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8 **Strategic Understandings: An investigation of professional academy youth soccer**
9 **coaches' interpretation, knowledge and application of game strategies**
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28   Abstract

29   The purpose of this study was to explore professional soccer coaches' interpretations

30   of features suggesting player game understanding across the age phases of professional

31   academy youth soccer in England, with particular attention paid to the role of strategic

32   understanding. Semi-structured interviews were conducted with coaches (n = 19) of

33   players aged 9 to 23 to better understand how coaches understand and apply methods

34   to develop players' strategic game understanding. Data revealed that coaches priori-

35   tized the technical and tactical development of their players over strategic development.

36   However, across the age phases, coaches encountered challenges with coaching for

37   strategic understanding (i.e., maintaining control of the game, players as problem solv-

38   ers, player reflection, and coaching individuals within a team). We suggest that coaches

39   and program designers need to show more intent toward developing players' strategic

40   understanding, becoming more purposeful when choosing "how" to develop this. In

41   particular, coaches should consider how coaching methods that seek to develop players'

42   metacognitive game skills can be applied, with the goal of developing self-aware, flex-

43   ible and independent players as learners who demonstrate an appropriately "deep" un-

44   derstanding of the game.

45   *Keywords:* learning; metacognition; skill; tactics; thinking

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53   Strategic understandings: An investigation of professional academy youth soccer

54   coaches' interpretation, knowledge and application of game strategies

55 **Introduction**

56   The ability to understand the game is an integral component for players and

57 teams to perform at the highest level (Davids, Araujo, Vilar, & Renshaw, 2013; Gre-

58 haigne & Godbout, 1998; Harvey, Cushion, Wegis, & Massa-Gonzalez, 2010; Light,

59 Harvery, & Mouchet, 2014; O'Connor, Wardak, Goodyear, Larkins, & Williams,

60 2018). Reflecting this importance, demonstration of skills such as reasoning, planning,

61 strategizing and reflecting about performance (Tishman & Perkins, 1995) are seen as

62 indicators of "understanding." Notably, however, the process of learning such skills

63 remains an aspect of player performance that is often difficult for coaches to navigate.

64 One reason for this struggle might be the dynamic nature of invasion games, where

65 players are required to execute a flexible organisation of movements to achieve perfor-

66 mance goals (Pill, 2014). For invasion game play, performance goals are likely to

67 emerge from both individual and team solutions for problems related to variants of both

68 time and space, information and organisation (Grehaigne, Richard, & Griffin, 2005).

69 Within this complexity, a flexible performer is one whom is consistently capable of

70 locating the optimum action for the team based upon the changing configurations of

71 gameplay (Grehaigne, Richard, & Griffin, 2005; Pill, 2014). In locating an optimum

72 action, Memmert (2006) uses the "inattention blindness paradigm" to explain that con-

73 scious attention to stimuli within a dynamic context (such as soccer) also requires

74 knowledge of situational probabilities so that decisions are made on both real-time per-

75 ceptions and anticipated actions. For a soccer player, the situation is bound by flexible

76   application of the game's tactical principles of play (Wade, 1967) and the internal logic

77   of the game (Grehaigne & Godbout, 1995, 1997), in a quest to outwit the opponent.

78   Principles of play provide a heuristic that enable coaches to generalize tactics

79   both in and out of possession, while the "logic of the game" refers to tactical and stra-

80   tegic notions that cause interaction between "opposition to opponents, cooperation with

81   partners, attack on the adverse camp, and defence of his own camp" (Grehaigne, God-

82   bout, & Bouthier, 1999, p. 8). How a player interacts with both the principles of play

83   and the internal logic of the game is underpinned by an ongoing "oppositional relation-

84   ship" existing between teams (Grehaigne, Godbout, & Bouthier, 1999; Grehaigne,

85   Richard, & Griffin, 2005). In an oppositional relationship, a team's actions (and actions

86   of players within the team) is influenced by what the opposition team (and their players)

87   do, and thus the operational conditions of any team are to manage disorder whilst pre-

88   serving some kind of order (Grehaigne, Bouthier, & David 1997). However, *under-*

89   *standing* of how to manage an oppositional relationship is when a team (and the players

90   in the team) are able to (deliberately) influence the opponent's next action so their re-

91   sponse is somewhat forecasted, with the goal to cause difficult problems related to time,

92   space, information and organisation (Grehaigne, Richard, & Griffin, 2005). In short,

93   players must make decisions on what they see, what they understand, what they antic-

94   ipate happening and what they would like to make happen.

95   Furthermore, this complexity is taking place on a number of levels. In a quest

96   to outwit the opponent, which is central to how an oppositional relationship is managed

97   (Almond, 1986), players are required to select and apply combinations of skill, tactics

98   and strategies on both a global level (two teams) and on partial levels (sub players or

99   two specific players) (Grehaigne & Godbout, 1995). To do so, Grehaigne, Godbout and

100 Bouthier (1999) explain that strategy is planned prior to the game, on both global and

101   partial levels, with the purpose of applying some general organisation to game play (for

102   a fuller definition of strategy, refer to Grehaigne & Godbout, 1995, p.491). Often in

103   team sport such as soccer, both strategic and tactical decisions and skilled actions are

104   informed by a preferred playing style, which can also be referred to as a "shared mental

105   model" (SMM) of performance. A coach's preferred playing style can alter slightly

106   between coaching contexts, dependant on their players' skillsets. In short, an SSM for

107   team sport is a set of knowledge bases that guide and coordinate players' actions to the

108   demands of the opposition (Giske, Rodahl, & HØigaard, 2014).

