

Fundamental Movement Skills and their Assessment in Primary Schools from the Perspective of Teachers

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Abstract

Background

Evidence suggests that significant numbers of school children fail to acquire age-appropriate fundamental movement skills (FMS), despite the importance of FMS in facilitating participation in physical activities. This has led to calls for an increase in routine screening of children's FMS in school settings. However, there is limited research exploring teachers' knowledge of FMS, and the capacity of schools to conduct such assessments. This project therefore aimed to explore primary school teachers' knowledge of FMS, and investigated what factors might influence the acceptability of FMS assessments in primary schools.

Methods

Primary school staff working in roles that directly impact the learning of children were invited to take a brief (10–15 minutes) online questionnaire developed using the COM-B Behaviour Change Model.

Results

Primary school staff ($n = 851$) from 32 countries (UK: $n = 746$, 88%) completed the questionnaire. A majority reported that knowledge of their pupils' FMS ability would be beneficial (65.3%), and 71.8% said they would assess FMS if appropriate support was provided. Identified barriers to school-based FMS assessments included: Capability – few (15%) possessed knowledge of FMS; Opportunity – teachers reported that 30–60 minutes would be acceptable for assessing the FMS of a whole class, a substantially shorter period than current assessments require; Motivation – 57.2% stated FMS assessments would increase workload stress and 48% of teachers would be influenced by their peers. Solutions to these issues are discussed using the COM-B theoretical framework.

Conclusions

Current FMS assessment tools are not acceptable, or feasible for use in schools. There is a need for existing measures to be modified, or new tools to be developed, underpinned by the considerations outlined in this paper, if FMS screening in schools is to become a reality.

Introduction

Fundamental Movement Skills (FMS) is a term used to describe a group of motor behaviours which include locomotion, object manipulation and stabilisation skills – for example, running, throwing and balancing-on-one-leg respectively (1). Despite a focus on the development of FMS in many Early Years curriculums (2), formal screening and/or objective assessment of FMS is not common practice in

schools. For example, in a child's first year of formal schooling in the United Kingdom (UK), teachers only record a single judgement of whether they feel a child's "moving and handling skills" are 'above', 'at', or 'below' expectation as part of the Early Years Foundation Stage Profile (EYFSP). Notably however, the EYFSP is not based on any standardised measurement of FMS.

Meanwhile, there are grounds to suggest that failing to acquire FMS at the appropriate age may increase the risk of a child experiencing long term physical and mental health problems (3). FMS deficits are hypothesised to be causal in poor health because they influence a child's ability to participate in physical activity (4) and low levels of physical activity in childhood are associated with many adverse physical and mental health problems (5, 6). FMS's direct impact on educational attainment also provides another mediating pathway through which FMS may influence health. A recent systematic review (7) concluded that strong positive associations exist between FMS and educational attainment in reading and mathematics. Studies have also linked low levels of FMS with social and emotional problems including: being withdrawn in social settings, having a poor self-concept, higher psychological distress, and increased anxiety levels (8–10).

Studies have suggested that a large proportion of children are unable to perform age-appropriate FMS (11–13) and therefore specific and sensitive screening of FMS proficiency in schools may be valuable in helping to identify children with FMS deficits, opening up the possibility of providing additional targeted support. It is known that early identification of motor skill problems is beneficial (14), thus Primary schools would be an ideal location for such assessments. Empowering schools to assess FMS proficiency is also in line with current calls within the UK for schools to be pro-active in increasing physical activity levels (15, 16).

However, whilst the proposition of assessing FMS in primary schools has *prima facie* appeal there are a number of potential barriers that could undermine such an initiative's effectiveness and feasibility. Previous studies have used interviews with small sample sizes to understand teachers' opinions on school-based assessments of FMS (17) but, to date, no research has utilised evidence-based theoretical behavioural science frameworks to understand teachers' current skills, and schools' capacity to implement and benefit from such assessments. This consideration is an essential first step in detailing the 'lie of the land' within schools and intelligently inform the process of identifying, designing, adapting, and then trialling school-based FMS assessments. Previous research has highlighted the importance of using the Capability, Opportunity, Motivation and Behaviour (COM-B) model of behaviour change (18) when using a whole school approach to promote increased physical activity (19). The current study therefore used the COM-B model (18) to collect data from teachers and other educators, in order to investigate the barriers and facilitators to implementing school-based assessments of FMS.

Methods

Participants and procedure

Teachers or staff who worked in a Primary school in a role which directly supports the education of pupils (e.g. head teachers, teaching assistants) were invited to take part in an online questionnaire, which had 29 items and was hosted by Qualtrics (www.qualtrics.com/uk/). The questionnaire was advertised on social media (e.g. teacher groups and forums on Facebook and Twitter) and through links with local schools. Participants were entered into a prize draw that gave them a chance to win one of three £20 “Amazon.co.uk” vouchers as an incentive for taking part. The questionnaire took participants approximately ten minutes to complete, and was available online between February and July 2019.

