at a Category 1 football academy within the United Kingdom took part. All coaches attended a 2-hour workshop on the use of Think Aloud (TA) as a reflective tool, with the opportunity to practice TA whilst coaching. Participants were interviewed on their perceptions of TA as a reflective tool using a semi-structured approach. Data were analysed abductively, which allowed the generation of initial codes and the involvement of the triad of knowledge (professional, interpersonal, and intrapersonal knowledge), which has been adopted within coaching and identified as an approach to developing coaching expertise (Côté & Gilbert, 2009), within the analysis process. Findings suggest all three types of knowledge can be developed through the use of TA, with sub-themes identified within each type of knowledge: professional knowledge (player and coach development, session design); interpersonal knowledge (communication, relationships); intrapersonal knowledge (biases, self-awareness, reflection). This research offers a novel perspective on coach development through the implementation of TA, with potential to support the development of coaching knowledge and expertise.

Key words: Reflection, Football, Think Aloud, Knowledge, Education

44   **Introduction**

45   Coaching effectiveness and the development of knowledge within this discipline is a growing

46   area of research (e.g., Côté & Gilbert, 2009; Downham & Cushion, 2020). One definition of

47   coaching effectiveness is "The consistent application of integrated professional,

48   interpersonal, and intrapersonal knowledge to improve athletes' competence, confidence,

49   connection, and character in specific coaching contexts" (Côté & Gilbert, 2009, p. 316).

50   Within a coaching context, knowledge can be classified in terms of: professional knowledge

51   (i.e., knowledge of one's sport and how to apply this knowledge (e.g., technical, tactical, and

52   pedagogical knowledge)); interpersonal knowledge (i.e., a coach's ability to connect and

53   communicate with athletes and stakeholders); and intrapersonal knowledge (i.e., self-

54   awareness and introspection; Trudel & Gilbert, 2013). These three types of knowledge have

55   been referred to within the teaching literature as the triad of knowledge to promote

56   professional expertise (Collinson, 1996). More recently, the triad of knowledge has been

57   adopted within coaching (Côté & Gilbert, 2009) and was identified as the first component

58   necessary for developing coaching effectiveness and expertise. The second component

59   encompasses athlete outcomes (competence, confidence, connection, character), and the third

60   component places importance on understanding the different levels of coaching (e.g.,

61   recreational, youth development, high performance) and the appropriate strategies for each

62   level (Côté & Gilbert, 2009). Therefore, although the development of coaching knowledge is

63   not the only element needed to develop an expert coach, it can be regarded as an integral

64   element in the process.

65   Development of professional knowledge is often emphasised over other types of

66   coaching knowledge. Lefebvre et al. (2016) found that the majority of the 285 coach

67   development programmes identified in a recent systematic review focused on professional

68   knowledge. Only 18 of these programmes focused on interpersonal knowledge, and just six

69   focused on intrapersonal knowledge. Despite this, professional, interpersonal, and

70   intrapersonal knowledge have been used recently in numerous coach education interventions

71   (e.g., Berntsen & Kristiansen, 2019) and have supported the development of frameworks such

72   as the International Sport Coaching Framework (ICCE, 2013) and the European Sport

73   Coaching Framework (ESCF; Lara-Bercial et al., 2017). Indeed, the ESCF states that

74   intrapersonal knowledge can be developed through "knowledge of the self and personal

75   philosophy based on experience, self-awareness and reflection" (Lara-Bercial et al., 2017, p.

76   32). Further, the ESCF highlights that coaching competencies are underpinned by knowledge

77   and reflection. In turn, this underlines the importance of reflective practice, which itself can

78   help to develop the triad of knowledge (Irwin et al., 2004).

79   Within sport, reflective practice has been defined as, "a purposeful and complex

80   process that facilitates the examination of experience by questioning the whole self and our

81   agency within the context of practice. This examination transforms experience into learning,

82   which helps us to access, make sense of and develop our knowledge-in-action in order to

83   better understand and/or improve practice and the situation in which it occurs" (Knowles et

84   al., 2014, p. 10). Reflection can be in-action, whereby the individual is thinking on their feet

85   and reflecting *during* moments of applied practice, or on-action, where an individual

86   retrospectively reflects on events *after* they have already occurred (Schön, 1987).

87   Research investigating the use of reflection for the development of coaching

88   knowledge has explored various strategies for reflective practice, such as reflective journals

89   (Koh et al., 2015); reflective cards (Winfield et al., 2013; Rodrigue & Trudel, 2018); and

90   meditation (Longshore & Sachs, 2015). A common feature of these methods, however, is that

91   they all encourage reflection-on-action. Further, educational interventions on reflective

92   practice taught as part of coaching courses typically focus on retrospective methods of

93   reflection, such as reflective journaling after the event, as opposed to reflection-in-action,

94   which occurs during the event (Gilbourne et al., 2013). Retrospective reports through

95   reflection-on-action have been criticised for their accuracy due to memory decay (Ericsson &

96   Simon, 1993), distortion of knowledge about the success of resolving stressful events (Brown

97   & Harris, 1978), and personal biases that can distort retrospective reports based on perceived

98   success or failure (Bahrick et al., 1996). Moreover, the memories people remember after an

99   event may differ from their experience during the event (Miron-Shatz et al., 2009). That is,

100   the remembering self is fallible and will not retain all information from an event (e.g., a

101   coaching session or match). Instead, what is felt at the end of an event and critical moments

102   will be recalled. This poses an issue for reflection-on-action and creates a case for the

103   introduction of in-action reflective tools.

104   Some drawbacks of reflection-on-action have been mitigated by methods that support

105   coaches to reflect in-action. Although coaches find workshops promoting reflection-on-action

106   to be useful at the time, learning is not necessarily transferred into coaches' practice

107   (Knowles et al., 2006). Transfer of knowledge is an important consideration for coach

108   education as Partington and Cushion (2013) demonstrated that coaches' understanding of

109   their profession does not always translate into practice. Together, this evidence suggests that

110   although coaches strive to implement certain coaching behaviours and knowledge in applied

111   practice, some often continue to coach in their traditional manner. However, if coaches can

112   reflect in action, they can change behaviour in-situ and the transfer gap between traditional

113   coach education and practice is lessened. Subsequently, this can develop their expertise.