109   However, no matter how well planned the strategy, the team and its' players

110   must also be able to make voluntary tactical decisions in action so that adverse situa-

111   tions posed by the opposition are appropriately dealt with (for a fuller definition of

112   tactics, refer to Grehaigne & Godbout, 1995, p.491). For the player with the ball or

113   nearest the ball, these decisions will also require a degree of skill, defined by Pill (2013)

114   as "the **effective** application of a technique suitable to the performance outcome re-

115   quired of the moment" (Figure 4: p. 9). A definition to which we have added the word

116   in bold, since most skillful players are usually effective! In summary, invasion games

117   require a complex mix of multilayered and temporally integrated pre-planning, percep-

118   tion, decision making, execution and (often) on the hoof reaction; all of which works

119   well under pressure. Therefore, the challenge for coaches is to develop players who are

120   able to execute the appropriate skill in the moment, but who understand why this skill

121   is appropriate according to the desired performance outcome, so that future applications

122   of skill in a moment can be primed by previous experiences of playing games, or prior

123   knowledge about how to play games.

124   ***Knowledge Bases for Playing Soccer***

125   In agreement with the findings of Toering, Elferink-Gemser and Visscher

126   (2009), we propose that quality on field performance where players are existing within

127   an "oppositional relationship" correlates with self-regulating qualities, such as reflec-

128   tion, planning, self-monitoring, evaluation, effort and self-efficacy. Findings from Toe-

129   ring et al. (2009) suggest that during play, elite soccer players are significantly more

130   reflective that non-elite soccer players, which is especially important for invasion

131   games players because reflection is the process that offers potential for players to think

132   strategically (Ertmer & Newby, 1996) about how to play the game, and how to learn

133   how to play the game.

134   We argue that games (specifically soccer) offer a proportion of less time pres-

135   sured situations where there is potential for players to demonstrate a self-regulated ap-

136   proach toward reflection. This is when a player has a perfect opportunity to think stra-

137   tegically about their live game performance; importantly, the more strategic a player's

138   thought processes the more flexible their performance capability (Perkins, 1993). This

139   is because they are operating more frequently on a meta-level with conditional

140   knowledge bases which offers a greater potential to develop a deep understanding of

141   how to play the game (Toner, 2017). In games, these conditional knowledge bases re-

142   quire constant interaction between declarative knowledge (i.e., knowing about the pros

143   and cons of different ways in which to handle a given situation) and procedural

144   knowledge (i.e., knowing how to best execute what to do in a given situation). We argue

145   the more flexible a performer, the more they will demonstrate in-game instances of

146   strategic thinking, where actions are consciously used to outwit the opponent in order

147   to advantage the team, with particular attention paid one's own awareness of how to

148   control and regulate their own learning (see Table 1).

149   *Player Understanding: Strategic Thinking in Soccer*

150   In this context, it is important to highlight the difference between "having a

151   strategy" and "thinking strategically" as metacognitive processes. It is likely that play-

152   ing soccer will require a collective strategy for the team to be guided by and some

153   tactical principles that will inform momentary instances as the game plays out (Gre-

154   haigne, Godbout, & Bouthier, 1999; Richards, Collins, & Mascarenhas, 2016). How-

155   ever, to maximise the impact of any soccer strategy or tactics, players need to use a

156   range of information sources to successfully navigate their way through a dynamic and

157   complex context, which requires players to respond to varying configurations of play

158   (Grehaigne, Richard, & Griffin, 2005; Pill, 2014). In doing so, we suggest the sources

159   of knowledge referred to by Weinstein and Van Mater Stone (1993) is a suitable frame-

160   work to understand how a soccer player would think strategically: knowledge about

161   myself (e.g., what are my capabilities and what patterns do I notice in myself?),

162   knowledge about the task at hand (e.g., what does this task require to be successful and

163   how will success in this task be evaluated?), knowledge about strategies for learning

164   (e.g., what obstacles in the game can I remove or avoid, how can I remain motivated

165   and what can I do to remind myself of how to approach a situation?), and knowledge

166   of the game (e.g., what do I know about soccer that will help to achieve all of the

167   above?). We would also include a further category, due to the fact that soccer is an

168   interactive game which requires an oppositional relationship, and a relationship with

169   team mates; what do I know about the people playing the game (e.g., what are my team

170   mates capabilities, what are my opponent's capabilities and what patterns do I notice in

171   others?).

172   For soccer players to skilfully interact with these sources during the game re-

173   quires a high degree of control, and without managing one's own thinking in this way,

174   it is likely that players will be operating cognitively (not metacognitively), or non-cog-

175   nitively where responses are "fast and effortless" and "apparently intuitive in nature"

176   (Toner, Montero, & Moran, 2015), and as a result will be more reliant on the coach's

177   feedback and direction.

178   ***Metacognitive Game Skills***

179   Reflecting the complexity of the processes described above, both metacogni-

180   tion and cognition are essential parts of player understanding. According to Flavell's

181   (1979) original explanation of metacognition, thinking about how to solve a problem is

182   used to make progress (cognitive thinking), whilst thinking about how one is thinking

183   about how to solve a problem is to monitor progress (metacognitive thinking). It is

184   essential for a soccer player to monitor their own progress as the game is being played,

185   because the game presents uncertain situations where the coach is limited to when and

186   how he/she might have an opportunity to "coach." In some ways the player themselves

187   are taking on the role of coach, if they are to effectively control how they use the sources

188   suggested by Weinstein and Van Mater Stone (1993). To control one's own thinking is

189   a complex process which requires constant adjustments of: planning (how will I ap-

190   proach this situation?), monitoring (how is this situation going, and what will I do

191   next?), and evaluating (what was the impact of how I dealt with this situation?) (Ertmer

192   & Newby, 1996). In translating this process into the context of games and, in this case,

193   soccer, Price et al. (2019) have developed three meta-cognitive game skills which indi-

194   cate a deep understanding of the game.

