



Teachers' perceptions of a fundamental movement skill (FMS) assessment battery in a school setting

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1 **Teachers' perceptions of a fundamental movement skill (FMS)**
2 **assessment battery in a school setting**

3

4 Running head: Teachers' perceptions of an agility and movement skill assessment

5 ABSTRACT

6 Fundamental movement skill (FMS) competence is low in adolescent girls. An
7 assessment tool for teachers is needed to monitor FMS in this demographic. The present study
8 explored whether the Canadian agility and movement skill assessment (CAMSA) is feasible for
9 use by physical education (PE) teachers of Australian Year 7 girls in a school setting. Surveys,
10 focus group interviews and direct observation of 18 specialist PE teachers investigated teachers'
11 perceptions of this tool. Results indicated that the CAMSA was usable in a real-world school
12 setting and was considered a promising means to assess FMS in Year 7 girls. However, future
13 iterations may require minor logistical alterations and further training for teachers on how to
14 utilize the assessment data to enhance teaching practice. These considerations could be used to
15 improve future design, application and training of the CAMSA in school-based PE.

16
17 Keywords: Australian, feasibility, fundamental movement skills, teaching

18

19 Fundamental movement skills (FMS) are typically classified into object control skills
20 (e.g., catching and throwing), locomotor skills (e.g., running and jumping), and stability skills
21 (e.g., balancing and twisting) (Gallahue, Ozmun, & Goodway, 2012; Ulrich, 2000). Developing
22 FMS may have important health implications for young people, as there is a positive association
23 between FMS competence and physical activity, and an inverse relationship between FMS
24 proficiency and weight status (Lubans, Morgan, Cliff, Barnett, & Okely, 2010). Quality
25 instruction and feedback are significant factors in the development of these skills (Martin,
26 Rudisill, & Hastie, 2009). Therefore, the ability to accurately and reliably assess FMS is
27 essential, to allow teachers to identify the FMS learning needs of students, and subsequently
28 develop, and deliver more meaningful and effective FMS learning experiences to their students
29 (Longmuir, Boyer, Lloyd, Borghese, Knight... Tremblay, 2015).

30 Elementary (primary) school physical education (PE) programs are designed to help
31 students develop FMS (Martin, Rudisill, & Hastie, 2009). Indeed, a recent systematic review
32 (Morgan et al., 2013) showed FMS could be improved in PE when taught by specialist PE
33 teachers or highly trained classroom teachers. However, research suggests that the quality of
34 elementary school PE is often poor (Morgan & Hansen, 2007). There are several well
35 documented institutional and teacher-related barriers that adversely impact on the effectiveness
36 of elementary school PE programs (Morgan & Hansen, 2008), and the quality of assessment
37 within the programs (Lander et al., 2015; Morgan & Hansen, 2007), resulting in many children
38 falling well below the recommended FMS benchmarks of their age and year level (Hardy,
39 Barnett, Espinel, & Okely, 2013).

40 Ideally, students should have demonstrated mastery of all FMS by Year 4 (Hardy et al.,
41 2013); however, in 2010 the prevalence of Australian Year 6 students with skill mastery was less

42 than 50% for the sprint run, vertical jump, kick, and overarm throw (Hardy et al., 2010). Of
43 particular concern is the low level of object control proficiency among girls (Barnett et al.,
44 2010). Consequently, many Australian students, especially girls, transition into junior high
45 (secondary) school under-skilled in FMS (Barnett et al., 2010; Hardy et al., 2013). Despite the
46 low levels of FMS in junior high school girls, recent research indicates that teachers of junior
47 high girls do not have a structured way to assess or teach FMS (Lander et al., 2015). Therefore,
48 skill deficits in girls are likely to remain unidentified in junior high school PE programs (Lander
49 et al., 2015), and opportunity to improve actual competence may be limited (Ehl, Robertson, &
50 Longendorfer, 2005; Lander et al., 2015).

51 Assessment is an integral facet of improving FMS proficiency. Indeed, assessment is a
52 critical component of effective teaching, and thus is an important enabler of student learning
53 (Black & Williams, 2010; Fiset & Franck, 2012). Effective teaching in PE hinges on obtaining
54 accurate information on student skill levels (Hands, 2002). To enhance the effectiveness of
55 teaching, and thus improve learning, assessment ‘for’ learning is recommended. Assessment
56 ‘for’ learning is regular, systematic, and comprehensively integrated into the teaching process.
57 Furthermore, assessment ‘for’ learning is ‘authentic’, that is, applicable to real-life situations
58 (Hay & Penney, 2009; Kirk & O’Flaherty, 2004; Mintah, 2003; Wiggins, 1998). It is assessment
59 ‘for’ learning, that has the potential to promote and advance learning, rather than to simply judge
60 achievement at one point in time (Assessment Reform Group, 2002; Black, Harrison, Lee,
61 Marshall, & William, 2003; Glasson, 2008; William, 2011).