Measure – Online Questionnaire

Demographic information was collected about participants’ gender, age, highest qualification, age groups taught, job role, years of teaching experience, type of school, country, and whether they had received training on FMS prior to completing the questionnaire.

Subsequent questions relating to FMS and school-based assessments were designed following the COM-B model (18). The COM-B model proposes that behaviour change at an individual, organisational, and/or population level has a greater likelihood of occurring when three facilitatory components: capability, opportunity, and motivation are enhanced. Capability can be either psychological (e.g. knowledge) or physical (e.g. skills), opportunity can be social (e.g. societal influences) or physical (e.g. environmental resources), and motivation can be automatic (emotion) or reflective (e.g. intentions and goals). The COM-B model is supported by a complex behaviour framework, the Theoretical Domains Framework, which describes 14 key factors from 33 theories of behaviour change that fall under the COM-B categories (20). Due to this synthesis, utilising the COM-B is beneficial because it allows understanding of a wide-range of multifaceted factors influencing behaviour(s) but does so using one model of behaviour change, rather than applying multiple theories or being more selective of theories. In this study the specific behaviour of interest was teachers implementing in-school FMS assessments.

Questions were mapped alongside all six sub-elements within the COM-B model and categorised in relation to the Theoretical Domains Framework (TDF) (20). Categorisations were discussed and agreed upon amongst authors. Multiple choice, scale and rank questions were used to explore primary school teachers’ opinion of their capability (e.g. ability to demonstrate FMS to pupils), opportunity (e.g. senior leadership team support for such initiatives) and motivation (e.g. how beneficial they believe knowledge of their pupils’ FMS levels would be for their teaching) to assess FMS. For a full breakdown of questions included in the questionnaire, and the aspects of the COM-B model and TDF framework they align with, see Table 1.

Data Analysis

Responses are discussed in the next section, with reference to patterns observed in the descriptive statistics. Multinomial logistic regression was completed using the Statistical Package for the Social Sciences (SPSS) version 24 to explore relationships between responses and demographic factors, for each question.

Results

The questionnaire was online for 133 days. A total of 1074 people opened and began filling in the questionnaire; 221 people did not complete the questionnaire and their responses were therefore excluded.

Participants

A total of 853 primary school staff fully completed the survey and had their data analysed. Participant demographics are given in Table 2. Participants reported working across 32 different countries, including the UK ($n=746$, 87.7%), India ($n=10$, 1.2%), the USA ($n=7$, 0.8%) as well as Australia, Germany, Ireland and Malta which all had five responses (0.6%). The remaining responses spanned six continents: Africa (7 responses from 5 countries), Asia (20 responses from 15 countries), Europe (9 responses from 7 countries), North America (3 responses from 2 countries), Oceania (3 responses from 2 countries) and South America (1 response from Mexico). The mean time spent in a teaching role was 8.57 years ($SD = 7.71$, range = 2 months – 45 years 3 months). The most common responses when job role was selected as 'other' were: deputy headteacher ($n=19$, 2.2%), trainee teacher ($n=8$, 0.9%), head of year/phase ($n=8$, 0.9%), higher level teaching assistant (HLTA; $n=7$, 0.8%). When 'other' was selected for type of school, the most common responses were: special educational needs schools ($n=9$) and faith schools ($n=5$). Only 128 primary school staff (15.1%) claimed to have received training on FMS, ranging from lectures within degrees to programmes used within schools to knowledge disseminated from Physical Education (PE) leads in their schools.

Capability

Frequencies for responses to capability questions are reported in full in Table 3.

Perceived Knowledge

Perceived knowledge about FMS was relatively low, only 5.5% claimed to be either 'very' ($n=44$, 5.1%) or 'extremely' ($n= 4$, 0.4%) knowledgeable. A large proportion (68%) did believe they had 'some' working knowledge of FMS though.

Actual Knowledge

When asked to select from a list of motor skills only those that are classified as FMS, 355 (42%) of the respondents selected all the correct answers (running, jumping, hopping, throwing, kicking, catching and balancing). However, 227 of this subsample (63.9%) also selected at least one incorrect answer. The

most commonly selected incorrect answers were 'activities of daily living' including dressing oneself (43.5%), using cutlery (41.2%) and brushing one's teeth (34%).

Knowledge of relationship between FMS and outcomes

There was a fairly good understanding of the relationships between FMS and childhood development, with 69.2% of respondents ($n= 589$) agreeing that FMS had a moderate or large impact on academic attainment, 66% ($n=562$) on social relationships and 79.1% ($n= 671$) on mental health. Teaching staff perceptions of the impact of FMS on physical activity and physical health were greater still at 92% ($n=782$) and 87% ($n= 743$) respectively.

