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1 Exploring the use of Mobile Athlete Self-Report Measures in elite
2 Gaelic Games: A Qualitative Approach

3 Running Head: Mobile Athlete Self-Report Measure Use in Elite Gaelic Games

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18 Abstract

19 Athlete Self-Report Measures (ASRM) are used in research and practice as an accurate,
20 practical and accessible method of athlete monitoring. Mobile adaptations of constructs from
21 validated ASRM have increasingly been employed for athlete monitoring in various sports
22 settings, however, insights on the user experience and perceived value of these systems in
23 the applied team sport setting has been limited. This study aimed to portray the experiences
24 of stakeholders using a pre-existing mobile ASRM (M-ASRM) in elite Gaelic Games. Twenty-
25 one stakeholders in elite Gaelic Games were recruited for this study (players n = 10, coaches
26 and support staff n = 11). Participants completed a semi-structured interview with the lead
27 researcher regarding their experience of using an M-ASRM in practice. Thematic analysis of
28 the transcripts was conducted using NVivo 12 software. Results were defined under the
29 themes of positive and negative user experience. Positive user experience was portrayed
30 through M-ASRM uses and perceived value: communication and information disclosure,
31 remote player monitoring, decision making and advanced planning, and player education and
32 self-management. Negative user experience was portrayed through M-ASRM challenges:
33 player adherence, player dishonesty, coach time and expertise requirements and socio-
34 technical and system factors. Results outline the major uses of M-ASRM in elite Gaelic Games
35 and importantly, highlight the key challenges experienced by stakeholders. These results can
36 be applied by coaches, sports medicine professionals and sports scientists using or intending
37 to use an M-ASRM, providing key considerations to employ for effective use in team sport.

38 Keywords: athlete monitoring; challenges; adherence; value; well-being; subjective

39 INTRODUCTION

40 Athlete self-report measures (ASRM) can be described as records of perceived physical,
41 psychological and/or social well-being, which are generally completed on a regular, often
42 daily basis (30). Validated self-report measures have been shown to accurately reflect training
43 induced changes in athlete wellbeing (30), thereby offering a practical and accessible method
44 of athlete monitoring for sport at many levels. Proposed value of ASRM in the applied setting
45 include monitoring individual training load response (20), the identification of persons at risk
46 of non-functional overreaching (6,8), overtraining (17) or injury (16), in addition to providing
47 a tool for communication (29).

48 Traditionally, validated ASRM are administered in a paper-based or electronic format at
49 regular intervals or specified training blocks. However, the time taken to complete these often
50 long questionnaires and the paucity of infrequent data were leading factors in sports
51 programmes beginning to create their own brief, customized self-report measures which
52 could be administered daily (30,32). These custom measures generally incorporated Likert
53 scale versions of individual variables from validated ASRM such as mood, stress, and fatigue,
54 and were frequently administered digitally using accessible software such as Google Sheets
55 to send, receive and collate information from athletes seamlessly, and in real-time. To meet
56 the needs of modern athlete monitoring, web-based ASRM software systems have been
57 commercially developed with a multi-disciplinary approach (29), offering additional features
58 such as automated reports, communication forums and collation of previously siloed data
59 sets. These custom, digitally administered ASRM designed for daily completion are our focus
60 and will be referred to here as mobile athlete self-report measures, or M-ASRM.

61 The accessibility, affordability and purported benefits of M-ASRM have aided their growth in
62 various sporting programmes (29), and recently, they have been adopted in Gaelic Games.
63 Gaelic Games are the national sports of Ireland, known predominantly by their team field
64 sports: football/ladies football and hurling/camogie (male/female versions respectively).
65 Gaelic Games are amateur sports, but at the elite level they have developed to expect a
66 demanding amount of commitment from athletes (18). Modern athlete monitoring practices,
67 including M-ASRM, have been implemented and developed in elite Gaelic Games (18),
68 however, little is known about how M-ASRM are being used in this context.

69 M-ASRM as a remote solution to personal and locational barriers to communication (29) is an
70 appealing advantage for amateur teams such as those in Gaelic Games, where staff may only
71 have access to the players for ~6-14 hours a week. ASRM have also been found to improve
72 disclosure of information from athlete to coach (10), with the ability to provide additional
73 information through a comment section being highly valued by coaches (23).

74 While M-ASRM have the ability to provide such benefits, many user-experience issues remain,
75 including those associated with the measure itself, such as the interface design and
76 accessibility, with the environment, such as stakeholder buy-in and data security (26) and with
77 support, such as compliance and the perceived role of an ASRM (28). User-centered design
78 approaches are recommended for the development of mobile technology platforms and
79 applications as they can help mitigate user-experience issues such as poor user-adoption (3)
80 and lower levels of user-engagement (35). Indeed, understanding the user experiences of
81 stakeholders relative to the needs of a particular sporting context has been recognized as a
82 crucial step in the implementation of sports interventions and programmes (12). Although
83 the use of self-report measures in athlete monitoring is increasingly recommended (15,31),
84 research in this area is in its infancy and there is limited evidence concerning how M-ASRM
85 are used in the applied setting (29), particularly in team sport environments.