62 Existing FMS assessment protocols – for example, Bruininks-Oseretsky test of motor
63 proficiency (Bruininks & Bruininks, 2005), Peabody Development Motor Scales (Folio &
64 Fawell, 2000), or the Test of Gross Motor Development (Ulrich, 2000) – are intensive to

65 administer and analyse, both in time and resources (Wiarth & Darrah, 2001), making them
66 difficult to implement within in a typical PE class, and by a PE teacher. Many existing
67 assessments have complex criteria, which are hard to interpret unless extensive training is
68 provided: they require students to be tested one at a time, and in isolation (i.e., one teacher or
69 assessor per child); the scoring protocols require students to perform the one skill several times
70 (sometimes up to five); and can take 20–60 minutes to administer per child (Wiarth & Darrah,
71 2001; Watkinson, Causgrove Dunn, Steadward, Wheeler, & Watkinson, 2003). Furthermore,
72 existing tests are often limited in their authenticity, as they focus on isolated skill performance.
73 These static testing environments do not adequately assess combined and complex movement,
74 nor reflect the open, dynamic and complex physical activity environments typical of childhood
75 play, physical activity and sport (Longmuir et al., 2015; Watkinson et al., 2003).

76 To address the current limitations of existing FMS assessment, the Canadian agility and
77 movement skill assessment (CAMSA) was developed. The CAMSA was designed to measure
78 movement skill, and was part of a larger study of children’s physical literacy – the Canadian
79 Assessment of Physical Literacy (CAPL) (Lloyd, Colley, & Tremblay, 2010; Tremblay & Lloyd,
80 2010; HALO, 2014). The administration and assessment protocol for this assessment has been
81 explained in detail elsewhere (<https://www.capl-ecsfp.ca/>). However, in brief, the course requires
82 students to run 20 meters while completing seven movement skill tasks (i.e., two-foot jump, side
83 step, catch, overhand throw, skip, one-foot hop, kick) (Figure 1). It was designed to reflect ‘real
84 world’ abilities required for sport and physical activity (Longmuir et al., 2015), such as
85 transitioning from one skill to the next, e.g., catching then throwing while on the move.
86 Performances are evaluated using completion time, which is then converted to a point score
87 (range 1 to 14). In addition, the quality of each skill (two foot jump, side step, catch, overhand

88 throw, skip, one foot hop, kick) is scored as either performed (score of 1) or not observed (score
89 of 0) across 14 reference criteria (range 0 to 14). The total score is calculated as the sum of the
90 skill and the time scores (maximum score of 28 points) (Longmuir et al., 2015). The test is
91 suitable for the FMS assessment of large groups of children in a relatively short time frame, as
92 the test requires limited equipment and space, and only takes between 1.5 and 2 minutes to assess
93 per child (Longmuir et al., 2015).

94 The feasibility, validity, objectivity, and reliability of the CAMSA have been
95 demonstrated for Canadian children 6–14 years of age, and discussed in detail elsewhere
96 (Longmuir et al., 2015). In brief, face validity was established through a Delphi expert review
97 process. Convergent validity was evaluated by age and sex associations with obstacle course
98 assessment performance. Inter-rater and intra-rater objectivity evidence was excellent for
99 completion time and substantial for skill score, and similarly, test–retest reliability was excellent
100 for completion time and substantial for skill score (Longmuir et al., 2015). However, these
101 assessments were conducted in a Canadian research setting, administered by highly trained
102 researchers (all with degrees in kinesiology and qualified in motor skill assessment) who had
103 received three additional hours of training specific to this protocol.

104 Therefore, the aim of this study was to explore whether the CAMSA is a feasible FMS
105 assessment instrument for use by teachers of Year 7 girls, in an Australian school-based PE
106 context. Year 7 girls were the focus of this study because there is no FMS assessment currently
107 available for this age group, and many girls transition into high school significantly under-skilled
108 for the sports-based secondary PE curriculum (Barnett et al., 2010; Hardy et al., 2013). In
109 addition, the greatest decline in physical activity is evidenced in girls between the ages of 13 and
110 18 (Australian Bureau of Statistics, 2013). Furthermore, Australian secondary school PE must be

111 taught by a specialist (i.e., certified) PE teacher (Rink, Hall, & Webster, 2008), whereas
112 Australian elementary school PE can be taught by non-specialist teachers.

113 METHODS

114 This feasibility study was conducted to determine whether the CAMSA is a practicable
115 measure of FMS for use by PE teachers of Year 7 girls, in a school setting and thus appropriate
116 for further testing, specifically, efficacy testing. The usability of the CAMSA was evaluated in
117 this study by examining teachers' feedback and reflections. Bowen et al. (2009) identified eight
118 areas to address in a feasibility study: demand, acceptability, implementation, practicality,
119 adaption, integration, expansion, and efficacy. The eighth concept, efficacy testing, was not
120 included in the present study, as it was considered outside the scope of this preliminary
121 feasibility research, and will be a focus of future research efforts. In the current study, teachers'
122 perceptions of the seven areas were investigated via teacher surveys, focus group discussions,
123 and observations (Tables 3, 4 and 5). Participant responses were analyzed in relation to the
124 suggested outcomes of interest, as suggested by Bowen et al. (2009) (Table 2), to determine
125 whether the instrument could be a feasible FMS assessment tool for Australian Year 7 PE
126 programs for girls, and appropriate for further research.