114   One approach that can facilitate reflection-in-action is Think Aloud (TA). TA has

115   been used within sport psychology research to understand cognitions in golf (Whitehead et

116   al., 2015), tennis (Swettenham et al., 2020), and cycling (Whitehead et al., 2018). Of direct

117   relevance to the coaching context, recent research has introduced the use of TA as a reflective

118   development tool in coaches (Whitehead et al., 2016). During TA, participants verbalise their

119   thoughts throughout the task (Ericsson & Simon, 1980), most commonly wearing a

120   dictaphone and a microphone whilst in their performance or coaching context. This allows for

121   data on real-time cognitive processes and decision-making to be collected and is an effective

122   way to overcome memory decay issues associated with retrospective methods, such as

123   interviewing or reflection-on-action. Ericsson and Simon (1993) distinguished three levels of

124   verbalisations within TA, each of which involve varying degrees of cognitive processing

125   required to produce vocalisation. In Level 1 verbalisation, the individual is required to make

126   no effort to communicate their thoughts as they are simply vocalising their inner speech.

127   Level 2 verbalisation requires the individual to verbally encode and vocalise their internal

128   representations not originally in verbal code. For example, the verbal encoding of sights and

129   smells would be included in Level 2 verbalisation. This encoding involves additional

130   processing but does not bring new information into the person's focus of attention (Hertzum

131   et al., 2009). Finally, Level 3 verbalisation requires the individual to explain their thoughts,

132   ideas, hypotheses, or motives. Level 3 has been criticised for potentially impacting

133   performance, although this has recently been challenged (Whitehead et al., 2015). As Level 3

134   verbalisation require the individual to hypothesise and explain their thoughts, this leads to the

135   retrieval of information from long-term memory, which in turn may disrupt the natural

136   process. However, within coaching and reflection, Level 3 verbalisation is purposefully used

137   to cause such 'disruptions', as this is what can help coaches to raise awareness of their

138   thoughts as they occur (Whitehead et al., 2016).

139   Whitehead et al. (2016) used TA to overcome issues of memory decay and bias within

140   traditional reflective practice methods in the context of coach development. TA could,

141   therefore, be an asset when developing adaptive expertise in coaching by building knowledge

142   through reflection-in-action. Recent research on developing reflective practice in coaching

143   has focused on Level 3 verbalisation (Stephenson et al., 2020; Whitehead et al., 2016), which

144   could lead to meta-cognition (i.e., thinking about thinking). Both recent studies that explored

145   the use of TA as a reflective tool with rugby league and football coaches found similar

146   perceived benefits amongst coaches (Stephenson et al., 2020; Whitehead et al., 2016). These

147   perceived benefits include an increased awareness, communication, and pedagogy, which all

148   represent different aspects within the triad of knowledge (intrapersonal, interpersonal, and

149   professional knowledge respectively). Although Whitehead et al. (2016) and Stephenson et

150   al. (2020) reported perceived coach development through the use of TA, with tentative links

151   to the triad of knowledge, the explicit development of specific coaching knowledge using TA

152   as a reflection tool has yet to be explored.

153   **Research Purpose**

154   The aim of this study was to provide evidence of how TA can be used as a tool to

155   support reflection-in-action in football coaches and how reflection-in-action can develop the

156   triad of knowledge within these coaches. Given that football is one of the most popular sports

157   in the world (Krustrup & Krustrup, 2018), it is hoped that the findings from this study will

158   resonate with coaches on an international scale. Stephenson et al. (2020) reported experiences

159   of one, young, football coach, coaching a national (nonprofessional) league classed at an

160   adult recreational level. This research must be expanded to explore how the application of TA

161   for reflective practice can be beneficial more broadly within football. Further, demands in

162   elite youth sport are high and come with unpredictable changes during adolescence, which

163   can impact mental wellbeing (Ong et al., 2018). Youth sport is a critical phase for young

164   athletes to develop the multitude of skills required for elite sport. The failure to cultivate

165   these skills being a reason why some elite youth athletes do not reach a career in professional

166   sport (Menting et al., 2019). There is therefore a need for coaches within academy settings to

167   reflect upon their practice effectively to best support the development of youth footballers

168   and increase their chances of long-term success. By implementing TA programmes, akin to

169   that delivered to rugby coaches by Whitehead et al. (2016), coaches could develop the triad

170   of knowledge and enhance their foundation for developing coaching expertise and

171   effectiveness.

172   <div align="center">**Methods**</div>

173   **Philosophical Assumptions**

174   This study was guided by ontological realism (there is a single reality independent of

175   human minds) and epistemological constructivism (knowledge is only partial and fallible),

176   which together positioned this work within the realm of critical realism (Bhaskar, 2008;

177   Ronkainen & Wiltshire, 2019). As such, we recognise the complexity of the social world,

178   with knowledge of the world being socially constructed and, therefore, independent to the

179   existence of the world itself (Ronkainen & Wiltshire, 2019). From a critical realist

180   perspective, theory can be applied to make sense of socially constructed knowledge, although

181   this philosophical position recognises that the objects the theory refers to have an existence

182   beyond the interpretations of the researchers (Westhorp, 2018). Therefore, we have adopted

183   this philosophical position as we believe there is a reality to be found regarding our research

184   questions, but the knowledge within this reality is subjectively and socially constructed by the

185   individuals that experience it.

186   **Participants**

187   Eight male football coaches (M age = 36) with an average of 15 years of coaching

188   took part in this study. All coaches were employed full time at a Category 1 football

189   academy, the highest status of academy in English professional football, which works in line

190   with the Elite Player Performance Plan (EPPP; Premier League, 2011). For the benefit of

191   non-UK readers, the EPPP supports English youth development football, with the aim of

192   creating a world leading academy system to increase the number and quality of home-grown

193   players. Categories are awarded, from Category 1 to Category 4, through independent

194   assessment on 10 factors including productivity rates, training facilities, coaching, education

195   and welfare provisions. Participants were recruited through opportunity sampling (Jupp,

196   2006) and provided consent prior to data collection. Institutional ethical approval was granted

197   prior to the start of data collection.