195   Metacognitive game skills happen during game play itself for practice and com-

196   petition and so, therefore, under time pressures and in situations where there is an op-

197   ponent to play against. Skills include: to plan for my/our next move, to solve and set

198   problems for the opponent, and to source new (and useful) knowledge independently

199   (cf. Price, Collins, Stoszkowski, & Pill, 2019). Unfortunately however, as Price, Col-

200   lins, Stoszkowski and Pill (2017) highlighted, the sport coaching literature has paid

201   little attention to the *meta*cognitive processes associated with game play, whereas cog-

202   nitive skills such as problem solving, decision making and tactical awareness are com-

203   monly cited (Kinnerk, Harvey, MacDonncha, & Lyons, 2018; O'Connor, Wardack,

204   Goodyear, Larkins, & Williams, 2018).

205   ***Metacognitive Perspectives of Game Understanding***

206   Due to metacognition being under-explored in the domain of expertise amongst

207   sport performers (Dail, 2014; MacIntyre, Igou, Campbell, Moran, & Matthews, 2014)

208   and especially for team sport and games, the potential methods for coaching strategic

209   understanding for soccer are limited. The exception is Price et al. (2017), whose digital

210   video games approach (DVGA) to coaching proposes one potential "how" for coaches

211   should they wish to enhance this element of their players' game understanding. This

212   approach to coaching is underpinned by metacognitive theory, and originates from

213   Gee's (2007, 2013) conceptual work concerning "good digital game design" where the

214   potential for learning and performance is enhanced. The goal of the DVGA is to de-

215   velop highly flexible players with strategic thought of how they understand the game.

216   By helping players to think and act strategically via exposure to three specific meta-

217   cognitive game skills (deliberate thinking and action, meta-level problem solving, good

218   learners and teachers), Price et al. (2019) suggest that players' learning capabilities can

219   be enhanced. However, empirical evidence supporting this hypothesis is currently lack-

220   ing.

221   Therefore, as a first step to addressing this need, the purpose of the current study

222   was to explore a sample of professional academy soccer coaches' interpretations of

223   game understanding. Firstly, we were interested in coaches' mental models of this con-

224   struct, the role of strategic understanding, and the extent to which the methods coaches

225   used to improve this element shared common ground. Secondly, and building from

226   these mental models, we aimed to understand how coaches at this level attempt to de-

227   velop their players' strategic understanding. Finally, by introducing the concept of de-

228   veloping "deep understanding" (Price et al., 2019) via metacognitive coaching meth-

229   ods, we aimed to explore how coaches encourage their players to reflect on their think-

230   ing and understanding.

231   **Method**

232   As our main research question concerned soccer coaches' subjective interpreta-

233   tions of game understanding, the study employed an exploratory case study design as

234   part of an overall interpretivist research paradigm for both data collection and analysis.

235   Qualitative data collection involved semi structured interviews, followed up with mem-

236   ber reflections (Smith & McGannon, 2017) to elucidate coaches' views of not just

237   "what" and "how" to coach for game understanding but also, "why" they think this way

238   (Abraham & Collins, 2011).

239   *Context of the Study*

240   All participants in this study were professional soccer coaches in England work-

241   ing at the youth academy level and hence, are bound by the premier league elite player

242   performance plan (EPPP) (Premier League, 2011), which was introduced with the aim

243   of producing more and "better" home grown players by promoting the empowerment

244   of each individual through a player led approach. The EPPP sets out three age phases

245   for player development; Foundation Phase (age 9-11 years), Youth Development Phase

246   (age 12-16 years) and Professional Development Phase (age 17-21 years). All were

247   from professional academies at Category 1 status (x15) and Category 2 status (x4),

248   working with players from a range of age phases. The EPPP outlines a total of four

249   categories, with category 1 being deemed as "most elite." The categorisation of acade-

250   mies is decided by an independent audit from The Premier League concerning a range

251   of factors including productivity rates and coaching (Premier League, 2011). Im-

252   portantly, all seven of the academies involved in this study have their own coaching

253   and playing approach, against which coaching staff and players are internally judged.

254   For reasons of confidentiality, it is not possible to publish the coaching or playing ap-

255   proaches adopted by individual clubs.

256   *Participants*

257   There were three criteria for inclusion in the study. First, to have a recognised

258   coaching qualification, awarded by UEFA (Union of European Football Associations)

259   at either B (the industry minimum standard) or A (advanced) level; second, to have at

260   least three years of experience of working with players in an academy environment;

261   third, to be currently working with academy players on a first hand and consistent basis

262   within the EPPP (Premier League, 2011). Initially, a number of coaches who met these

263   criteria were recruited via email to take part in the study. Following this, a further group

264   of coaches, who work within the Youth Development Phase, were recruited as we rec-

265   ognized that it was during this age phase that players move from a 9-aside game format

266   to an 11-aside game format. Therefore, we viewed this age phase as two separate

267   phases; 12-13 years (playing 9-aside), and 14-16 years (playing 11-aside). Thus, par-

268   ticipants recruited per age phase were: Foundation Phase (age 9-11 years) = five par-

269   ticipants (x4 full time and x1 part time), Youth Development Phase (a) (age 12-13

270   years) = four participants (x2 full time and x2 part time), Youth Development Phase

271   (b) (age 14-16 years) = five participants (x3 full time and x2 part time), Professional

272 Development Phase (age 17-21 years) = five participants (x5 full time), totalling 19

273 participants (all male) who all reported themselves to be British. (see Table 2).