127 **Participants**

128 Nineteen specialist (i.e., certified) PE teachers of Year 7 girls were initially recruited.
129 Eighteen of the 19 participants completed all three surveys (one teacher opted out of the study
130 due to perceived work overload); therefore, 18 teachers, and their respective Year 7 girls PE
131 class (approximately 405 Year 7 girls, age range 11–13), participated in the study (Table 1).
132 Previously, a qualitative descriptive study was conducted to investigate barriers and facilitators
133 of FMS assessment as perceived by Year 7 PE teachers (Lander et al., in press). A purposeful

134 sample (Sandelowski, 1995) of four teachers from this study, all of whom had indicated interest
135 in further involvement, was selected for the current study as they represented diverse school
136 types, sectors, locations, and had varying attitudes, perceptions and experiences in regard to FMS
137 instruction and assessment. An email invitation was sent out to each teacher, and invitations,
138 plain language statements, and consent forms were forwarded to principals of the four schools.
139 After consent was received, a snowball sampling strategy (Streeton, Cooke, & Campbell, 2004)
140 was implemented within each school, whereby an email was sent to all Year 7 PE teachers at
141 each school inviting them to participate in the study. The research was approved by [REDACTED]
142 [REDACTED] Human Ethics (HEAG) in December 2014, and the Department of Education and
143 Training (DET), Victoria, in January 2015.

144 **Procedure**

145 Teacher training was provided by the researcher prior to Term 1, 2015. The teacher
146 training included a two hour face-to-face seminar, written resources, an interactive workshop,
147 and ongoing support. The seminar content included the background and importance of teaching
148 and assessing FMS, as well as specific administration and evaluation protocols of the CAMSA,
149 as specified in the CAPL training manual (<https://www.capl-ecsf.ca/>). The written resources
150 provided instructions on how to set up, administer, and evaluate the CAMSA, including a
151 template for scoring and evaluating student performance, and also provided teachers with links to
152 both the CAPL training manual (<https://www.capl-ecsf.ca/>) and video demonstrations of the
153 CAMSA (<https://www.capl-ecsf.ca/capl-training-videos>). The interactive practical workshop
154 comprised a step by step demonstration of the setup, administration and evaluation protocol, and
155 teachers had the opportunity to practice the CAMSA several times, receiving feedback and
156 guidance from the researcher. Teachers were also offered ongoing support in the form of

157 telephone consultation, email contact, or on-site visitation by the researchers (the level of support
158 requested by the teachers was recorded and taken into consideration when analyzing the
159 ‘practicality’ focus area).

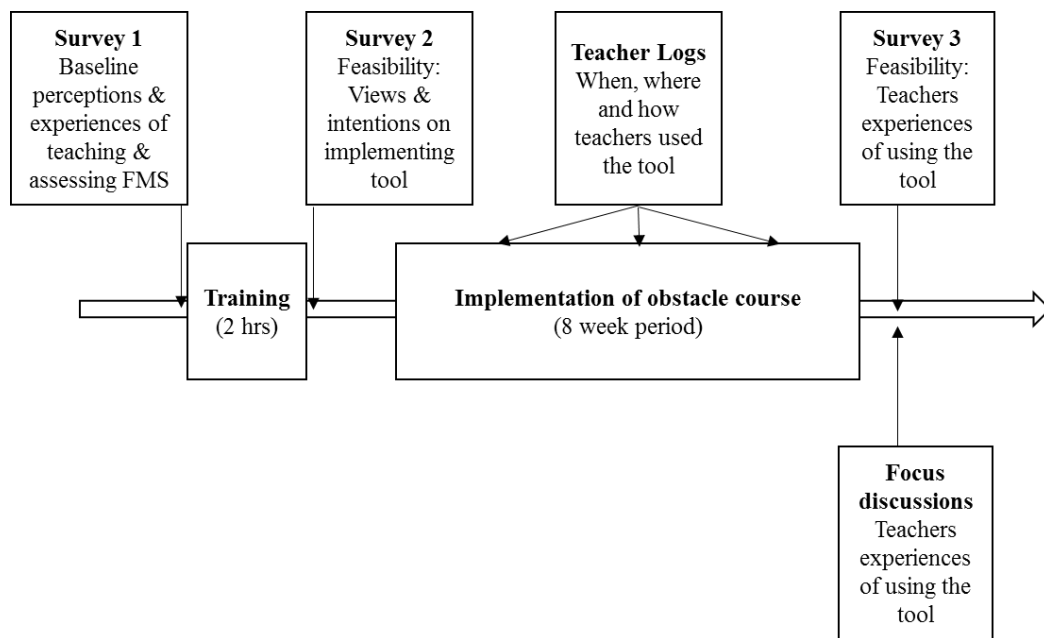
160 Administration of the CAMSA was then carried out by the teachers to all Year 7 girls in
161 week 1 of Term 1, 2015. They evaluated the assessment results from the CAMSA using the
162 protocol specified in the training manual. They were encouraged to use the CAMSA as often as
163 they felt appropriate throughout Term 1 (8 weeks in length) to monitor progress, modify and plan
164 program content and teaching approaches, and use the data to evaluate the success of their
165 teaching and student progress.