86 Successful implementation of an M-ASRM in practice is a complex coordination of factors
87 which are related to discrete contexts and environments (25). Exploring the use of M-ASRM
88 in Gaelic Games provides a window into a new context: how M-ASRM are used in an elite field
89 team sport and the challenges that are experienced due to the personnel, financial and access
90 limitations of an amateur sport setting. Therefore, the aim of this study was to investigate the
91 user experience of M-ASRM in elite Gaelic Games to inform future implementation and use
92 of these systems in team sport environments. We present the positive and negative user
93 experience of an M-ASRM in elite Gaelic Games, through the perceived value gained from
94 using such systems and the challenges experienced by stakeholders.

95 METHODS

96 Experimental Approach to the Problem

97 The qualitative approach of semi-structured interviewing was employed to gain an in-depth
98 insight into players and coaches' perceptions and experiences of M-ASRM use in their

99 individual contexts, as it can allow disclosure of important and often hidden aspects of human
100 and organizational behavior (22). In addition, semi-structured interviewing allows all
101 participants to be interviewed relatively systematically with the use of a topic guide, while
102 allowing them to provide responses in their own terms and language (22).

103 Subjects

104 Twenty-one stakeholders in elite Gaelic Games were recruited for this study (players n=10,
105 coaches and support staff n=11, from 15 teams). Participants were recruited by a combination
106 of opportunity and snowball sampling where invitations to take part were sent via email.
107 Inclusion criteria were: use of an M-ASRM system for a minimum of one month, stakeholder
108 of an elite Gaelic Games team and 18 years of age or older. There were no exclusion criteria.
109 Written consent was obtained for interviews in person while verbal consent was obtained for
110 telephone interviews. Ethical approval for this study was obtained through the University
111 College Dublin Human Research Ethics Committee. Participant characteristics are presented
112 in Table 1. Participants were widespread in their team's geographic location and five
113 participants were familiar to the lead author. Nine of the 11 coaches and support staff (CSS)
114 were the main system administrators for their teams, with two assuming a secondary role in
115 the M-ASRM use. The most commonly used M-ASRM among participants were Metrifit RTP
116 (Ready to Perform) (n=17) and Metrifit Elite (n=4) (Metrifit, Health & Sport Technologies Ltd,
117 Greenore, Louth, Ireland).

118 *****Table 1 near here*****

119 Procedures

120 Each participant completed a one to one interview with the first author at a location
121 convenient to them or via telephone if necessary. Interviews were approached with the use
122 of a topic guide to explore participants perceptions of M-ASRM use in their individual setting
123 (as relevant to each group, i.e. player or coach/support staff). Table 2 contains the section of
124 the topic guide as relevant to this study. Open-ended questions were employed flexibly to
125 allow for new areas of conversation to emerge and be explored with the participant. The lead
126 author assumed an 'insider' role in the interview (7), having previously worked clinically with
127 M-ASRM in elite Gaelic Games. The lead author's experience may have shaped the
128 interpretations of the conversation and also enabled the building of an initial rapport with
129 participants (9). Interviews were audio-recorded and transcribed verbatim by the lead author.

130 Anonymized codes were applied as follows: players were attributed the letter P with a
131 number identifier, while coaches and support staff were attributed the letter C with a number
132 identifier, for example: P001 or C001.

133 *****Table 2 near here*****

134 [Statistical Analyses](#)

135 Thematic analysis of the transcripts was conducted using NVivo 12 software (QSR
136 International Ltd, Victoria, Australia). A theme was defined as something important in the
137 data related to the research question, which represented a level of patterned response or
138 meaning within the data set (5). An inductive approach was employed to allow patterns to
139 emerge from the data (34), with the topic guide providing an initial structure for the codebook
140 (24). Thematic analysis involved careful reading and re-reading of the data to identify
141 patterns, assign codes, and formulate themes and sub-themes (5,14). A sample of the
142 transcripts were analyzed by two authors and key concepts were discussed and challenged in
143 the development the codebook (11,14). Ensuring analytical rigor, the data were analyzed and
144 coded independently by the first two authors as an ‘insider’ and an ‘outsider’, and
145 subsequently compared and discussed to resolve discrepancies in coding concepts (33). The
146 authors adopted the ‘critical friend’ model in data collection and analysis, challenging the data
147 interpretations and knowledge construction throughout to encourage reflexivity (9).

148 [RESULTS](#)

149 Participants were asked to consider and discuss how they use the M-ASRM in their individual
150 contexts. Results are presented under two overarching themes: positive & negative user
151 experience. Table 3 represents the results in units as discussed by participants.

152 *****Table 3 near here*****

153 [Positive User Experience](#)

154 [1. Communication & Information Disclosure](#)

155 Communication value was described as a medium to disclose information, a method of
156 communicating efficiently with a large panel of players and data to spark and inform
157 conversations both with players and other CSS.