274 ***Procedure***

275 Ethical approval for the present study was granted by the University's research

276 ethics committee before informed consent was obtained from all participants. The first

277 author, who is a UEFA qualified soccer coach and FA coach educator with experience

278 of qualitative research methods, conducted all interviews to avoid inter-interview bias

279 (Lincoln & Guba, 1985). The average duration of interviews was 67 minutes (range =

280 49-85 minutes). All interviews were audio recorded, then transcribed verbatim.

281 All interviews were conducted over a four-week period at the end of the soccer

282 season. This was a particularly convenient time as the clubs involved were in the pro-

283 cess of reviewing their coaching methodologies in preparation for the following season.

284 As such, the interviews encouraged coaches to be open about their club's approach

285 toward player development, and appreciative of the social and cultural challenges

286 within the environment they operate within. To aid the openness of the researcher-par-

287 ticipant relationship, at the beginning of all interviews the researcher reinforced the

288 confidentiality and anonymity of data, as well as participants' rights to withdraw at any

289 stage and for any reason.

290 At the start of each interview, participants were told to think of one player they

291 had coached during the season who they felt had a particularly good understanding of

292 the game compared to their teammates. For the duration of the interview, participants

293 were reminded to think of this player when responding to interview questions. Towards

294 the later part of the interview, coaches were presented with three prompts that repre-

295 sented principles of metacognitive game skills in action (Price et al., 2019): (1) "The

296 plan is to use this strategy, though we might need to re-plan depending on what happens

297 in the game"; (2) "This is how to solve the problem we face, and we're using this solu-

298 tion so that the game poses problem x to the other team"; and (3)"I've realized that we

299 are finding situation X difficult in this game; I'm going to find new knowledge of the

300 game to alter how I deal with this situation in the future."

301 The use of these specific prompts was important as a key purpose of this study was

302 to understand how coaches perceive a "deep understanding" of the game to be repre-

303 sented by their players. Upon being presented with each prompt, coaches were asked

304 to explain if and how the prompt might be an effective criterion for game understanding

305 in soccer. Further discussion moved towards the variants of each prompt in game play

306 (practice and competition), followed with how the coach might facilitate its develop-

307 ment for their players. Follow up elaboration and clarification probes (e.g., can you

308 describe what that might look like on the field with your players?') were used to en-

309 courage the coaches to describe their thoughts using practical soccer examples, to evoke

310 a rich and meaningful dialogue, as well as strengthening understanding of what was

311 being said (Gratton & Jones, 2004).

312 *Data Analysis*

313 The first author read each interview transcript twice in order to become im-

314 mersed in the data, paying particular attention to the ways that participants differenti-

315 ated between technical, skill, tactical and strategic understanding of soccer. Following

316 this, an inductive thematic content analysis was conducted which consisted of identifi-

317 cation of higher order (global) and lower order (initial) themes, using Braun & Clarke's

318 six step analysis (Braun & Clarke, 2013). These steps included: becoming familiar with

319 the data by reading and re-reading transcripts; generating codes systematically and in-

320 clusively; generating initial, lower order themes by organising codes into clusters; re-

321   viewing initial, lower order themes by looking at the data set holistically with the sup-

322   port from critical friends; defining and naming global, higher order themes, and finally

323   producing the report with selection of key data extracts. During this process, key quotes

324   were extracted from the data and classified into themes.

325   ***Trustworthiness***

326   In order to enhance the trustworthiness of both the data collection and analysis,

327   the following practices were utilized. To guide discussion and explore coaches con-

328   structs of game understanding, an interview schedule was designed to elicit detail of

329   the "what," "how" and "why" of coaching soccer for understanding (see Table 3). To

330   go beyond surface level responses from the coaches, questions were deliberately broad

331   and open-ended (cf. Stoszkowski, Collins, & Olsson, 2017) and the interview schedule

332   was cross checked by all four authors against its' potential to elicit responses relevant

333   to the purposes of the study (Cresswell, 2007). Although the order of questions asked

334   during each interview varied slightly depending on the direction of the discussion, the

335   same questions were asked to all 19 participants.

336   As Smith & McGannon (2017) describe, using a critical friend in qualitative

337   research has the potential to create valuable dialogue between researchers, adding rigor

338   to the process. In the current study, the first author conducted the analysis of interview

339   data and generated initial themes. Following this, the second, third and fourth authors

340   were asked to provide critical feedback on the way the raw data had been interpreted

341   and sorted into initial themes. This process helped the first author to reflect on the initial

342   choice of themes and to explore alternatives, whilst also learning how to defend her

343   decisions. Member reflections, which Braun and Clarke (2013) and Tracy (2010) ex-

344   plain go beyond simply checking that the researcher "got it right," were also used to

345   empower participants in the data analysis process, adding both richness and depth to

346   findings. The first author met with each participant individually following the analysis

347   of their interview to present the themes and associated extracts of data that were gener-

348   ated in the analysis. Together, first author and participant explored their interpretations

349   of the themes with extracts of data, and identified any gaps or similarities concerning

350   these interpretations. Throughout the data analysis process, the first author also re-

351   flected on her approach by writing memos in a reflective diary in order to enhance

352   reflexivity and transparency (Tracy, 2010). She then routinely presented and discussed

353   these memos with the broader research team in order to identify any personal biases

354   that may be influencing the research process. Finally, in presenting the findings from

355   the inductive data analysis, the direct quotations selected are contextually rich, and

356   taken from a range of participants within the sample. This allows the reader, based upon

357   their own coaching context, to decide on the applicability of findings concerning "game

358   understanding."