166 **Data collection**

167 Evaluation of the CAMSA was achieved via teacher surveys, focus group interviews with
168 teachers, and direct observation of the administration of the assessment tool. Figure 2 describes
169 the timing of the evaluation tools in relation to implementation. Teachers were surveyed three
170 times. Survey 1 was conducted before the initial training session, and sought baseline data on
171 teachers’ perceptions and experiences of teaching and assessing FMS to Year 7 girls, and also
172 about the perceived need of an instrument such as the CAMSA (Table 3). Survey 2 was
173 conducted after the two-hour training session, and investigated the teachers’ views and intentions
174 regarding whether the tool could and would be implemented in their current PE practice (Table
175 4). Survey 3 was conducted after the teachers had administered the tool, either in the last week of
176 Term 1 or in the first week of Term 2, to evaluate the teachers’ experiences using the CAMSA in
177 their Year 7 PE program when teaching girls (Table 5).

178 Survey 2 and Survey 3 were designed to determine the feasibility of the CAMSA in a PE
179 setting as perceived by the teachers, and the questioning revolved around the seven areas of

180 feasibility outlined earlier. Survey responses were all based on a 5-point Likert scale: 1 =
 181 strongly disagree, 2 = disagree, 3 = neither disagree nor agree, 4 = agree, 5 = strongly agree. In
 182 addition, teachers were encouraged to keep a log of when, where and how they used the
 183 assessment tool and/or data derived from the assessment tool throughout the term. These logs
 184 were then used as reference points for the teachers when they participated in the focus group
 185 discussions. The post-trial focus groups discussion, using semi-structured discussion prompts,
 186 were used as an additional method of evaluation. Four focus groups (one focus group per
 187 school), with all teachers (n=18), were conducted to discuss the teacher logs and expand on
 188 aspects of the focus areas in more depth. In addition, the researcher observed and recorded one
 189 teacher per school as they implemented and evaluated the CAMSA with their Year 7 girls PE
 190 class. The focus area for the direct observation was ‘implementation’. Specifically, teachers were
 191 observed to determine how effectively they were able to integrate the assessment tool itself, and
 192 the data gleaned from the assessment data into the teaching process in their Year 7 girls PE class.



193

194 Figure 2: Timing of the evaluation tools in relation to implementation

195 **Data analyses**

196 Descriptive analysis was used to investigate the teachers' perceptions of the feasibility of
197 the CAMSA course in their Year 7 girls' PE classes, as reported in the surveys. The survey
198 responses and observation notes were collated, tabulated, and categorized to align with the seven
199 feasibility components (demand, acceptability, implementation, practicality, adaption,
200 integration, and expansion). For simplicity of analysis, the survey responses that were originally
201 based on a 5-point agreement scale were condensed into three categories (1 = disagree, 2 =
202 neither disagree nor agree, 3 = agree). In addition, focus group discussion data (four focus
203 groups, 18 teachers) were transcribed verbatim by the first author. The interview data were used
204 for process evaluation, with a particular focus on the implementation of the CAMSA relative to
205 program plan, barriers and problems encountered, and the teachers' actual use or engagement
206 with the CAMSA throughout Term 1, 2015 (Baranowski, 2000; Patton, 1982)

207

208 **RESULTS**

209 Survey 1 (pre-training: Table 3) and Survey 2 (post-training, pre-trial: Table 4) responses,
210 reporting on teachers' pre-trial perceptions, were coupled with the teachers' actual experiences
211 (Survey 3; post-trial: Table 5), and are presented below by focus area. Direct observations and
212 quotes from interview responses are integrated and provided as examples of certain points.

213 **Demand**

214 Survey 1 (pre-training) revealed that all participants (n=18) agreed that teaching FMS
215 was important in the Year 7 PE curriculum, and that assessment of FMS was also important
216 (Table 3). However, the majority of the teachers (14/18) reported barriers to effective FMS

217 assessment in the PE context, including a lack of objective and effective assessment tools
218 available, and therefore accurate and meaningful FMS assessment was often neglected.

219 *We don't have up-to-date or accurate assessment protocols to identify what is the most*
220 *important area to focus on: i.e., catching or throwing or kicking. (Female teacher,*
221 *independent girls' schools)*

222 All teachers indicated there was a significant need for an assessment tool that could be
223 easily administered to measure student FMS competency.

224 **Acceptability**

225 Survey 2 (pre- trial) results indicated that all teachers (n=18) anticipated that the CAMSA would
226 be a suitable assessment tool (for both students and teachers) for measuring FMS proficiency in
227 Year 7 PE students (Table 4). All teachers were satisfied with the training session provided for
228 the administration and evaluation of the CAMSA. All participants intended to use the tool in
229 their Year 7 program, and perceived it to be an appropriate method of FMS assessment for their
230 PE class. All teachers predicted that the tool would fit into their organizational culture and
231 structure without major disruption, and also speculated that it would have positive effects on
232 teaching and learning. After using the CAMSA, teachers affirmed that the format was well
233 accepted by students.