158 *“It gave context and content to actually start a conversation rather than just your usual*
159 *‘hellos’” - C002*

160 *"It definitely has helped I'd say in terms of just getting to know your players, you know, there's*
161 *30 players there, it's very hard to talk to them before and after every training session" – P004*

162 *"She had spent the whole night with her mum, and she put on [the M-ASRM] that she was*
163 *exhausted and in the comments section she wrote that her mum had been quite ill in hospital.*
164 *It's something that would have been very difficult for her to come up and say to the lads: 'look,*
165 *can I let you know what happened?'" - C004*

166 2. Remote Player Monitoring

167 CSS spoke about the advantage of remote player monitoring such as the ability to understand
168 players in a more holistic manner and outside of their face to face interactions, with the added
169 benefit of their players feeling like they are being cared for.

170 *"It's good to know where the players are at mentally, because at the end of the day they're*
171 *people first and athlete second" - C009*

172 *"[The] 145 hours that they're not with the team, I think that's where the real challenge is and*
173 *ultimately that's probably where most of the gains are made because everybody's more than*
174 *likely training the same collectively, it's what you are doing away from your collective sessions*
175 *that in many cases is the key difference" - C005*

176 Similarly, players valued the ability to produce data and recognized the merit of the early
177 identification of potential problems.

178 *"It could be something coming and at least if a physio or manager can get in there quickly*
179 *before it actually does happen then you can [reduce] injuries" - P004*

180 3. Decision Making & Advanced Planning

181 CSS described their M-ASRM system as giving them confidence in their training methods,
182 being used to make decisions and plan sessions ahead of schedule both at an individual and
183 group level, based on the information coming in.

184 *"Yes, you were probably making right decisions from the start, but this validated what [the*
185 *coach] was doing and just gave him more confidence in the programme he was running" -*
186 *C003*

187 *"Myself and medical are over and back between each other, in contact the whole time and*
188 *we'll say leading up to a session, they'd be telling me if players might have injuries logged or*
189 *knocks logged, so they're letting us know before training what players can and can't do" - C009*

190 4. Player Education & Self-Management

191 CSS perceived that using the M-ASRM system could facilitate implicit learning and self-
192 regulation among some players but referenced little evidence of this happening in practice.

193 *"I would have imagined and hoped that the fact that they're monitoring everything every day*
194 *and they're actually writing down how they feel, as in how tired they are in the morning, that*
195 *they get to know themselves a bit better, that they actually become more aware of how they*
196 *feel themselves after training" - C004*

197 *"Maybe even puts into a players mind, right maybe I should be a bit more proactive in*
198 *managing this and get in touch with a physio earlier or management earlier, rather than*
199 *waiting 'til last minute or turning up to training and springing it then that you feel a bit tight*
200 *or feel a bit down, or whatever it is that they don't feel up to training" - C010*

201 Players perceived that inputting data to the system could facilitate them in thinking more
202 purposefully about how they were feeling and preparing, potentially encouraging good
203 habits. However, many players felt that they would have been aware of this even without the
204 use of an M-ASRM system.

205 *"I'm very conscious of it anyway without me even marking it down" - P004*

206 *"Yeah like generally if you're feeling tired you kinda know about your recovery with no [help]*
207 *at all" - P006*

208 *"You don't want to write down that you ate badly so you're keeping an eye on what you're*
209 *eating and making sure that you're eating well" - P008*

210 Negative User Experience

211 1. Player Adherence

212 As a common barrier to the use of self-report systems, user adherence was a key challenge
213 for the participants in this study.

214 *"The system itself works perfectly, the only issue is people and adherence, so I think if people aren't*
215 *filling it out it becomes worthless and useless and just a pain in the ass and a waste of money" –*
216 *C002*

217 Contextual Factors

218 Adherence and the culture of M-ASRM use was, in some scenarios, dictated by the time of
219 year and the team environment with respect to the schedule, results and other contextual
220 factors.

221 *"Recently the compliance levels have dropped, they had a quite a poor league and a week's*
222 *break then with their clubs, it will be something I will be addressing. The way the season has*
223 *gone has dictated the way [the M-ASRM] has been utilized because it's a different atmosphere*
224 *in that we're trying to maintain our team unity and a meaningful feeling about being here even*
225 *though the season hasn't been as successful as they would have liked" – C010*

226 Individual Factors

227 CSS felt that adherence levels were individual to each player and their interest, and that such
228 differences were to be expected when dealing with different types of people.

229 *“You know you’ll have that bell curve there where you might have 20% that are highly into it*
230 *and they will always be on time, you might have your 40-50% who are you know pretty good*
231 *and in your bell shaped curve they’re your main group, and then you’ll have your 5-10-15%*
232 *who you pull your hair out with them, they don’t login on time or you know they don’t respond*
233 *to it the way they should but when you’re working with a group of 35 that’s to be expected” –*
234 *C005*

235 Although the common expression was that using the system was not a burden, daily
236 adherence was still described by some players as inconvenient.

237 *“Even as it is it’s a bug bearer for certain players, so you don’t want to be... it’s hard to get the*
238 *balance coz players are a nightmare, it only takes 30 seconds and they’re still giving out about*
239 *it” – P004*

240 *Self-perpetuating negatives*

241 A concern for players related to their internal response to logging negative experiences, for
242 example, a poor night’s sleep or a poor performance. Although players were able to recognize
243 the value in self-monitoring, they described that sometimes logging made it challenging to
244 keep a positive mindset or would reinforce the negative point in their mind, causing them to
245 avoid filling out the system in such a scenario.