359   **Results**

360   The analysis of data generated four global, higher order themes that were dis-

361   cussed consistently across the age phases (see Table 4): (1) maintaining control of the

362   game; (2) players as problem solvers; (3) player reflection and (4) individuals within a

363   team. In the following sections, each higher order theme is presented alongside associ-

364   ated lower order themes, with exemplar quotes. Pseudonyms have been used through-

365   out to protect the identity of the coaches.

366   *Maintaining control of the game*

367   There were two lower order themes associated with this higher order theme –

368   playing in a style that represents identity of the soccer club and using game plans. All

369   game plans. All coaches identified that they were bound by their club's preference for

370 playing style (in and out of possession), and that they rarely provided opportunity for

371 players to play in a different style, both in practice and competitive matches.

372 Interestingly, coaches made the point that the style of play was also their game

373 strategy e.g., "the coherence of a philosophy throughout the different ages that we play

374 means that strategies are often the same" (Simon, u11 coach). On numerous occasions,

375 when asked if the playing style might change during game play, coaches commented

376 on the necessity for academy teams to play in a similar fashion. This is exemplified in

377 the following quotes:

378 "I think we're quite good at the club that we do have a way of playing, and I think

379 if you looked at our teams from under nine right the way up there is, you can see

380 a club way." (Mark, u14 coach)

381

382 "…we're doing it for a reason, and particularly at this club, we do have a playing

383 philosophy and as I said, there are some expectations about the way that we play...

384 So…we've got to have those things for a reason, and hopefully it's because the

385 coaches and the players believe in it." (Craig, u13 coach)

386

387 "...the boys will always have a strategy and a way of playing, that we like to think

388 that we have throughout the whole academy…that might look slightly different

389 at under nines…but as soon as that's going into eleven-v-eleven, we want to start

390 seeing traits of what we do and what we believe in." (John, u18 coach).

391 The second lower order theme referred to game plans in advance of matches,

392 specifically in relation to the role of the coach when deciding on a game plan. Several

393 coaches related strategy to having a "plan A," which was formulated by the coach after

394   video analysis of the opponent in advance of the match. The exception were the foun-

395   dation phase coaches, where video analysis of the opponent was not as prominent. In

396   all cases, coaches expected the players to persist with applying plan A, and viewed

397   opting to use a plan B, C or D as a potential risk for losing player buy in or surrendering

398   to the opposition. For example, John (u18 coach) outlined how "sometimes you do need

399   a plan B, but normally it detracts from plan A, and actually you don't end up performing

400   plan A to the best of its ability." Similarly, another coach questioned why coaches

401   would even consider a plan B:

402   "I don't see why you'd give up on it, at this age, when you're talking about de-

403   velopment…Why you'd give up on the first initial strategy…are you solving the

404   problem by just like parking it and just saying, you weren't very good at that, so

405   we'll change it a little bit to then something we are good at" (Craig, u13 coach).

406   *Players as problem solvers*

407   Two lower order themes were generated here: game management and dealing

408   with change. In the case of game management, this referred to recognizing and respond-

409   ing appropriately to the state of the game (e.g., time left, score, weather conditions, and

410   players on cautions or sent off). Coaches from all age phases used scenario based prac-

411   tices to help players develop their game management skills, e.g., "it's the last ten

412   minutes, you're two-one down, what are you going to do…But the players see it as a

413   fun, as a situation where they're being tested, they're playing a game." (Jeff, u11

414   coach). This perspective was echoed by Rod (u13 coach) who described how "we do

415   scenario-based coaching, in terms of you are two-one down against a team playing

416   three-five-two, how are you going to deal with that? Because that's a pressurized envi-

417   ronment and you do see them do different things when it's pressurized."

418   Coaches of all age phases practiced game management within their competitive

419   games program and suggested that the score line should impact how the team play. For

420   example, Craig (u13 coach) said "particularly in tournaments, we do it quite a bit.

421   So…playing against Arsenal, started off high pressing, got a couple of goals, boys mid

422   game had the understanding...like had the confidence to change the playing style." In

423   the foundation phase, coaches also appeared to encourage helping players to manage

424   games, as long as it was not the only focus:

425   "If your sole purpose is always to win, then finding a way of winning is the

426   most important thing. If your sole purpose isn't just to win but also to educate

427   and learn about a particular way of playing, then this is probably more accepta-

428   ble." (Matt, u9 coach).

429   Jaiden (u10 coach) also explained that winning and learning have the potential to go

430   hand in hand:

431   "I wouldn't say, our outcome is to win this week. And naturally, I don't think

432   you ever get away from the fact that football, you try and, like you are trying,

433   that's why you're learning…because you're trying to win." (Jaiden, u10 coach).

434   In relation to the second lower order theme, the need for players who can deal with

435   change relates to the game of soccer being an open and complex system, where no game

436   can ever be the same. All coaches agreed that the game of soccer is based upon outwit-

437   ting the opposition, as such it was common for coaches across the age phases to discuss

438   the need for tactical decision makers who base their decisions on the opponent, e.g., "I

439   think for me, tactical would be…that can change from time to time depending what

440   opposition you're up against." (Ray, u18 coach). The dynamics of tactical decision

441   making was also summed up by Mark (u14 coach):

442   "I mean there's individual tactics, so 'how am I going to beat my direct oppo-

443   nent?' Or 'how am I going to deal with my direct opponent?' And then there's

444   the team emphasis of 'what do we do as a team when we've got the ball or we

445   haven't got the ball?'"