234 *The girls adapted to the [CAMSA] course quickly, they were engaged and seemed to*
235 *really enjoy themselves; it made administering the assessment fun and easy. (Male*
236 *teacher, independent girls' school).*

237 Teachers unanimously suggested that the CAMSA was a vast improvement on existing FMS
238 assessments they had attempted in Year 7 PE. In particular teachers appreciated the clear criteria
239 and agreed that it was simple and easy to observe and assess.

240 *This is so much easier than other FMS manuals that schools are using where the criteria*
241 *is so complex that you get lost in the performance.* (Female teacher, independent girls'
242 school)

243 **Implementation**

244 All teachers anticipated that they would be able to successfully administer the test
245 (Survey 2; pre-trial: Table 4). Teachers' actual experiences (Survey 3; post-trial: Table 5) were
246 consistent with initial predictions and revealed that all teachers could, and did, set up and
247 administer the tool successfully in their PE class. Teachers expressed that their efficiency, speed
248 and quality of implementation improved with practice and familiarity.

249 *At first the test was a bit daunting as it was new to me – but it was so easy to administer*
250 *and I gained confidence very quickly.* (Female teacher, independent girls' school).

251 The duration of the initial administration of the tool ranged from 40 minutes to 75
252 minutes per class. All teachers implemented the tool at least once per class (the recommended
253 minimum) in Term 1, 2015, within the first two weeks. All teachers reported they had scheduled
254 repeat episodes of the course later in the year, with the intention to monitor progress and reassess
255 student needs. However, only one school (with six participating teachers) conducted the test
256 twice in Term 1, once in the first week (diagnostic) and once in the last (summative), to
257 determine progress throughout the term.

258 *It was great to get a baseline measure of the students' skills, use the criteria to provide*
259 *feedback to the students and then re-test them to show them and me what progress, if any,*
260 *had been made.* (Male teacher, government co-education school)

261 All teachers predicted they would be able to evaluate the test results successfully (Survey
262 2; pre-trial: Table 4). Again the teachers' initial expectations of successful analysis largely

263 aligned with their actual experience of the process, with the majority of teachers (15/18; Survey
264 3; post-trial: Table 5) stating that they were able to analyze and evaluate the data obtained from
265 the assessment tool successfully. The three teachers who did not feel they could successfully
266 analyze the data requested assistance via email.

267 *The actual scoring system was quite simple to follow and pretty easy to undertake.* (Male
268 teacher, government co-education school)

269 In addition, the majority of the teachers (17/18) reported that their students (~405
270 students) were actively engaged in the assessment, participated in the CAMSA successfully and
271 enjoyed the process, regardless of their level of skill (Survey 3; post-trial: Table 5) .

272 *Every one of my students completed the assessment with some level of success. Even if
273 they dropped a catch, there were several other skills included that the student could move
274 on to, so that one dropped catch wasn't the focus.* (Female teacher, co-educational
275 government school)

276 Survey 2 (pre-trial) results indicated that teachers unanimously expected they would be
277 able to successfully use the data gleaned from the assessment tool to guide subsequent teaching
278 (Table 4). However, Survey 3 (post-trial) data revealed that not all teachers (13 of the 18)
279 reported using the data generated from the CAMSA to plan, prepare or guide subsequent
280 teaching (Table 5). In addition, from the interview data, it appeared that the majority of the
281 teachers were referring only to preparing lesson content (i.e., specific skills to focus on), rather
282 than improving or modifying teaching approaches. Indeed, from interview accounts it appeared
283 that many teachers were not confident in selecting and/or integrating the optimal pedagogy into
284 their lesson to better engage their students.

285 *It's great that we have the information, but knowing what to do with it, and how to*
286 *change our teaching is the challenge. (Male teacher, independent girls' school)*

287 Furthermore, direct observation by the researcher identified that, while all schools were
288 implementing the tool, the extent and efficiency of implementation varied. In the least effective
289 implementation, only one CAMSA was set up, so assessment 'of' learning, rather than
290 assessment 'for' learning, was the single and central purpose. In this scenario there were
291 extended waiting periods for students, lack of physical activity and engagement, and a greater
292 focus on single episodes of assessment. The most successful implementation occurred when
293 several other activities, stations or tasks were set up in conjunction with the CAMSA. This
294 approach better engaged students, decreased student waiting time, decreased the emphasis on
295 high stakes assessment, and better integrated assessment as part of learning.

296 **Practicality**

297 Survey 2 (pre-trial) indicated that all teachers thought they would be able to administer
298 and evaluate the CAMSA independently. Although many teachers (12/18; Table 4) reported that
299 no additional support was required, six teachers suggested they would have liked or they did
300 need additional support throughout the assessment and evaluation process. When this was
301 discussed in focus group interviews it became apparent that the support required largely regarded
302 pedagogy, or how to integrate assessment into subsequent FMS teaching practice, rather than the
303 administration, implementation or evaluation of the tool. Although ongoing support was offered
304 to all teachers throughout the term, three out of the four schools did not request any additional
305 assistance. The one school that required assistance asked for clarification via email about the
306 scoring protocol, personal assistance with the setup of the course, and feedback after their first
307 attempt of the test to ensure they were following the protocol accurately.