246 *“The day of a game if you’re logging that you’re tired and that day your energy levels are*
247 *down, I think psychologically it’s a negative for you when you’re trying to switch that mind*
248 *frame around” – P004*

249 Interestingly, only one coach mentioned this possibility.

250 *“Certain types of personalities could get too caught up in it or if someone is very low and*
251 *they’re putting in low scores and they’re seeing these red flags and red markers every day*
252 *that might be a negative effect” – C010*

253 Encouraging Adherence

254 CSS described that encouraging adherence was time consuming and exhausting. Methods
255 applied in attempting to improve adherence were mainly through negative reinforcement,
256 including sending reminders, naming and shaming non-adherent players, a fine system, and
257 peer pressure, while positive reinforcement included using the system for other reasons -
258 such as uploading match statistics, creating convenience and peer influence by
259 encouragement being player led.

260 *“There would be messages put up [on the team Whatsapp group], if you didn’t do it you were*
 261 *in trouble” – P002*

262 *“I think had I have just introduced it and left it, it would have rotted and sank but because I*
 263 *was so persistent about it and calling lads up every day...” – C002*

264 *“The main physio has her log in as well, so she’d be connecting with players when they’re*
 265 *rehabbing injury and stuff, keep annoying them through that and she’s using it then to actually*
 266 *upload her programs and that through it, so kinda forcing them to use it” – C009*

267 One coach made an insightful observation regarding the method of sending reminders
 268 comparing his previous customized self-report measure in Google Docs to the M-ASRM
 269 software, noting that having a direct link or “click here” tab to a Google Doc was resulting in
 270 better adherence outcomes than a reminder message to access and complete the M-ASRM.
 271 Therefore, creating convenience through a link to take you directly to a questionnaire versus
 272 a reminder to manually exit one mobile application to enter another was resulting in better
 273 adherence.

274 *“Google docs was always sent through the group Whatsapp, ...it would literally just be a little*
 275 *tab they press in, it only takes 60 seconds and they’re done, whereas [with the M-ASRM] ... I*
 276 *know it’s simple and it probably takes just as much time but for some reason they weren’t*
 277 *going from that [reminder] message on Whatsapp to actually going into [the M-ASRM] and*
 278 *doing it, whereas the [Google Doc link], because it was in front of them, they just pressed on*
 279 *it” – C003*

280 Backdating

281 Due to challenges with adherence, M-ASRM often allow information to be backdated. While
 282 both players and CSS felt that the M-ASRM mostly reflected the athlete state, they spoke
 283 about backdating as a challenge to data accuracy.

284 *“I suppose if you forgot to fill it out for 2 days and you were trying to think back it was hard” -*
 285 *P002*

286 *“Occasionally you’ll have a situation where a girl completely forgets to log, and she misses out*
 287 *Monday or Tuesday and then she has to throw her mind back and then you know the*
 288 *information she’s giving you for Monday and Tuesday is definitely wrong” - C004*

289 2. Player Dishonesty

290 Dishonesty was mentioned with respect to both physical and psychological measures,
 291 including rate of perceived exertion (RPE). Dishonesty appeared to be normalized and
 292 justified to players with respect to certain scenarios.

293 *“I do see now that we talked through it that there would be a sort of a trend to lie maybe, well not*
 294 *lie, just sort of... put in not-honest scores” – P007*

295 Factors Influencing Honesty

296 More experienced players appeared to be more honest, commenting on how they might have
297 responded differently to the system when they were younger and often perceiving the
298 younger players to be less honest. Fear of injury, poor performance or a negative impact on
299 the team influenced a player to be honest. One CSS spoke about the need to separate the
300 system from one which influences decision making to promote honesty.

301 *"If I am carrying a knock, just flag it because inevitably it will have a bad effect on my*
302 *performance if I just gloss over it and hide it" – P007*

303 *"It's knowing me and knowing my role; that there's gonna be no major decisions made based*
304 *on your wellness" – C006*

305 Factors Influencing Dishonesty

306 *'Faking good' – distorting self-report data to appear more favorably*

307 *"[With the M-ASRM], you're trying to be honest, but you're never trying to be at a disadvantage" –*
308 *P007*

309 There was a concerning trend among players of flippant dishonesty and conscious bias, often
310 concerning team selection or wanting to train in the lead up to a game.

311 *"Definitely I was a lot more sore and sleep wasn't great but I wasn't logging honestly because*
312 *I didn't want them knowing the state I was in I suppose, so there probably is an honesty factor*
313 *there coming up to games" – P004*

314 *"One player in game week, his scores were coming dramatically up and more than they should*
315 *have been based on training the week before, so I remember the manager having a word with*
316 *a fella and we found that he [thought] if his wellness markers weren't coming up that he would*
317 *be in danger of not being selected for the game. There was [another] player, he was working*
318 *long hours right up to the game and we didn't find this out until the week after" – C006*

319 *'Faking bad' – distorting self-report data to appear less favorably*

320 Significantly more references were made to 'faking good' than 'faking bad'.

321 *"Maybe dishonest guys in the panel... they would put things down to try and make themselves*
322 *[seem worse than they are], hoping that they might get pulled from training" – P003*

323 Privacy

324 Concerns around privacy appeared to be very individual and referred mainly to the type of
325 information being inputted and the personnel who had access to this information. Players
326 were not always aware of who had access to their data, and some were uncomfortable with
327 sharing their personal information. Only one coach made reference to players not being
328 comfortable to disclose personal information.