198   **Procedure**

199   *Think Aloud Training*

200   Participants attended a two-hour coach reflection workshop designed to provide an

201   introduction to TA. The workshop included: education on what TA is and how it had been

202   previously used within coaching; first-hand accounts from coaches with experience using TA

203   as a reflective tool; examples of TA reflective audio from coaches; the opportunity to practice

204   TA whilst watching a video of a coaching session, and the opportunity to practice TA whilst

205   coaching, with their coaching colleagues taking the role of the football players. During the

206   educational session, the coaches were presented with research outlining that what people

207   remember after an event may be different to how they experience the event (Miron-Shatz et

208   al., 2009). The following information was provided to the coaches in an educational format:

209   the remembering self will not retain all information from a coaching session or match; what

210   happens at the end, and critical moments will be recalled; this means reflecting after the event

211   may not be accurate; and TA can be used to mitigate these issues. The practicalities of using

212   TA were then introduced, with examples of previous research, the development of TA

213   reflective frameworks, and the potential impact this may have on coaching also outlined (e.g.,

214   communication, self-awareness, pedagogy; Stephenson et al., 2020; Whitehead et al., 2016).

215   *Interviews*

216   Two months after the workshop, follow-up interviews were organised with eight of

217   the coaches individually. Three of the eight coaches had used TA within their coaching

218   sessions prior to the follow-up interviews. While this low number was partially due to

219 COVID-19 lockdown restrictions within the UK at the time of the study, all coaches had

220 experience practicing TA within the workshop. Interviews were conducted by the lead

221 researcher via Zoom™ online video conferencing. A semi-structured interview guide

222 (available upon request) was created. This was used to discuss participant's initial

223 perceptions of TA, and how they felt it could (or has already) benefitted them and their

224 coaching team.

225 **Analysis**

226   Interviews, totalling 287 minutes ($M = 34.7$ minutes), were transcribed verbatim into

227 110 pages of data. This data was then analysed in NVivo qualitative analysis software using

228 Braun and Clarke's (2019) reflexive thematic analysis, meaning the researchers engaged in a

229 "reflective and thoughtful process" (Braun & Clarke, 2019, p. 594) together when analysing

230 the data. Moreover, the researchers took into account assumptions held by the current

231 research to create a conscious and reflexive use of the approach and its procedures. Data were

232 analysed abductively, themes were initially identified, and then the triad of knowledge was

233 introduced. The final themes and sub-themes themes can be seen in Table 1.

234 **Table 1**

235 *Themes and sub-themes generated from coach interviews*

Themes (The Triad of Knowledge)	Sub-Themes	Description
Professional Knowledge	Player and Coach Development	The impact of TA in supporting the development of players at the football academy through the development of coaching practice.
	Session Design	The impact of TA on the ability to plan and adapt coaching sessions.
Interpersonal Knowledge	Communication	The impact of TA on the coach's use of language and time spent talking during coaching sessions.
	Relationships	The impact of TA on developing coaching relationships through sharing and discussing TA recordings.
Intrapersonal Knowledge	Biases	The impact of TA on the coach's personal biases relating to perceptions

		of player ability and quality of coaching sessions or matches.
	Self-awareness	The impact of TA on the coach's consciousness of their own character, thoughts, feelings, and behaviours.
	Reflection	The impact of TA on the coach's conscious analysis of their coaching experience leading to a change in coaching behaviour.

236

237   Data were analysed by the lead researcher who was working at the football academy

238   in question at the time of the research. To reduce any biases due to this, the second researcher

239   acted as a critical friend (Smith & McGannon, 2018) and supported the reflexive thematic

240   analysis process (Braun & Clarke, 2019). In step 1 of the reflexive thematic analysis, the

241   research team familiarised themselves with the data; in step 2, 109 preliminary codes were

242   generated in accordance with the research questions. At this point, initial codes were

243   reviewed as a team and considered. This collaborative coding allows a "dialogic exchange of

244   ideas" that support interrogation and discussion from multiple perspectives (Saldana, 2013, p.

245   34). In step 3, the triad of knowledge was introduced and the lead researcher searched for

246   themes relating to the different types of knowledge across interview data, such as

247   'Communication', 'Session Design', and 'Biases'. In step 4, the themes were reviewed by

248   author one and author two. When reviewing the themes, the authors recognised it was

249   difficult to separate the initial themes of 'Coach Development' and 'Player Development' as

250   ultimately the development of the coach leads to the development of the player, and so we

251   decided to condense both themes into 'Player and Coach Development'. Additionally, this

252   clarified what data would fit within the theme of 'Communication' as previously it was

253   difficult to separate from 'Coach Development'. Once the final themes were decided upon in

254   step 5, interview transcriptions were reanalysed in depth for these themes.

255   **Quality Standards and Trustworthiness**

256   The term trustworthiness is used by qualitative researchers to describe the steps taken

257   to improve the quality of their work (Sparkes & Smith, 2014). During the data analysis

258   process, collaborative coding was conducted to help encourage critical reflexivity (Braun &

259   Clarke, 2019). In addition, to facilitate critical dialogue during the analysis, the first and

260   second author engaged in peer debriefing through formal meetings (Creswell & Miller,

261   2000). Specifically, the authors met to discuss and debate which codes linked to which types

262   of knowledge. Further, some difficulties arose when themes overlapped each other for certain

263   quotes, such as communication being viable as interpersonal knowledge and professional

264   knowledge. Due to this, it is important to note the analysis involved a constant moving back

265   and forth or as Braun and Clarke (2019) call it 'a continual bending back on oneself' (p.594),

266   where the theory was used to make sense of the data, and critical reflections between

267   members of the research team occurred.