308 Despite the general success in administration of the tool within the PE context, some
309 teachers reported some negative factors affecting implementation (although teachers often
310 provided intuitive and insightful solutions to overcome these barriers). Firstly, the necessity of
311 two teachers to perform the two assessor roles, as prescribed by the protocol, was often
312 unrealistic within the ‘real-life’ school PE setting. Therefore, some teachers compromised by
313 setting up a video camera in the position of assessor 1, which allowed for thorough evaluation of
314 student performance via the recorded footage. Another perceived difficulty was the burden on
315 the one teacher to complete all the assessor roles outlined in the protocol (timing student,
316 instructing via the script, and feeding the balls), while still keeping the rest of the class engaged.
317 As a solution, some teachers used injured or out-of-uniform students as timers, while other
318 teachers brought in older students as assessors.

319 Another perceived difficulty was the time burden of the assessment; firstly, in regard to
320 the physical setup of the test itself, requiring a number of cones, hoops and precise
321 measurements. Teachers felt this was time-consuming as they often had to set it up after the class
322 was underway, which reduced their teaching time. However, there were several suggestions to
323 resolve this, including colored tape markings on the floor to replace the cones and hoops.
324 Another suggestion was a thin floor mat with all required markings painted on it that could be
325 quickly rolled out and folded away afterward. However, overall, teachers stated that, in regard to
326 practicality, the positive effects of the course far outweighed the negatives.

327 *The tool was so easy to administer, it was realistic and practical, perfect for PE. Girls*
328 *were very engaged and very competitive to beat their previous score.* (Male teacher,
329 government co-educational school)

330 **Adaptation**

331 Survey 3 (post-trial) data suggested that the CAMSA was perceived to be a major
332 improvement on previous forms of FMS assessment teachers had been using, which were often
333 subjective and therefore not reliable. All teachers reported that the clear and valid criteria
334 coupled with the format of the course allowed them to identify student skill levels quickly and
335 accurately.

336 *This [CAMSA] course made it very easy to identify students at either end of the*
337 *proficiency spectrum. The high performers and the low level performers really stood out,*
338 *and therefore you could identify these students immediately and begin to tailor programs*
339 *for these students. (Female teacher, independent girls' school)*

340 The participants concurred that the dynamic nature of the assessment led to a higher level
341 of fun and engagement. Students enjoyed taking part and were very keen to better their scores.
342 They also agreed that the format of the CAMSA course allowed several skills to be observed at
343 one time and therefore had more reach and relevance across the different units that were
344 scheduled across the Year 7 curriculum.

345 *I loved the variety of skills that were included in the test, because they are skills that are*
346 *included in nearly every unit we cover in Year 7 PE, from athletics to many of the ball*
347 *sports. The test would be relevant for all the units. (Female teacher, co-educational*
348 *government school)*

349 The teachers also reported that the skills course format, rather than tests that assess single
350 skills in isolation, was hugely valuable. Participants suggested that it provided a truer picture of
351 the students' skills, as they had to transition from one skill to the next, which was more like sport
352 and physical activity. Teachers also indicated that it was the transitions that largely differentiated
353 low and high performers.

354 *The better skilled kids would move from one skill to the next quickly and smoothly,*
355 *therefore their time would be faster – it was the opposite for the less skilled kids.* (Female
356 teacher, independent girls' school)

357 Furthermore, several teachers valued the combined method of assessment, integrating
358 both qualitative and quantitative measures.

359 **Integration**

360 Survey 2 (pre-trial) results indicated that all but one teacher predicted the CAMSA would
361 fit into their current school PE curriculum and structure (Table 4). Survey 3 (post-trial) data
362 supported this, with the majority of the teachers (14/18; Table 5) agreeing that the CAMSA was
363 successfully integrated into their school PE infrastructure (i.e., curriculum, lesson allotment,
364 scope, sequence, and structure). For example, one school had an athletics unit in Term 1, but
365 were able to utilize and specify the test and test data for the purpose of athletics. Conversely,
366 four of the teachers reported that, as their curriculum was already established for Term 1, it was
367 difficult to integrate the assessment and the assessment data.

368 The majority of teachers (15/18; Table 5) reported that the tool was not a disruption to
369 their class, curriculum or student learning objectives, and teachers inferred that once familiar
370 with the protocol, the CAMSA was a valuable inclusion not only as an assessment tool but also
371 as a guide for teaching and planning.

372 *The content of the [CAMSA] course gave me a framework for any lesson that included*
373 *skills tested in the course. I knew the teaching points to give, which were clear and*
374 *simple. ...The kids and I loved using this tool!* (Female teacher, independent girls' school)

375 Survey 2 (pre-trial) responses indicated that all teachers anticipated students would enjoy
376 and be engaged with the tool, and in reality these perceptions were largely supported, with 17 of
377 the 18 teachers reporting their students were actively engaged and enjoyed the task (Table 5).

378 Furthermore, interview accounts indicated that the students became familiar with the
379 course very quickly, and displayed a desire to improve their scores.

380 *It is a fantastic tool that the kids took ownership of and really enjoyed completing.* (Male
381 teacher, co-educational government school)

382 One school planned to modify their reporting system to align it with that of the CAMSA,
383 so that not only teachers and students were aware of student progress, but the parents were also
384 informed about student proficiency and progress.