329 *“At times, you feel like ‘I’d rather keep this to myself’, it’s a bit invasive maybe” – P001*

330

331 *“You would have to trust that it was being looked after by the management and that the data*

332 *was safe. There wasn’t a whole pile of personal information” - P002*

333

334 3. Coach Time & Expertise Requirements

335 *“I think you just need to have initially the understanding but then kinda the foresight to see how you*

336 *can get the most out of this” – C005*

337 One of the clearest barriers towards effective M-ASRM use for CSS was the time demands of

338 tasks such as ensuring adherence, analyzing data and generating reports in addition to

339 disseminating this information to the relevant parties. Because of this, there was a common

340 perception that the team hadn’t been able to achieve optimal use of the system.

341

342 *“There is time in using the system as a coach and then following up on players. If you’re*

343 *giving the [M-ASRM] role to a physio along with everything the physio is doing, it’s probably*

344 *not gonna work out as well” – C011*

345

346 *“Serious time goes into it. Could I put in more time? Yes, I could. But for myself in terms of*

347 *doing [another full-time job], it’s tough going... It’s hard to have people on a part-time basis*

348 *looking at this stuff” – C006*

349

350 Some players also had an awareness of the limitations of the amateur nature of the game

351 with respect to the culture trying to be introduced.

352

353 *“I think the whole thing needs to be organized better, one or two people looking after it and*

354 *they’re properly looking at the data in terms of what’s going on with players and have more*

355 *control there and more support for players, whether it’s [with work] or whatever it may be” –*

356 *P004*

357

358 *“It’s really very much down to whoever is looking after [the M-ASRM], that he’s very much on*

359 *top of it...I’d say it’s hard managed” – P010*

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355 4. Socio-technical & System Factors

356 *“Not the be-all and end-all I would say, it still doesn’t replace clinical judgement or developing a*

357 *relationship with a player I would suggest” – C007*

358 Need to contextualize & interrogate data

359 CSS felt that the use of the system required a comprehensive understanding of individual

360 players and sometimes further information (such as a message or comment) to correctly

361 contextualize the data they input. It was also necessary to interrogate the data or supplement

362 it with an objective measure to combat dishonesty and identify unusual or unexpected self-

363 report data.

364 *"If they don't comment on it, I would probably text just to see what the issue is or how bad it*
365 *is because sometimes a 2 or a 3 [out of 5] is not enough to go off. Some fellas are very good at*
366 *using the comment section to say 'oh it's just a bit of tightness, I've had a week of driving at*
367 *work' and that's fine but in terms of the lads just going 2 or 3 and leaving it at that, then it*
368 *requires more communication from my end just to see what the issue is" – C011*

369 *"I guess because we use both objective and subjective it's very difficult to [manipulate data]*
370 *and I actually see more players trying to manipulate a GPS than try to manipulate subjective*
371 *markers" – C005*

372 Communication Limitations

373 CSS often spoke of how face-to-face conversation was a more valuable method of
374 communication and of developing a coach-athlete relationship than using a software system.

375 Clinical judgement and communication skills were still central to addressing any issues.

376 *"I think wellness is a bit more holistic, where it needs a bit more of a personal touch than*
377 *actually just pinging in numbers into something" – C003*

378 *"I think actually having the conversations one on one is more impactful, certainly from the*
379 *athlete's perspective or the athlete's wellbeing, even just psychologically I suppose that they*
380 *have someone to vent to" – C002*

381 Question Design

382 Players often felt that it was difficult to portray how they felt accurately with the system
383 descriptors, with other references to careless reporting due to the 'numbers' nature of a 1-5
384 Likert scale.

385 *"Sometimes I feel like the metrics on it aren't capturing exactly how you're feeling. If you could*
386 *kind of...if it was compulsory to put in a comment at the end that it might sort of give*
387 *management a bit more clarity on how you're feeling" – P006*

388 *"I suppose I don't fill it in to the greatest amount of detail it's more just ticking the numbers"*
389 *– P001*

390 DISCUSSION

391 The aim of this study was to investigate the user-experience of stakeholders using a pre-
392 existing M-ASRM in elite Gaelic Games. Major themes that emerged from analysis included
393 its perceived value as a communication platform, its role in remote monitoring and decision-
394 making, challenges with 'buy-in' throughout the organization, time and expertise
395 requirements, and concerns about the honesty and accuracy of data. The use of the M-ASRM
396 and perceived value were similar to previously published work in the use of ASRM (29), and
397 while some of the challenges have been mentioned previously (26), the team sport context
398 investigated in this study allowed for new perspectives to emerge.