268   **Results**

269   Interviews were analysed thematically for elements within the triad of knowledge

270   (professional, interpersonal, and intrapersonal knowledge) that coaches perceived to have the

271   potential to be developed through TA. The following section presents each theme and sub-

272   themes (italicised), whilst also providing quotes from coaches to illuminate how knowledge

273   within these areas was perceived to be developed through the use of TA. All eight coaches

274   will be referred to hereafter by a pseudonym to protect their identity. Within the results, they

275   will be identified as academy coach one (AC1) through to academy coach eight (AC8).

276   **Professional Knowledge**

277   Within the theme of professional knowledge (e.g., technical, tactical, and pedagogical

278   knowledge), two sub-themes were generated to represent areas the coaches perceived TA to

279   impact: *player and coach development* and *session design*.

280   ***Player and Coach Development***

281   Player and coach development referred to supporting the development of players at

282   the football academy through the development of coaching practices. AC3 spoke about

283   shifting focus away from coaching behaviours and onto the behaviours of the players through

284   the use of TA. This could allow the coaches to better understand the players' responses to

285   certain aspects of the game, such as reactions to mistakes:

286   I'd used it [TA] at the player-led festival…Then observe behaviours and look at it

287   from a "what do they react like when they're winning, what do they react like when

288   they're losing, what do they do in terms of their body language when the game's tight

289   or it's quite physical?" and we just stepped back and observed it from that point of

290   view and I had the microphone and I was just looking at a few people's reactions to

291   certain mistakes when a centre forward missed a shot, goalkeeper made a bad pass or

292   he let one in. (AC3)

293   For AC7, they recognised the importance of understanding their own thoughts about

294   individual players and how that impacted on player development, "you can kind of get your

295   thoughts on how a certain individual is doing within a session as well and what you think

296   could be improved." (AC7)

297   AC1 spoke about how integral coaching skills, such as listening and time spent talking, can

298   be identified using TA. This could, in turn, lead to changes from the coach, such as time

299   spent talking, as they pick up behavioural cues from the players:

300   When you're watching somebody else coach you're looking at when they're coaching

301   and the impact on the players and are they actually listening and a lot of the time

302   you're watching and you observe that they're just waiting for them to finish and they

303   want them to shut up and move on. (AC1)

304   Overall, coaches perceived that *player and coach development* was supported through the use

305   of TA as it could provide them with a greater understanding of the players and themselves.

306   The coaches felt this could allow them to improve the feedback and support they provide the

307   players. Moreover, by using TA, the frequency and impact of coaching behaviours (e.g., use

308   of silence, challenge vs support) could be explored and adjusted according to the players'

309   needs.

310   ***Session Design***

311   *Session design* refers to the ability to plan and adapt coaching sessions. AC6 and AC8

312   spoke about how TA can allow coaches to remember the positive aspects of the session

313   design rather than just focusing on the negative aspects. This is where methods of

314   retrospective reflection may suffer due to memory decay, rather than only remembering the

315   drills that stood out, or simply carried out at the end of a coaching session:

316   It [TA] helps you to remember a lot more of the session so you can evaluate the whole

317   thing. So I might remember the really, really poor drill that I did, you know and focus

318   on that where actually the other three drills that I did were actually quite good, but

319   I'm only focussing on the poor one, or vice versa, I might remember the really good

320   one where the players did really well at it and I did some really good coaching for

321   them and they got it, but then I might forget actually the end match, the 4 v 4, 5 v 5 at

322   the end was quite poor but I forget about that. So I think the impact of it [TA] helps to

323   remember what you've done, a lot more of what you've done as you can play it back.

324   (AC6)

325   Similarly, AC8 explained how TA could encourage him to reflect on the positive elements of

326   a coaching session:

327   I think the good stuff [elements of the coaching session] as well, so when the good

328   stuff's happening it will all be recorded "that's great, this is working really well, he's

329   responded to that, this session works really well, move that out of there 'cause I had a

330   problem and that's worked really well". (AC8)

331   AC8 also discussed how TA could make coaches better through analysis of the effectiveness

332   of the session design and emotions the coach may experience based on the outcome of the

333   session. This can lead to adapting the session based on reflections-in-action to increase

334   coaching effectiveness:

335   It [TA] will make them [the coaches] better, it will make them more, erm, more

336   thoughtful in terms of the preparation, things may have been exposed in a previous

337   session in terms of how they've felt about a certain thing. So if it was like, I don't

338   know, area size too small… that will be a priority in their mind and in their planning

339   where they've felt "shit, I was panicking, this is a nightmare, it's not working" rather

340   than they'll just think "leave it smaller" and then that's it and move on to the next part

341   of the session and the next bit when they reflect and think "I was starting to get a bit

342   anxious, I knew it was my time to take the 16 players and the lead coach was

343   watching me and my work was too small. Do I make it bigger now, do I change the

344   pattern, do I put some on the outside or do I run with it?" (AC8)

345   TA was perceived to support *session design* in that it can help coaches to develop a more

346   balanced view of their sessions. Meaning they can take in the positives as well as the

347   negatives, whilst exploring the various emotions they may experience when coaching.

348   **Interpersonal Knowledge**

349   Within the theme of interpersonal knowledge, two sub-themes were generated which

350   captured areas where the coaches perceived TA to have impact: *communication* and

351   *relationships*.

352   ***Communication***

353   *Communication* represented the coaches use of language and time spent talking

354   during coaching sessions. Coaches discussed multiple facets of communication and perceived

355   TA to be beneficial for developing an awareness and understanding of effective

356   communication. AC2 discussed how the use of TA and reflecting-in-action could help them

357   to reflect on the clarity of their language during coaching and understanding from the players:

358   I've done it [TA] to myself on my own, okay, 'so, has [player name] listened to me?

359   Has my instruction been clear enough when I've said to him "be creative, do whatever

360   skill you want and have a shot on the goal at the end"? Did I say that, was it clear

361   enough? Did I talk too much? Was I commentating? You know, am I talking too fast?

362   Am I talking too high? Am I talking too low? That type of stuff really. (AC2)

363   Likewise, coaches explained that using TA could positively impact how much coaches spoke

364   during sessions to keep the momentum and intensity of the session going:

365   My first thoughts were that this tool could massively manage and maybe curb how

366   much people talk as I think I see way too much of that. (AC1)

367   I think sometimes you, you not "over coach" but you kinda speak for the sake of it, in

368   terms of trying to keep the session flowing and maybe commentating at times to try

369   and keep the tempo referring and the intensity and the motivation for the players.