385 *We are redeveloping our reporting system in PE to coincide with the standards provided*
386 *in the CAMSA – we are using pre-test and post-test results to report on improvement*
387 *over the semester.* (Female teacher, independent girls' school)

388 **Expansion**

389 All teachers, in both Survey 2 (pre-trial) and Survey 3 (post-trial), agreed the CAMSA
390 could be expanded to provide an ongoing measure of FMS proficiency for Year 7 girls at their
391 school. When asked about modifications for future iterations, some interesting suggestions were
392 made. A couple of teachers indicated that the prescribed distance in the overhand throw and kick
393 component in the course was too short, and reduced the need for a forceful execution of those
394 two skills.

395 *Make the throw and kick distance longer [suggested 10 m] so it makes them perform the*
396 *skills properly with more power.* (Male teacher, independent girls' school)

397 One participant indicated that the small target also restricted the execution of the throw.

398 *I didn't like the use of the target for the throw as student were too focused on getting it in*
399 *the target, they didn't focus on technique and ended up lobbing it rather than (overarm)*
400 *throwing. (Female teacher, independent girls' school)*

401 Indeed, throughout the interviews, a few teachers expressed concern that students were so
402 focused on performing the course as quickly as possible that it often jeopardized the quality of
403 their performance.

404 *I don't really see the value in attaching time, as the students get so attached to how fast*
405 *they can do it that their technique goes out the window, this is especially true in the side*
406 *step and skip, where they end up just running. (Male teacher, independent girls' school)*

407 Survey 2 (pre-trial) results indicated that all teachers perceived that the tool would
408 enhance their FMS teaching (Table 4). Survey 3 (post-trial) results showed this was true for 14
409 of the 18 teachers (Table 5). Interview accounts of these four teachers indicated that additional
410 pedagogical education, in conjunction with comprehensive training on the assessment tool,
411 would have greatly benefited their teaching practice.

412 *I see the assessment tool as just that ... an assessment tool. I don't see it as enhancing my*
413 *teaching, as assessment alone doesn't change much – you need to know how to teach.*
414 *(Male teacher, independent girls' school)*

415 The majority of the teachers indicated they thought the tool would enhance the FMS
416 proficiency of their students. Indeed, in Survey 3 (post-trial), 11 out of the 18 teachers reported
417 that the CAMSA course actually enhanced the FMS proficiency of the students (Table 5). Three
418 out of the four schools did not conduct post-test assessment, so did not have data to compare
419 student progress reliably. However, one school (with six participating teachers) monitored

420 student progress across Term 1, and believed there were improved results in overall skill scores
421 for many students.

422 Teachers unanimously agreed that they felt more confident in their ability to assess the
423 FMS proficiency of Year 7 girls after the training and implementation of the CAMSA.
424 Furthermore, interview accounts indicated that many teachers were interested in, or intended to
425 use the tool in the future, and reported that the benefits to both teacher and student would only
426 continue to increase as their familiarity and confidence expanded.

427 *There is so much potential with what we can do with this tool. I can see this changing the*
428 *face of Year 7 PE. If we have students' skill level data from day one of Year 7, we know*
429 *what to do and how to do it. Our teaching will have much more impact as we know what*
430 *we are dealing with. (Female teacher, independent girls' school)*

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432 DISCUSSION

433 This study aimed to address two research questions: (1) whether the CAMSA was a
434 feasible FMS assessment instrument for use by teachers of Year 7 girls, in an Australian school-
435 based PE context and (2) whether the CAMSA could be successfully integrated into the teaching
436 process (i.e., used as assessment 'for' learning) in the context of a PE class when teaching Year 7
437 girls. The CAMSA was found to be feasible for use in the real-world context of Year 7 PE
438 classes, as perceived by the teachers. However, some issues were raised by the teachers in regard
439 to integrating the assessment tool into the teaching–learning process.

440 Teachers universally agreed that there was a significant demand for the tool in the Year 7
441 girls PE program. Fundamental movement skills are not a key focus in the National Curriculum
442 for Australian junior high (secondary) School PE, nor do they feature prominently in many

443 junior high PE programs across Australia, perhaps because, theoretically, students should have
444 mastered these skills by age 10 (Ulrich, 2000). However, in reality, many students transition into
445 secondary school falling well below the recommended FMS benchmarks of their age and year
446 level (Hardy, Barnett, Espinel, & Okely, 2013), indicating that FMS education is a required and
447 necessary component of the Year 7 curriculum. In the present study, the participating teachers
448 indicated that the CAMSA provided an effective means to accurately identify where students are
449 in their learning, and therefore it was viewed as not only a needed tool, but also as an acceptable
450 and valuable inclusion to the Year 7 PE curriculum.

451 The majority of teachers managed to successfully implement and evaluate the tool,
452 sometimes several times in one term, and most were able to do so independently. Encouragingly,
453 all teachers administered the test within the first couple of weeks of term, allowing for early and
454 accurate identification of learner needs. This is congruent with research on effective assessment,
455 whereby conducting assessment early in the teaching process provides valuable information to
456 best meet the needs of individual students (Black & William, 2010; Harrison, 2013).