399 Previous work has detailed the facilitation of communication as a major role of an ASRM (29),
400 and similar results have emerged in this study. For CSS, M-ASRM were perceived to provide a
401 level of communication that was unattainable in any other way. The value of improved
402 communication channels can potentially be considered more valuable in the context of
403 amateur team sports such as Gaelic Games where resources, access to players and time
404 constraints can make monitoring a team of athletes incredibly challenging. Gaelic Games may
405 also benefit from remote monitoring, information transference and informed decision making
406 due to the respective Gaelic Games structures allowing for athletes to play on multiple teams
407 at the same time, for example with their club, university and county (19). Due to these
408 challenging player demands and difficulty in managing training load, player welfare in elite
409 Gaelic Games is a topical discussion (18), and the increasing use of M-ASRM in this context
410 may be somewhat attributable to this issue.

411 While the value of an M-ASRM was visible to the stakeholders, its ability to promote player
412 education and self-management reflected an interesting disparity between players and CSS.
413 Players perceptions were variable, with potentially more self-aware individuals feeling that
414 they didn't need an M-ASRM to highlight to them what they already knew as responsible
415 athletes. CSS had few examples of self-regulation happening in practice, and more so
416 assumed that implicit learning and self-regulation would emerge from sustained use. In
417 previous research, a coach described this approach as being too linear and requiring the
418 athlete to know when and how to respond to their data (29). While the current study showed
419 some potential for M-ASRM to promote positive athlete behaviors, the experience was highly
420 individual. Further research is required to investigate methods of empowering self-regulation
421 in athletes with individual preferences, knowledge and interests, particularly in a team sport
422 environment.

423 Our findings also suggest that whilst individual 'buy-in' can be central to M-ASRM success,
424 team sport applications appear to create some new considerations for M-ASRM adherence.
425 The challenge of promoting adherence in this study appears compounded by the dynamic
426 environment and the emphasis or lack thereof placed on the M-ASRM due to the multi-
427 factorial nature of team performance. The M-ASRM system, treated as an adjunct, appears
428 often to lack priority if deeper challenges were emerging, such as the team having an
429 unsuccessful season. It may be even more difficult therefore for 'weaker' teams to prioritize

430 M-ASRM use in scenarios where more pressing issues are to the fore. This may be considered
431 as a consequence of amateur sport and is a significant barrier to M-ASRM use, as persistent
432 use over a season can help to develop a positive attitude towards an ASRM (2).

433 At an individual level, unfavorable responses to self-report has been mentioned previously
434 where athletes felt that monitoring served as a negative reinforcement of their fatigue, which
435 was a concern especially during competition phases (21). In other contexts, psychological
436 monitoring has been discontinued in the lead up to competition due to the impact of external
437 stressors and the possibility of negative feedback (2). Previous research has suggested that
438 individual characteristics should be assessed to determine the appropriateness of ASRM use
439 (27), however, this approach may not be desired or feasible in a team sport environment. The
440 fact that only one CSS in this study referred to the possibility of negative reinforcement
441 suggests that the issue is not widely recognized or appreciated. CSS should seek to
442 acknowledge negative reinforcement with their players and create open communication
443 channels to address each scenario individually and collaboratively with the athlete.

444 The findings also suggest that backdating of data was permitted in most cases to reduce the
445 impact of non-adherence, yet this was one of the leading concerns with accuracy as
446 participants perceived this data to have little chance of providing reliable information. Self-
447 monitoring in performance appraisal, for example, trains users to record information
448 accurately and as it occurs (13), yet the default timeframe for backdating data on the Metrifit
449 RTP system, for instance, is three days. CSS should consider what they are monitoring and
450 why with regards to reasons for allowing backdating of information. If the data is almost
451 inevitably incorrect, then where is the value in allowing the backdating of information, if
452 merely to fulfil a data set? Backdating in this study, seemed to be promoted as a punishment
453 or method of negative reinforcement – i.e. ‘you won’t get away with non-adherence’.
454 Whether trying to have the perfect data set for research, analytical or punishment purposes,
455 CSS should seek to minimize the instances of collecting inaccurate information.

456 Dishonesty is an inherent issue with self-report and a further challenge for CSS to ensure data
457 accuracy. Whilst a recent survey of elite female sprint athletes indicated that the majority of
458 respondents were honest in their responses, they were more likely to be dishonest where
459 they felt disproportionate training modifications were arising from their data input (21), and
460 elsewhere, where they didn’t want to highlight poor behavior or preparation (26). Our

461 findings show that dishonesty was an evident problem in this study, appearing as a form of
462 social desirability bias and perhaps highlights that an alternate approach to self-report is
463 required for team sports. Athletes have previously expressed concern of being compared to
464 other athletes who may interpret a scale differently (28), which is of particular interest in elite
465 team sports such as Gaelic Games, where selection and the desire to appear favorably over
466 teammates appears to influence M-ASRM reporting. CSS felt that feedback and acting on the
467 data promoted honesty, but equally this could promote dishonesty if players think they will
468 be removed from training. A further attempt to promote honesty was removing the idea of
469 an M-ASRM being used as a decision making tool, and as such, is in line with current
470 recommendations (4) – although to do this could be ironically misleading when some CSS
471 spoke of using it to pick their game-day squad. If we address the factors which were perceived
472 to promote honesty in this study, we should focus on honesty as a central tenet to group
473 success and progression, provide efficient feedback to players on their data, address
474 dishonest responses and reiterate the importance of honesty to facilitate peak athletic
475 performance through informed decision making.