370   (AC7)

371   AC3 discussed utilising a great amount of positive communication during coaching and

372   believed that using TA could help them to build more balance into their feedback, whilst also

373   recognising when remaining silent might be more impactful:

374   Commenting on, what's your language like, what's your tone like, are you overly

375   critical on players, are you too positive? That's the thing that sometimes I struggle

376   with, I think I'm too positive at certain times, so that's something I'm quite conscious

377   of, trying to really balance praise and actually not saying anything sometimes to have

378   a bit more power and impact on when I do say something. I think that can, that can

379   help by using think aloud. (AC3)

380   Coaches perceived TA could support *communication* by increasing their awareness and

381   understanding of effective communication. This includes aspects of communication such as

382   clarity, tone, amount of time spent talking, use of silence, and effective questioning.

383   ***Relationships***

384   *Relationships* refers to developing coaching relationships through sharing and

385   discussing TA recordings. AC8 discussed the relationships coaches could build together

386   through sharing their TA audio: "You're building relationships as well aren't you 'cause

387   you're getting a bit more insight into how they're [other coaches] thinking" (AC8). AC5

388   mentioned how hearing a coaching colleague's feedback on their TA audio would help them

389   to understand each other's thought processes. This could lead to better coaching relationships,

390   and a more cohesive coaching delivery: "If I work with [a coach colleague] as such, if I listen

391   to his feedback "oh what's his sort of thinking, thought process?" (AC5). AC6 reported

392   similar interactions with their coach mentor, with the ability to share his thought processes

393   from his coaching session leading to a better understanding from the coach mentor. Though

394   not expressed in the interviews, this could lead to stronger relationships due to an uncensored

395   sharing of thought processes:

396   I think it would help him [coach mentor] as well to understand what we're thinking

397   because I must admit when I was sat with [coach mentor], he was watching the match

398   and he was providing feedback on me but then if I can, I could say to [coach name],

399   for example, I was just trying to do that but if I find that he's recording it as well then

400   he's got the evidence to say "oh [coach name] was thinking that at the time". (AC6)

401   AC8 mentioned that to have a greater insight into what other coaches are thinking by using

402   TA would provide him with a better understanding of other coaches' self-awareness and

403   decision making in action. Though not explicitly verbalised, having a greater understanding

404 of other coaches' levels of self-awareness and behaviours could support the growth of

405 relationships:

406   I would have loved to have known what was going through his mind. I asked him, I

407   asked him obviously when we went through it but like I said "I thought [coach name]

408   was maybe gonna do that" or I thought in the moment I know he probably wasn't

409   thinking that, he was just sort of probably thinking about his session or not even being

410   self-aware that maybe things were taking as long as maybe they were. (AC8)

411 *Relationships* were perceived to be enhanced through the use of TA. Coaches felt that sharing

412 their TA audio could help to build relationships and an understanding of one another's

413 thoughts. Further, sharing their TA audio with their coach mentor could promote a better

414 shared understanding of their coaching behaviours and decision-making. This could support

415 the growth of coaching relationships through an uncensored sharing of thoughts.

416 **Intrapersonal Knowledge**

417   Within the theme of intrapersonal knowledge, three sub-themes were generated which

418 captured areas of interpersonal knowledge that the coaches perceived TA to impact: *biases*,

419 *self-awareness*, and *reflection*.

420 ***Biases***

421   *Biases* refer to coaches' personal biases relating to perceptions of player ability and

422 quality of coaching sessions or matches. It was discussed the use of TA could increase

423 awareness of personal biases, allowing coaches to understand what this may look like for

424 them whilst coaching and provide them with a more accurate representation of their coaching

425 experience. AC1 discussed the ability to separate themselves from their emotion after a match

426 to reduce biases, which may occur due to the result:

427   I suppose it's [TA] that trying to remove as much emotion from the event as possible

428   isn't it? Erm, a large part of our job is writing reviews on players. So we'll do linked

429   reviews on players every week and speak about their performances in the game and I

430   often find that some weeks, some weeks I haven't watched the game back and I've

431   written the review and then I watch the game back and then maybe later on that day or

432   the next day and then my review would be completely different if I was to write it

433   again based on what I've just watched back. (AC1)

434   For AC5 and AC3, using TA was perceived as beneficial to recognise individual coach biases

435   towards players. This recognition could allow coaches to overcome player biases, preventing

436   them from becoming negative or inappropriate, and hindering the players' development:

437   Initially when I'm talking about players and certain players and we all have, I do it

438   myself, we all have biases, there's always, there's a couple of players whether it's in

439   the group that you're working with or groups that you kind of, you see boys in those

440   groups and it's something on, yeah, sometimes you're quite negative in a way

441   [towards the players] that is probably inappropriate. (AC3)

442   I think sometimes your biases will come out a bit more in your conversations and then

443   when you listen back to it you think "okay, maybe I do think I am a bit too supportive

444   of them, maybe I should have come down on him in that situation". I think that would

445   be really good, really good to practice that a bit more. (AC5)

446   Coaches perceived TA to increase awareness of personal *biases*, especially those that occur

447   depending on the result of a match, which may impact a coach's view of a player. By

448   recognising biases towards individual players, coaches felt it could help them to recognise

449   negative or positive behaviours towards these players and adjust them accordingly.