457 Although this study differed from the Canadian feasibility study (Longmuir et al., 2015),
458 in regard to protocol, context, assessors and participants, the positive results regarding the format
459 and the structure of the tool were shared. The teachers valued the practical and dynamic nature of
460 the tool, which they believed provided a truer picture of girls' FMS proficiency. The teachers
461 also agreed that the number and variety of skills measured in one test provided scope for
462 transferability of the findings across a diverse range of units in the Year 7 PE curriculum,
463 supporting the notion that incorporating movement skills within a skills course format enables a
464 more accurate and complete profile of whether the child can combine more complex and
465 dynamic skills that enable them to succeed in being physically active with peers (Longmuir et

466 al., 2015). Overall, teachers agreed that the CAMSA was a significant improvement on
467 assessment strategies they had implemented in the past.

468 Although the CAMSA course was largely viewed by teachers as a feasible measure of
469 FMS proficiency in girls, several issues were raised regarding successful integration of the test
470 into the teaching process, predominantly about how to best use results to support student learning
471 (i.e., assessment ‘for’ learning). Indeed, to more comprehensively integrate this assessment tool
472 into effective teaching practice, the teachers may have benefited from additional training in
473 pedagogy or teaching strategies that translate the data gleaned from the CAMSA course into
474 practical teaching methods. Indeed, research strongly suggests to promote and advance student
475 learning, assessment must be comprehensively integrated into effective pedagogy (Black &
476 William, 2010).

477 Another concern raised by several teachers was time restraints, which is often stated as a
478 barrier to effective PE (Morgan & Hansen, 2008). The protocol for the CAMSA requires two
479 assessors. This was considered unrealistic by many of the teachers, as they did not have the
480 luxury of two teachers available. Although participants found inventive alternatives, such as iPad
481 usage or the inclusion of student assessors, they still perceived this as a barrier to feasibility in a
482 PE context. In addition, they felt that conducting all the specified assessor roles limited their
483 capacity to keep all students active and on task. Indeed, having only one CAMSA set up, and
484 being completely engrossed in this formal assessment, as the protocol demands, detracts from the
485 ability of the teacher to be present for the other students in the class. As well as being difficult
486 for teachers, this scenario emphasizes ‘high stakes’ assessment, which can demotivate students
487 (Ntoumanis, 2001).

488 **Future recommendation**

489 Issues that surfaced here may be used to improve future iterations of this type of
490 assessment tool for the education context. For the CAMSA to facilitate assessment ‘for’ learning,
491 or ‘authentic’ assessment, and to be better integrated into the teaching process, several
492 recommended amendments to the protocol are suggested. Firstly, class setup needs to be
493 prepared in advance, for instance, several activities or CAMSA courses set up rather than one
494 single assessment. Formative assessment should also be encouraged, that is, using the results to
495 plan and deliver subsequent FMS lessons. The assessment procedure should be shared with the
496 students, for instance, via peer assessment, or self-assessment using video footage. Multiple
497 assessment episodes should be integrated into the teaching process, using assessment regularly to
498 monitor, promote and improve learning, to de-emphasize summative or high stakes assessment.
499 These recommendations not only provide direction or focus for teacher training or professional
500 development programs, but indeed suggest there is a need for more comprehensive teacher
501 training program, when testing the tool further.

502 A limitation to this study was the isolated testing of the CAMSA, which reflects only one
503 component (physical competence) of the CAPL. The CAPL is capable of assessing multiple
504 aspects of physical literacy, including: daily behavior, motivation and confidence, knowledge
505 and understanding, and physical competence. Indeed, physical literacy moves beyond measuring
506 fitness, motor skill or motivation in isolation. Therefore, further research is recommended to
507 investigate the feasibility of the CAPL in its entirety within an Australian school-based PE
508 context. Furthermore, this study focused on the teaching and assessing of girls FMS, therefore
509 the findings are limited to Year 7 girls only. Future research is recommended in co-education
510 settings, where the findings can apply to both males and females. In addition, further research is
511 needed to ascertain the students’ reflections and feedback of the CAMSA, and importantly to

512 determine the efficacy and effectiveness of the CAMSA, on the actual FMS proficiency of the
513 students.

514 CONCLUSION

515 For an intervention to be worthy of testing for efficacy, it must address the relevant
516 questions within feasibility (Bowen et al., 2009). The results of this study provide evidence that
517 the CAMSA is feasible FMS assessment instrument, for use by PE teachers of Australian Year 7
518 girls, in a PE context, among a sample of secondary school teachers. Teachers thought there was
519 a significant demand for the tool, perceived the approach to be appropriate, and expressed that
520 use of the assessment tool enhanced their confidence in conducting FMS assessment. However,
521 our findings suggest that, for the tool to be integrated as an ‘authentic’ assessment of FMS in the
522 Year 7 PE environment, the provision of comprehensive training in pedagogical practices
523 promoting the integration of the assessment into effective teaching practice would further
524 enhance the successful utilization of the tool. It is reasonable to assume that a more
525 comprehensive teacher training package coupled with the integration of the CAMSA into Year 7
526 curriculums may lead to better student outcomes in movement skill competence than pre-existing
527 FMS assessment practices.
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