476 Honesty when completing an M-ASRM is also topical with recent concerns regarding data
477 privacy, yet preliminary research showed that privacy concerns were unlikely to influence
478 ASRM use by athletes (28). Improved information disclosure is unquestionably valuable and
479 the CSS in this study spoke about scenarios of relevant information that they may not have
480 otherwise garnered, however, in some cases players perceived this to be personal
481 information that they were not comfortable to share. This could be influenced by Gaelic
482 Games often having a dynamic and changeable team scenario with fewer personal
483 relationships than with individual athletes or smaller training groups. There appeared in some
484 scenarios to be a lack of clarity regarding who had access to players data and this should be
485 addressed in line with previous recommendations to offer a clear outline of who has access
486 to M-ASRM data and why (25). It is important to note here that no ASRM data should be
487 shared or shown to other team members as it might with quantitative metrics: this
488 occurrence was only referred to by one participant in this study but is important to consider
489 nonetheless.

490 The use of M-ASRM in training prescription, modification and planning in advance has been
491 mentioned previously (29) and in this study was found to be valued by CSS to validate their

492 methods and decisions, both to themselves, their colleagues and players. The challenge with
493 this use of M-ASRM is that players expect action to be taken from their data as a result;
494 demanding significant time from CSS to contextualize and respond appropriately, with
495 inappropriately weighted responses potentially influencing future dishonesty from a player
496 (21). This challenge for CSS appeared to reflect a significant underestimation of the time and
497 expertise required to facilitate successful use of an M-ASRM by all parties in elite Gaelic
498 Games. Where the instruction to implement an M-ASRM came from a higher level such as the
499 local governing body or team manager, there was an assumption that the system would
500 function almost independently through automation of reports and red flag identification.
501 However, this failed to acknowledge the time required to ensure player adherence to the
502 system, to analyze and contextualize the data to make appropriate decisions based on it, and
503 to communicate this to the relevant parties, bearing in mind that the system administrator
504 was generally assuming this role on top of their already part-time position. Lack of foresight
505 and planning was also evident where the CSS themselves were the instigator in implementing
506 the M-ASRM. Discrepancies between predicted and actual benefits of athlete monitoring due
507 to lack of human resources has been described previously (1), and in this study, many CSS
508 perceived that they were unable to use the system to its “potential” as a result. This suggests
509 that there is an unrealistic expectation of the investment required for successful M-ASRM
510 use.

511 Furthermore, the negative experiences of the socio-technical limitations of M-ASRM use
512 reflect a key consideration in the adoption of brief, customized self-report measures. While
513 condensed measurement reduces burden on stakeholders, it also reduces the level of
514 information that is transmitted. Where M-ASRM use often required extra contact to
515 contextualize data, or extra analysis with other data sources to ensure accuracy, it is imposing
516 more load on the system administrator and potentially detracts from the proposed value of
517 the M-ASRM. It was also difficult for players to portray feelings like their mood, for example,
518 on a 1-5 Likert scale, with results suggesting potential detachment from the system and
519 careless reporting. It is evident that CSS recognize that a self-report system will never fulfil all
520 elements of communication necessary to develop a coach-athlete relationship, and there
521 remains limited evidence to suggest that ASRM use improves athlete self-regulation. It is

522 essential, therefore, that an M-ASRM is recognized both for what it can and cannot provide
523 to users.

524 The results of this study concerning the use of M-ASRM in elite Gaelic Games align with those
525 previously published, identifying undesirable athlete responses and intervening as necessary,
526 while facilitating communication between athletes and CSS (29). However, for successful use,
527 athletes are expected to routinely complete an ASRM and CSS are expected to quickly
528 interpret and use this data (29). Given that player adherence, dishonesty and coach time and
529 expertise requirements are three of the main challenges experienced while using an M-ASRM
530 in elite Gaelic Games, this creates a disparity between the optimal and the realistic use. While
531 M-ASRM have demonstrated value in athletic preparation for this cohort, it is crucial for CSS
532 to appreciate the challenges encountered and the contextual limitations of M-ASRM use.

533 This study adds to the current knowledge on ASRM use in applied sport and provides new
534 interpretations of key user experience factors such as adherence, dishonesty, and data quality
535 and limitations as they present in a team sport environment. Additional learnings concern the
536 contextual nature of M-ASRM value to its stakeholders, relative to the engagement and
537 resources which the M-ASRM is afforded. These perspectives can be utilized in the decision-
538 making and user-centered process design for M-ASRM implementation.