450   ***Self-Awareness***

451   *Self-awareness* refers to the coaches' consciousness of their own character, thoughts,

452   feelings, and behaviours. AC6 discussed how TA impacted their ability to recognise patterns

453   of behaviours and to pinpoint areas that may need improvement in their coaching practice:

454   Another impact I would say was to, it would help you long term, so if you can do it

455   obviously more than once and do it quite often you might tend to get a pattern of what

456   I do as a coach so I can see I did it on that week and I did it on that week as well

457   where I didn't question him, I didn't provide any positive feedback to him… If you

458   get that pattern you can change it can't you, if it's in front of you. (AC6)

459 AC2 touched on the importance of finding a personal balance to ensure they bring their best

460 selves to work. To do this requires a level of self-awareness and self-analysis to be more

461 effective at work and understand their impact upon other people. AC2 suggested this could be

462 developed by listening back to themselves, which could be facilitated through TA and

463 provide coaches with a more objective view on their coaching practice:

464   The more I listen to myself, I'll kind of be able to, to, er, distinguish and identify how,

465   am I thinking aloud there or am I commentating? Am I, you know, just saying what

466   I'm seeing or am I looking back objectively and giving an objective viewpoint on the

467   practice, the coach, my communication or is it subjective and getting affected by, er,

468   you know, emotions or who I'm talking to or how I'm feeling that day, you know…

469   So probably how I'm feeling as an individual, you know, what's my night's sleep

470   been like, what's my food been like? (AC2)

471 AC4 perceived TA to have the potential to improve awareness of language used within

472 coaching practice and to notice if language changes due to the pressure of competition:

473   Does it become more demanding in a game and used, more assertive would be the

474   word, more assertive language because of the game or are you more, are you quite the

475   same? 'Cause really you should be the same. (AC4)

476 AC8 spoke about how TA could be used to provide the coach with feedback in-action to

477 allow coaches to regulate their emotions and use of language in matches through "in game

478 development":

479   Really interesting to record think aloud during a game 'cause I think you'd get a real

480   shift on emotion based on the context of what's happening on the pitch. For them to

481   hear that back, they'll have an idea 'cause they'll think "ah yeah, I was really annoyed

482   at that" but if they're constantly talking and giving some feedback to themselves on

483   what they're thinking, what they're seeing, play that back over the year and I think for

484   in-game development it could be really, really good, really good. (AC8)

485 As such, TA was perceived to develop *self-awareness* by helping the coaches to understand

486 their patterns of behaviour and how these may impact their coaching. Coaches felt awareness

487 of language use and how this may change in different contexts (e.g., competition versus

488 training) could be developed. Further, they perceived that this awareness could support their

489 in-game development and regulation of emotions.

490 **Reflection**

491   *Reflection* referred to how a coach's conscious analysis of their coaching experience

492 could lead to a change in coaching behaviour. Here, coaches discussed the benefits of TA as a

493 reflective tool and the ability to reflect-on-action by listening back to the TA audio. Coaches

494 explained how they would question themselves when listening back to a TA audio recording:

495   So I think, for me, when I listen back to it and I'll be asking myself "would I have

496   questioned that there, would I have said it like that?". So, I think there'll be a lot

497   [that] comes out of it [TA]… It would be interesting to look at games in sessions, so

498   whether they differ from how people behave. (AC4)

499 AC8 spoke about how reflecting using TA influenced the planning and preparation of future

500 coaching sessions and could be employed to help them overcome any issues that arose during

501 reflection-in-action using TA:

502   Then afterwards that would be a key thing to reflect on and think "right, I could have

503   done that, I should have done that, I did do that, it worked, it didn't but then straight

504   away in terms of the planning and prep that's a few things for them to think about,

505   how this is gonna fit to get the benefits of what I want in a session". (AC8)

506 AC1 felt TA was a novel reflective tool compared to other methods taught on coach

507 education courses and emphasised that "how" you reflect can have an important impact on

508 coaching practice:

509   I think it's pretty interesting stuff 'cause it's quite different to most of the usual stuff

510   you do on your, on your coach ed stuff. I've not really seen people go into real depth

511   about how you reflect and stuff like that. It's very much they tell you to reflect but I

512   end up writing a load of rubbish on a page that I'm never gonna look at again so it's,

513   so it's how you reflect to make an actual impact on what you're doing. (AC1)

514 *Reflection* was perceived by the coaches to be developed through TA, as it provides them

515 with a novel way to reflect-in-action as well as reflecting whilst listening back to their TA

516 audio recordings. Coaches discussed how they would question themselves whilst listening

517 back to their TA audio recordings. This could then support their planning for future sessions,

518 helping them to overcome barriers and maintain the positive aspects of their coaching.

519   **Discussion**

520   This study aimed to explore the perceptions of football academy coaches on the

521 impact of TA as a reflective tool and explored whether TA can be used to develop the triad of

522 knowledge within football academy coaches. During the analysis process, the triad of

523 knowledge (professional knowledge, interpersonal knowledge, and intrapersonal knowledge)

524 was evident within the data. In turn, the current findings offer an insight into how reflective

525 practice, using TA, could develop a foundation of coaching knowledge to cultivate expertise

526 within academy football coaches.

527   From the findings, we suggest that all three types of knowledge could be developed

528 through TA. Coaches discussed how professional knowledge could be developed using TA as

529   the process of reflecting-in-action can support player and coach development, as well as

530   session design. This continues from previous TA research that suggests pedagogy, a type of

531   professional knowledge, was developed following the use of TA (Stephenson et al., 2020);

532   Whitehead et al., 2016). Further, participants expressed how a shift in focus from coaching

533   behaviours onto the behaviours of players could occur. By having a greater understanding

534   and awareness of player behaviours, enhanced individualised player support and feedback

535   could occur. Individualised support is an important consideration within youth football, with

536   many factors perceived to impact talent development (e.g., resilience, goal-directed attributes,

537   sport-specific attributes, awareness; Mills et al., 2012). With the potential to increase

538   awareness of player attributes and needs through the use of TA, coaches could adapt their

539   coaching to best support the person in front of them. In line with previous TA research

540   exploring reflective development of coaches (Whitehead et al., 2016; Stephenson et al.,

541   2020), interview data in the current study suggests the TA process could heighten the coach's

542   self-awareness. Specifically, awareness as to whether a coach was talking excessively or

543   providing exceeding amounts information, which has been found to reduce the clarity of

544   verbal communication (Thelwell et al., 2017) and could negatively impact player

545   development. This may be due to the need to be in control, or be a response to stressful

546   experiences. Research suggests high pressure situations can lead to ineffective coaching and

547   negatively affect athlete performance (Gould et al., 2001). Additionally, McCann (1997)

548   reported athletes were able to recognise when their coaches were experiencing stress, which

549   negatively impacted athlete confidence. Therefore, within this study, coaches reported how

550   TA has the potential to support professional knowledge through developed coaching

551   behaviours such as providing feedback and individualised support to aid player and coach

552   development.