446   When coaches referred to the need to adapt to the opposition's actions, it was

447 from a tactical problem-solving viewpoint with no reference to the need for players to

448 monitor their progress in solving this problem or refer back to the team playing style,

449 or the SMM for performance. Furthermore, over half of the YDP and PDP coaches

450 stated that players' solutions to tactical problems was often limited by their technical

451 capabilities. From a perspective of strategic understanding, players must be aware of

452 what they can and cannot do, but also be prepared to control the way in which they

453 interact with other sources to shape not just what they do, but how they think about

454 what they do. For example, David (u16 coach) said "I think your tactics is determined

455 by what you can do and what you can execute. Again, as I said before I still think that

456 their technical ability determines your tactical decisions." Ray (u18 coach) also sug-

457 gested that strong technical ability can open up a wider range of options for players

458 when seeking to outwit the opponent:

459   "You know you've got to have the tools in the box to execute those decisions. So,

460   I see sometimes, I watch games and people go, oh bad decision, and I will go in

461   my head, bad technique, because I see, no, you haven't got the tools in the box to

462   make that decision."

463 *Player reflection*

464   Performance analysis technology was considered a necessary support mecha-

465 nism by all coaches for developing players' ability to reflect on and in performance.

466 Generally, coaches from the youth development and professional development phases

467 described engaging with match footage post performance as a sign of a reflective player

468 who can appreciate the tactical elements of game play. However, coaches across the

469 age phases also suggested that players are not particularly skilled with reflection "on"

470 or "in" action e.g., "as I said, in most cases…I don't think they reflect particularly ac-

471 curately" (Craig, u13 coach). Nevertheless, the coaches explained the potential of per-

472 formance analysis tools to support reflection on action:

473   "It's about being able to really begin to question some of those assumptions that

474   a player had about what it was and why they thought it worked. I think that's

475   where we also use analysis quite effectively from an individual perspective"

476   (Tim, u15 coach).

477 Dean (u16 coach) agreed, suggesting:

478   "You also get access to match analysis, like I say, every game is filmed...so the

479   amount of learning and reflection you can do about the problems you face, how

480   you solve them and what you may have done differently."

481   The next lower order theme (having a why behind game actions) relates to sit-

482 uations where players can verbally explain the proposed consequences of game actions,

483 thus raising questions concerning the relationship between knowing and doing for soc-

484 cer performance. Age and stage of learning is likely to impact this finding due to social

485 and cognitive maturation processes. This is also significant because how and whether

486 games players make decisions in a conscious way is not definite. In naturalistic and

487 dynamic settings for sport, time pressure is proposed as a reason why unconscious and

488 implicit processes for decision making are unknown, and that many verbal reports on

489 conscious and explicit decision making focus on the reasons behind a decision, or the

490 product of a decision (Raab, 2003). On the basis of evidence presented earlier we would

491 challenge this. For the moment, however, it is important to state that the expression of

492   declarative knowledge to justify actions is not *necessarily* an indicator for skilled per-

493   formance (Allard, Deakin, Parker, & Rodgers, 1993), but does *signify* a degree of stra-

494   tegic thinking.

495   These issues notwithstanding, coaches explained how players might be able to

496   execute certain techniques, skills or tactics; however, it was not often that a player could

497   explain "why" these actions would have an effect on game play:

498   "That's the biggest thing I think with the youngsters these days, we're trying to

499   get the 'why' out of them…They can all come up with a suggestion of keep the

500   ball in the corner, but as soon as you ask them 'why,' they're like, 'well?'...they

501   need more, they need another layer to their knowledge almost" (Rod, u13 coach).

502

503   "I think if players have that sort of menu in their head, and think…well if this

504   situation, this dictates this, I will execute this then. I don't know, I think a deeper

505   understanding can give you a bit more strings to your bow so to speak…" (Jeff,

506   u11 coach).

507   *Individuals within a team*

508   This higher order theme incorporated two lower order themes. Playing to

509   strengths refers to individual players and the team having an appreciation of their ca-

510   pabilities, in order to outwit the opponent. Coaches from all age phases noted that their

511   most effective players were those who could make decisions in game play based upon

512   their individual skill sets. For example, Sol (u18 coach) explained that "it's not so much

513   that they've got the best technique, they make the best decisions related to their tech-

514   nique." Jeff (u11 coach) also noted that "the difference between the top players I've

515   seen in our academy so far and the weaker ones is that the top ones are comfortable

516   talking about their strengths and weaknesses," while John (u18 coach) was adamant

517   that "the top players do that, they look at themselves, they look at where their capabil-

518   ities are at and how they can reinvent or still affect the game, but maybe it looks a little

519   bit different."

520   The second lower order theme was recognizing opportunities to practice indi-

521   vidual targets, which referred to circumstances where individual players are challenged

522   to enhance an aspect of their play, within a team framework. Coaches emphasised the

523   difficulty for measuring individual player progress according to their target due to the

524   fact they are operating within an environment (the game of soccer) where success is

525   often dependant on how others perform. Interestingly, this was only raised by YDP and

526   PDP coaches, who explained that individual targets can impact the team's performance.

527   For example, Dean (u16 coach) said "I don't know if we maybe create a little bit of

528   selfishness because we're encouraging everybody to think about their own targets, what

529   they need to get better at, what their strengths, what their weaknesses are etc." In the

530   YDP phase, Craig (u13 coach) also explained how he concentrates on coaching players

531   to improve upon individual targets:

532   "We'll just play 11-v-11 and then just working with units, so we're just working

533   with individuals, and a lot of the time we're not really overly fussed by the

534   strategy, it's more, we're more working with players on their targets."

535   Nonetheless, coaches from all age phases expressed how they feel responsible for de-

536   veloping individual players and developing a high-quality team, with little or no em-

537   phasis places on the need for players to monitor their own progress with individual

538   challenges or team goals. Sol (u18 coach) suggested that "we're going to get the very

539   best out of you, we're going to maximize everything you've got, but you still want the

540   team to perform as well." Similarly, Jeff (u11 coach) observed that "there's two

541   coaches, probably to sixteen players, how do you affect each individual, their needs,

542   whilst obviously maintaining the team element as well," while Kai (u14 coach) said

543   "it's a team sport comprising of individuals that need to work together…in my opinion,

544   each one of them, you're their personal football coach."