539 A limitation of the current study is that most participants had used a single type of M-ASRM,
540 so findings on perceived value may differ with other M-ASRM depending on the system
541 features. System features may also influence user engagement, adherence and the challenges
542 related to system factors. It should also be considered that Gaelic Games present a relatively
543 unusual elite team environment in that the athletes are amateur, and staff generally work in
544 a part-time capacity, which may affect the ability to use the system and the effect of the
545 burden on CSS time and expertise. The small representation of females in each sample is
546 reflective of the fewer number of females working in coaching and support staff roles and
547 also the fewer number of female teams (ladies football and camogie) who are using M-ASRM
548 – potentially due to less funding and resources. The dominance towards football involvement
549 in both samples is reflective of the higher number of teams who compete at the highest elite
550 level in football compared to the other three field sports. While the dominance of league
551 division one representation is reflective of the higher-level teams generally having better
552 resources and personnel to obtain and implement M-ASRM.

553 PRACTICAL APPLICATIONS

554 The results of this study offer a number of key considerations for CSS who are using or
555 intending to implement an M-ASRM both with team and individual athletes. Prospective M-
556 ASRM users can learn from the use of and value extracted from an M-ASRM in elite Gaelic
557 Games when considering the implementation of a self-report monitoring system in their
558 context. CSS can expect to benefit from the facilitation of communication, increased
559 information disclosure from athletes and data to inform daily decision making, while the
560 potential impact of M-ASRM use on athlete self-regulation can also be evaluated.

561 Equally, this study outlines the limitations and challenges associated with the user experience
562 of an M-ASRM in an elite but amateur team sport context. CSS should be cognizant of the
563 user-adoption factors which influence athlete adherence in team sport, such as maintained
564 emphasis on the system importance from all stakeholders and encouraging individual buy-in,
565 considering internal motivation and perceived usefulness. Dishonesty to gain a competitive
566 advantage is an evident problem with an M-ASRM in team sport which should be especially
567 considered in the lead up to competition. Promoting honesty may be facilitated through
568 addressing dishonest responses and reiterating the requirement for accurate data to optimize
569 individual and group performance.

570 Importantly, this study has highlighted the burden on CSS time and expertise in ensuring
571 adherence to an M-ASRM, in analyzing, contextualizing and corroborating data, in addition to
572 disseminating this information to the relevant parties. Furthermore, the socio-technical and
573 system limitations should be considered to appreciate an M-ASRM both for the value it can
574 and cannot provide to CSS. These findings can be used to carry out an initial evaluation of the
575 appropriateness of M-ASRM implementation in a given context and provide an outline for
576 realistic use and managing stakeholder expectations.

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680 Table 1: Participant Characteristics

<i>Characteristics</i>	<i>CSS (n=11)</i>	<i>Players (n=10)</i>
Male/Female	10/1	8/2
Mean Age (years) \pm SD	37 \pm 11	27 \pm 3.6
<i>Role</i>		
Strength & Conditioning Coach	4	n/a
Sports Scientist	2	n/a
Physiotherapist	2	n/a
Manager (Head Coach)	2	n/a
Nutritionist	1	n/a
<i>Sport</i>		
Football	7	6
Hurling	2	2
Ladies Football	1	1
Camogie	1	1
<i>League Division</i>		
One	6	5
Two	2	1
Three	1	2
Four	2	2
<i>Team Experience (seasons) \pm SD</i>	1 - 13 (mean 4.5 \pm 3.5)	3 - 14 (mean 8 \pm 3)
<i>System Experience (seasons) \pm SD</i>	1 - 4 (mean 1.9 \pm 1.3)	1 - 3 (mean 1.9 \pm 0.7)

681 CSS = coaches and support staff

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684 Table 2: Interview Topic Guide

	<i>Coaches and Support Staff (CSS)</i>	<i>Player</i>
General Use	How do you use your ASRM? What actions are taken from it? How has using the system influenced your coaching practices/role?	Can you tell me about how the ASRM is used by your team? What do you do with the data? How has using the system impacted you as a player?
Views	Can you tell me your views on the system? Positive/negative	Can you tell me your views on the system? Positive/negative
Adherence	How do you perceive the levels of compliance with the system?	Can you discuss what influences you to log your information?
Data Accuracy	What are your thoughts on the accuracy of the data?	Can you tell me about the thought you give to the information you input?
Data Privacy		How do you feel about being monitored? How do you feel about sharing your information?

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687 Table 3: Results Representation

<i>Theme</i>		<i>CSS Quotes</i>	<i>Athlete Quotes</i>	<i>Total Quotes</i>	
Positive User Experience	Communication & Information Disclosure	11	6	63	
	Remote Player Monitoring	9	5	42	
	Decision Making & Advanced Planning	11	5	51	
	Player Education & Self-Management	6	10	50	
Negative User Experience	Adherence	<i>Contextual Factors</i>	9	3	23
		<i>Individual Factors</i>	11	8	35
		<i>Enforcement</i>	11	7	43
		<i>Backdating</i>	4	2	8
	Dishonesty	<i>Honesty</i>	4	6	12
		<i>Faking good</i>	5	6	28
		<i>Faking bad</i>	3	2	8
		<i>Privacy</i>	4	8	19
	Coach Time & Expertise Requirements	10	4	48	
	Socio-technical & System Factors	<i>Contextualising & Interrogating data</i>	9	0	16
		<i>Communication Limitations</i>	5	0	10
		<i>Question Design</i>	3	5	17

688 CSS = coaches and support staff

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