553   In terms of professional knowledge, the coaches identified TA to have an impact on

554 session design by bringing awareness to the effectiveness of the session in-action, which

555 could allow them to respond flexibly to changing conditions. With the role of an effective

556 coach embodying adaptive expertise, they are required to perform flexibly and innovatively

557 within coaching sessions in response to situational demands (Collins et al., 2016). This

558 finding also reinforces previous findings reported by Whitehead et al. (2016), in rugby

559 league, where coaches using TA as a reflective tool perceived that it aided development in

560 coaching pedagogy as a result.

561   Furthermore, within professional knowledge, coaches suggested TA could allow them

562 to remember the session more accurately. Within the interviews, one coach stated they would

563 remember the poor drill over the successful drill. By having a more accurate representation of

564 the coaching session by using TA in-action, coaches can prevent overlooking the successful

565 drills that could be emphasised within their future coaching practice. As humans, we may

566 have a negativity-bias, that means negative information can be attended to compared to

567 positive experiences (Rozin & Royzman, 2001). Within sport, the importance of focusing on

568 strengths has been highlighted by coaches, athletes, and parents (Gucciardi et al., 2009). This

569 can be called a strengths-based approach, which draws on positive psychology, appreciative

570 inquiry (AI) coaching, and strengths-based coaching (Gordon & Gucciardi, 2011). A

571 strengths-based approach can combat negativity bias and is used within fields such as

572 executive coaching (Gordon, 2016), elite sport (Ludlam et al., 2016), and clinical psychology

573 (Seligman & Peterson, 2003) to achieve outcomes such as happiness and flourishing

574 (Compton & Hoffman, 2019), increased performance (Peláez et al., 2019), and mental

575 toughness (Gordon et al., 2017). Within AI, individuals are encouraged to focus on what

576 works rather than what is wrong, but this has been criticised on the basis that an avoidance of

577 negatives may distort the reality of the situation (Cram, 2010), and may be unsuitable for

578   neophyte coaches or during problematic coaching situations (Pill, 2015). However, this is a

579   surface understanding of AI, as individuals do not avoid negatives when using AI but instead

580   engage in critical reflection of failure and success (Hart et al., 2008). We can therefore see

581   TA's potential to reduce negativity biases and help critical reflection within coaches as they

582   recognise the positives in their practice along with where they can develop.

583   Coaches perceived TA to have an impact upon interpersonal knowledge, specifically

584   for communication with players and relationships with other coaching colleagues. TA can

585   bring awareness to the clarity of the coaches' communication style, such as the use of

586   silences, asking questions, and feedback. Many coaches discussed the impact TA can have on

587   the amount the coach talks within a session, which is noteworthy given evidence that the use

588   of silence is the largest single behaviour elicited by professional top-level soccer coaches

589   (Smith & Cushion, 2006). Furthermore, coaches in the current study highlighted how TA

590   could refine the feedback they provide, for example, by not being overly positive in their

591   feedback. It is important that positive feedback is used correctly, but positive feedback in the

592   form of general praise can be interpreted as non-specific feedback and reduce the impact it

593   has (Schmidt, 1991). Though research has demonstrated associations between positive

594   feedback, feelings of relatedness, and intrinsic motivation (e.g., Hollembeak & Amorose,

595   2005), it is important to make sure this feedback is specific and constructive (Ntoumanis et

596   al., 2018). Therefore, the findings illustrate how TA can raise awareness to different facets of

597   communication and development of interpersonal knowledge. In turn, this can be reflected

598   upon and cultivated to influence many aspects of player and coach development.

599   TA was perceived to influence relationships between coaching colleagues. It was

600   discussed how the ability to share TA audio could lead to better coaching relationships and

601   ultimately more cohesive coaching delivery for coaches working with the same team. This

602   links to social learning initiatives, such as the community of practice approach. Here,

603   research has found that coaches value the ability to connect with other coaches and focus on

604   the processes of coaching (Bertram et al., 2016), learn through engaging in a community of

605   practice (Culver & Trudel, 2006), and share their own knowledge within the community of

606   practice (Culver et al., 2009). Additionally, the influence of support from coaching peers has

607   been shown to be an important factor for the development of coaches through non-formal

608   learning situations (e.g., conferences and seminars) and informal learning situations (e.g.,

609   interactions with peers; Camiré et al., 2014). As such, TA reflections could be even more

610   powerful when shared amongst peers to encourage a community of practice, whilst also

611   having the potential to improve interpersonal relationships.

612   For intrapersonal knowledge, perceived benefits identified by coaches included the

613   awareness of personal biases, self-awareness, and reflective practice. Coaches perceived that

614   TA brought more awareness towards personal biases present within the coaching

615   environment, for example biases towards certain groups of players or individuals, which may

616   have a negative impact on the support provided to those players by the coach. It could be

617   argued that recognition of biases is particularly important within academy coaching where the

618   focus is on development of the player and not just the results that are produced. Additionally,

619   some coaches discussed how they became more aware of overly supporting players and how

620   TA as a reflective tool could identify biases within the coach's personal behavioural style.

621   Recognition of these behaviours is important, as the development of positive athlete attitude,

622   motivation, and behaviour stem from the behaviours of the coach, such as a clear vision and

623   balance of support and challenge (Arthur et al., 2012). Within this study, self-awareness

624   included the ability to recognise patterns of behaviours in coaching practice and the ability to

625   change or maintain these patterns of behaviours based on their effectiveness. Research shows

626   the importance of using reflective practice to change behaviours (Gilbert & Cote, 2013) and

627   is an integral component in shaping coaching behaviours (Cushion, 2016).