545   **Discussion**

546   *The role of strategic understanding*

547   The primary purpose of this study was to explore coaches' interpretations of

548   game understanding, with a particular emphasis on the role of strategic understanding.

549   Our findings suggest that strategic understanding of the game was inconsistently com-

550   prehended between coaches and furthermore, not explicitly coached at any age phase.

551   Thus, there were no universal methods to coaching strategy described by the partici-

552   pants, either across level or club. As in the academic literature to date, tactical decision

553   making and tactical awareness appear to dominate coaches' approaches on what and

554   how to coach game understanding (Kinnerk, Harvey, MacDonncha, & Lyons, 2018;

555   O'Connor, Wardack, Goodyear, Larkins, & Williams, 2018). Some coaches suggested

556   that they did develop players' game understanding away from the soccer field (i.e., in

557   the classroom) when preparing for competition; predominantly through use of video

558   analysis with deductive questioning. However, motor performance studies would ad-

559   vise that such an approach toward learning provides limited opportunity to foster the

560   declarative- procedural relationship (Allard, Deakin, Parker, & Rodgers, 1993) and thus

561   opportunity for players to think strategically via conditional knowledge bases are under

562   facilitated.

563   Most of the coaches in the current study explained that players are not encour-

564   aged to change how they play during competition unless directed to do so by the coach

565   (which is only likely occur during a competitive match where teams are seeking to win

566   points). In the oldest age phase, coaches explained how it was a necessity for the whole

567   team to believe in the game plan, therefore changing that plan might lead to the coach

568   being viewed as "weak." In professional soccer in England, clubs have a distinct play-

569   ing style which is implemented throughout the club's youth system, thus promoting a

570   view of game understanding which requires players to learn and apply key patterns of

571   play (i.e., "if they do this, we do that"). A playing style that denies players an oppor-

572   tunity to alter their tactical decisions and strategic direction on a global and partial level,

573   both in practice and competition might not be conducive to development of a team or

574   individuals with strategic understanding.

575   Although the coaches in the current study were reluctant to facilitate the oppor-

576   tunity for players to think strategically in game play, it was surprising to note that all

577   coaches also acknowledged the game as a complex system, where players are required

578   to adapt to the range of scenarios that the game poses, which is representative of an

579   ecological perspective of games (Davids et al, 2013). The current findings also reveal

580   conflicting ideas from practice to theory concerning the role of player adaptability and

581   player flexibility. Notably, effective strategic understanding of games includes flexibil-

582   ity of thought during the event itself, where the player applies a number of criterions to

583   a live, in-game play situation, in order to detect an optimum solution. This, we suggest,

584   demonstrates a "flexible performance capability" (Perkins, 1993, p.40), where judge-

585   ment of an action is dictated by the extent to which it might impact upon the opponent.

586   Importantly, however, being flexible is not the same as being adaptable, in that the

587   judgement of a decision to act is not a behavioural response based upon interacting

588   information that elicits an adaptation to the body in order to apply an efficient move-

589   ment solution (Davids, Handford, & Williams, 1994). In fact, we argue that judgement

590   to act is based upon controlled combinations of declarative, procedural and conditional

591   knowledge (Weinstein & Van Mater Stone, 1993) about the game and the players play-

592   ing the game, with intention to set a difficult problem (and monitor the progress of this

593   problem response) for the opposing team or player(s). This is because team sport games

594   facilitate a continuous oppositional relationship between the teams playing it, and ac-

595   tions must therefore be understood in their entirety (Grehaigne, Richard, & Griffin,

596   2005) with individual confrontation, tactical principles and anticipatory situations con-

597   sidered by and of players.

598   ***Methods used to coach game understanding***

599   In the current study, the decompartmentalisation of declarative ("know

600   why/why not," Price et al., 2019) and procedural ("know-how-to-because," Price et al.,

601   2019) knowledge bases is similar to previous studies that have examined players' game

602   understanding and performance (Grehaigne & Godbout, 1998; Turner & Martinek,

603   1999; Pritchard, Hawkins, Weigan, & Metzler, 2008; Kannekens, Elferink-Gemser, &

604   Visscher, 2009; Harvey et al, 2010). Coaches described the struggle to judge the extent

605   to which players need to know about the game's rules, optimum technical actions, and

606   capabilities of those playing the game (declarative knowledge), in comparison to the

607   extent to which players' need to have the tactical understanding of selecting an appro-

608   priate action during game play (procedural knowledge). This dilemma in itself suggests

609   that coaches are unsure to which the role of implicit unconscious responses (ecologi-

610   cal), explicit conscious decisions (cognitive) affect "understanding." Furthermore, we

611   note that the coaches did not refer to the role of conditional knowledge bases, which is

612   the understanding of how and when to combine declarative and procedural knowledge

613   (metacognitive) ("know-how-to-learn," Price et al., 2019). As discussed previously, in

614   the context of games, conditional knowledge suggests a deep understanding of the game

615   and relates to demonstration of three specific metacognitive game skills: deliberate

616 thinking and action; meta-level problem solving, and good learners and good teachers

617 (see Price et al., 2019 for a more detailed overview of metacognitive game skills and

618 their relationship to coaching games).