628   Under intrapersonal knowledge, self-awareness of the use of language was identified

629   as an important factor of coaching practice that TA could influence. This is consistent with

630   previous research that reported self-awareness as a perceived benefit of reflective TA in

631   coaching (Stephenson et al., 2020; Whitehead et al., 2016). Additionally, coaches expressed

632   that TA could bring awareness to consistent language and feedback within training and

633   competition. Previous work has shown a shift in coach language can occur due to the

634   outcome of a match, where during winning bouts in boxing, coaches used less controlling and

635   internal feedback, and more positive feedback compared to losing bouts (Halperin et al.,

636   2016). Self-awareness of personal needs and work-life balance was also discussed by the

637   coaches, with the more they listen to themselves potentially influencing their self-awareness

638   across other domains such as self-care and work within the coaching office. Self-awareness

639   has been shown to predict coaching efficacy and could bring more awareness towards coach

640   needs in terms of self-care to reduce coach burnout, a topic growing in research (Hassmén et

641   al., 2019).

642   Finally, reflection was discussed within intrapersonal knowledge as a process that TA

643   could support. The coaches expressed how they could listen back and reflect on their TA

644   audio by asking themselves questions about coach and player behaviours, use of language,

645   ability to adapt, what was successful, and what was not successful. Furthermore, reflection on

646   their TA audio could influence their planning and preparation for future coaching sessions, a

647   complex practice involving many variables (Denison, 2010), and change or maintain any

648   aspects of their coaching identified as ineffective or effective. The coaches also emphasised

649   the importance of *how* one reflects and the unique qualities of TA as a reflective practice tool,

650   such as speaking their thoughts out loud in-action providing the option to listen back to

651   reflections which other reflective tools, such as Gibbs' Reflective Cycle (Gibbs, 1988), do not

652   provide. Therefore, the findings suggest that the use of TA as a novel reflective tool can

653   enhance intrapersonal knowledge through awareness of one's own thoughts, emotions, and

654   biases to support coaches to become more self-aware.

655   **Practical Implications**

656   There are a number of practical implications from this study. Focusing on

657   professional knowledge, coaches could use TA to record successful events, rather than being

658   overridden by negativity-bias (Rozin & Royzman, 2001) or inaccuracy of the experiencing

659   self (Miron-Shatz et al., 2009). In turn, it is conceivable that strengths could be cultivated and

660   maintained by using TA as a reflective tool, although coaches are encouraged to find a

661   balance between focusing on their strengths and uncovering weaknesses whilst using TA to

662   create an accurate representation of their coaching.

663   Taking the interpersonal knowledge findings from this study, it could be suggested

664   that coaches can use TA to build their awareness of different facets of communication, such

665   as tone, time spent talking, clarity, and the use of silence with TA. Further, by working with a

666   coaching colleague and sharing TA audio, this could help coaches to gain a better

667   understanding of each other's thought processes, strengths, and weaknesses whilst building

668   coaching relationships. It was previously stated that coaches value learning opportunities,

669   networking with peers, and sharing knowledge. However, coaches often perceive time and

670   money as two barriers towards some of these learning situations (e.g., conferences, seminars;

671   Camiré et al., 2014). Gilbert et al. (2009) suggested youth sport coaches need these

672   opportunities to engage in continuing professional development, allowing them to create and

673   share knowledge with coaching peers. TA could therefore be a tool through which to promote

674   peer learning and development of knowledge without incurring the same costs in terms of

675   time and money, as coaches can openly share their TA audio and reflections with one

676   another, gain feedback, and support one another.

677   Finally, to support the development of intrapersonal knowledge, TA can support

678   coaches to develop awareness of themselves and their biases. Self-awareness can be

679   developed by identifying and cultivating positive patterns of behaviours in line with coaching

680   philosophies. Specifically, the use of TA could allow an optimal balance of challenge and

681   support to occur through the consideration of biases towards individual players and personal

682   coaching style. Similar findings have been evident within previous research (Stephenson et

683   al., 2020; Whitehead et al., 2016), but research has yet to identify the explicit benefits.

684   During reflective practice, coaches can use TA to recognise and regulate their own emotions

685   and use of language through "in game development". Within Hassmén et al. (2019), coaches

686   discussed how an increased awareness of signals of stress and rumination helped during the

687   burnout recovery process and prevention of future burnout. Therefore, TA used in these ways

688   could develop intrapersonal knowledge and impact not only the effectiveness of the coach

689   and subsequent player development, but the fulfilment and mental health of the individual as

690   a coach and a person.

691   **Limitations and Future Directions**

692   Although this study has provided positive perceptions for the use of TA to develop

693   knowledge with coaches, it is important to acknowledge its limitations. First, a limitation of

694   this research is the lack of applied experience that the coaches had in terms of the use of TA.

695   Given the current COVID-19 pandemic, data collection was disrupted. Nonetheless, this

696   study does provide a novel insight into coaches' initial perceptions of TA and suggest that it

697   has potential for the development of knowledge within coaches; specifically, in Category 1

698   football academy coaches within the UK. Thus, future longitudinal research to explore the

699   long-term impacts of reflective practice using TA within football coaching and across

700   different settings (e.g., gender, age groups, location) is warranted. Second, the study only

701   takes into account the personal views of the coaches participating and it is not known whether

702   the benefits perceived by the group of coaches will transpire when TA is applied within

703   coaching practice. Therefore, future research should examine the development of these types

704   of knowledge amongst coaches enrolled on a TA reflective practice course. For example, this

705   could involve collecting TA data to analyse the content of verbalisations, which could, in

706   turn, enable a more critical examination of the development of the triad of knowledge

707   through the use of TA.

708   **Conclusion**

709   The current study has provided insight into how TA can be used as a novel reflective

710   practice tool to develop the triad of knowledge within coaches at a professional football

711   academy. In turn, the findings demonstrate how the use of TA has the potential to build a

712   foundation of knowledge for coaches to then develop coaching expertise (Côté & Gilbert,

713   2009). Given the universal nature of reflection and coaching, TA has potential to have similar

714   impacts on coaching internationally. Finally, the researchers hope that coaches, and those

715   working alongside coaches, can explore the practical applications of TA discussed within this

716   paper. We hope this will further coaching practice and the subsequent development of

717   athletes.

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