619   The general consensus from coaches in the current study suggests that players

620 at this level must recognise the state of the game (e.g., score, time remaining, intention

621 of the opponent), the skill sets of players playing the game (opponent, team mates, self),

622 and act accordingly (i.e., tactical appreciation). The coaches did not refer to instances

623 where they encourage or identify instances where players think about how they are

624 thinking about how to set or solve a problem. Despite the fact that games often present

625 high pressured situations where time for conscious reflective cognition and pre reflec-

626 tive cognition is limited (Light, Harvey, & Mouchet, 2014), we argue that even follow-

627 ing actions where there is no time to think, all actions should be self-monitored and

628 therefore justifiable if players are to demonstrate a deep understanding of the game.

629 Thus, supporting the coaches' perspectives from this study, which suggested excep-

630 tional game understanding is associated with players who are able to articulate "why"

631 they executed a particular action. However, extent of conscious action for games play-

632 ers is yet to be determined, and it's process remains unclear (Macquet, 2009), thus in-

633 dicating a need to investigate how games players approach problems during game play.

634   The findings in the current study suggest that soccer curriculums are intensively

635 focussed upon coaching to develop players' individual capabilities, with little emphasis

636 on how the opponent influences players' thinking and actions during both practice and

637 competition. A practical example of this, consistently discussed by coaches, was the

638 process of setting players individual specific challenges to achieve during game play,

639 which were dependant their personal strengths or areas for development. This approach

640 to curriculum design differs from contemporay constructivist ideas of curriculum

641 design (cf. Bruner, 1960) that suggest that the curriculum progressively "construct"

642 independent self-regulated leaners using progressive complex, from simple to complex

643 design where authentic problems (in a soccer context, problems that consider the oppo-

644 nent) can be revisited in more complex ways using problem solving discovery learning.

645 This is where the player(s) decides on necessary skills, tactics or strategies to deploy,

646 despite what areas they need to personally practice. Furthermore, the coaches suggested

647 that by focusing on "ourselves" the coach and their team are more likely to cause the

648 opponent problems, and consequently outwit the opponent. Coaching a team to focus

649 on individual and team strengths or goals, rather than the actions of the opponent is in

650 contrast to an ongoing "oppositional relationship" for sport (Grehaigne, Godbout, &

651 Bouthier, 1999; Grehaigne, Richard, & Griffin, 2005) where actions of the opponent

652 inform momentary tactical decisions in an effort to find a way to win the game (Al-

653 mond, 1986). Our findings are consistent with other empirical studies, where youth

654 soccer coaches prioritize technique or skill practice using deduced principles of game

655 play (Ford, Yates, & Williams, 2010; O'Connor, Larkin, & Williams, 2018), before

656 supporting players to enhance their in-action psychological skills (i.e., outwitting the

657 opponent by responding to the opponent using metacognitive game skills).

658   The coaches in the current study expressed a concern that concentrating on the

659 opponent's capabilities to inform players' actions might be considered as a short-term

660 performance driven or a winning focused approach to player development. Therefore,

661 coaches and coach developers may need to ascertain a sense of "comfortableness" with

662 using the opponent as a key influencer for developing deep understanding by determin-

663 ing imminent in-game actions and rationalizing past in-game actions. In contrast to pre-

664 vious conceptual work in game understanding (e.g., Grehaigne et al., 1999; Grehaigne

665 et al., 2005; Grehaigne et al., 2005), we suggest that strategy should be purposefully

666   altered as play emerges (and is therefore not just formulated on a macro level when

667   there is ample time available to think). In this sense, there is a need to think strategically

668   about the strategy, tactics and skills deployed, because games are about finding ways

669   to gain advantage and to disadvantage the opponent. It is not logical to dismiss the

670   opponent when thinking strategically if we understand games to be an ongoing episode

671   of "outwitting the opponent," nor is it helpful for player understanding if the coach

672   controls all thinking relating to how their team will play, and why their team will play

673   in this way. By preparing players in practice and providing players with opportunity in

674   matches to think metacognitively, team's will be more capable of independently out-

675   witting their opponent. This is because they will have opportunity to learn how to mon-

676   itor their own progress in game play and make appropriate adjustments according to

677   what they know and how they think about the opponent, themselves and team mates,

678   the game, how they learn best, and the performance goal. However, in the absence of

679   high-quality scouting information and as an essential skill to be developed, we highlight

680   metacognition as something which appears to be missing in the current diet for players

681   at our sample academies.

682   **Conclusion**

683   The findings of the current study suggest that professional youth soccer coaches

684   in England share inconsistent interpretations of a player who has a strategic understand-

685   ing of the game. None of the coaches interviewed purposefully set out to coach their

686   players' strategic understanding of the game, neither in practice nor competition. The

687   findings also highlight that there is no common coaching method used by the coaches

688   to develop their strategic understanding, although coaches appeared to agree on the

689   skills that demonstrate players' superior game understanding (e.g., reflection, game

690   management, justification of game actions, adaptability and playing to strengths). To

691 add, the coaches viewed metacognitive game skills as valued aspects of player perfor-

692 mance, so long as the coach retained some level of control over what and how the play-

693 ers are thinking and acting during game play.

694   If coaches believe that a "deep understanding" of the game is an important as-

695 pect of player performance, then we advise that key decision makers within profes-

696 sional soccer clubs and their coaching staff should work collaboratively to establish a

697 player development program that also aims to foster their players' metacognitive game

698 skills. Due to strategy being a construct inherent in all games, it is logical to advise for

699 coaches to plan opportunities for players to improve their strategic understanding of the

700 game and to trial coaching methods that seek to deliver this benefit for player learning

701 and performance. There are understandable social and cultural barriers within profes-

702 sional sports coaching contexts concerning choices of what, how and why to coach.

703 Therefore, integrating the development of metacognitive game skills into the coaching

704 curriculum will require ongoing and context specific support for coaches.

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