Confidence Demonstrating

When asked to rate their ability to demonstrate FMS on a scale between one and five (with one indicating 'not confident at all' and five indicating 'extremely confident'), 92.1% ($n=786$) were confident (selecting responses four or five) that they could run between two markers for 15 seconds. Confidence was also high for throwing into a target box ($n= 717$, 84.1%), hopping between two markers ($n=732$, 85.8%), and holding balance ($n= 679$, 79.6%).

Confidence Assessing

When asked about confidence in assessing small-groups (of five) children simultaneously for the activities described above, confidence rates remained positive, with 75.8% ($n= 647$) responding with four or five on the scale for 'running', 81.2% ($n= 693$) for 'throwing', 77.5% ($n=661$) for 'hopping' and 75.3% ($n=642$) for 'balancing'.

Opportunity

Frequencies for responses to opportunity questions are reported in full in Table 4.

Assessment of FMS in Schools

When teaching staff were asked whether they themselves, or their school, currently assess their pupils' FMS, 128 people (15%) in the sample responded with 'yes', 398 (47.6%) stated they did not, and 319 (37.4%) were unsure.

Support from Senior Leadership

A large proportion of teaching staff ($n= 736$, 86.4%) believed that senior leadership teams (SLT) in their school would 'definitely' or 'probably' be supportive if they decided they would like to assess the FMS proficiency of their pupils.

Access to Additional Support Staff Resource

The majority of respondents believed they would 'definitely' ($n = 277$, 32.5%), or 'probably' ($n= 389$, 45.6%) be able to enlist another member of staff to help them to assess FMS proficiency in school. Only 4.2% of the sample ($n= 36$) claimed that this would 'definitely not' be possible.

Access to Equipment

When asked whether schools had access to basic equipment that would enable the testing of FMS, the majority of staff said their schools had '25 beanbags' ($n=696$, 81.7%), 'chalk' ($n=774$, 90.8%), a 'sports hall larger than five metres squared' ($n=741$, 87%), an 'outdoor space larger than five metres squared' ($n=832$, 97.7%), a 'stopwatch' ($n=786$, 92.3%) and a 'tape measure or metre ruler' ($n=827$, 97.1%).

Acceptable Assessment Time

School staff were also asked how long would be acceptable to spend assessing the FMS of one child and a whole class at the start of the academic year, with the most common responses being 'less than ten minutes' and '30-60 minutes', respectively.

Two Hour Start of Year Assessment

The majority of teaching staff said that they would be able to devote two hours at the start of the school year to assessing FMS, selecting either 'definitely yes' ($n=194$, 22.8%) or 'probably yes' ($n= 47$, 56.1%). Only 18 participants (2.1%) stated that this would 'definitely not' be possible.

Time in School Day Most Suitable to Assess FMS

When asked to rank when they would most likely be able to find time to assess FMS in schools, the most popular response was 'during P.E. lessons' (91%). The least feasible time to assess these skills was 'before school', with 41.5% of the sample ranking this last.

Motivation

Frequencies for responses to motivation questions are reported in full in Table 5.

Perception of ability to identify children who need support through FMS assessment in schools

The majority of school staff believed that a school-based assessment would be able to identify children who need extra support (72.9% yes, 25.5% maybe), with only 1.4% of the sample claiming they did not think this would be the case.

Perceived benefit of knowledge of pupils' FMS for teaching

When asked to rate on a scale from one (not beneficial at all) to five (extremely beneficial) how their teaching would benefit if they were aware of their pupils' FMS ability, only 5.2% of school staff responded with either one or two. The majority of respondents selected either three (29.7%), four (38.1%) or five (27.2%).

Workload Stress

When asked whether assessing FMS in schools would increase workload stress, over half of the respondents selected 'definitely yes' ($n= 94$, 11%) or 'probably yes' ($n= 394$, 46.2 %). Only 30 participants selected 'definitely not' (3.5%).

Peer Influence

When asked whether their decision to assess FMS would be influenced by other staff in their school, over half of the respondents selected either 'extremely likely' ($n= 114$, 13.4%) or 'somewhat likely' ($n=380$, 44.6%), and only 15.1% of participants selected that it would be 'not likely at all' (5.2%, $n=44$) or 'somewhat unlikely' (9.9%, $n=84$) to influence them.

Likelihood of Assessing FMS

When asked on a scale of one (not likely at all) to five (extremely likely) how likely they would be to assess the FMS proficiency of their pupils if they had appropriate training and support available, the response was largely positive, with 71.8% of the sample choosing four or five, and thus being likely to implement such an initiative. Only 5.7% of the sample ($n=47$) selected one or two, indicating they would be unlikely to assess.

Demographic Factors

Multinomial Logistic Regression indicated that previous FMS training was the most consistent demographic variable which most often influenced response - where training was found to be beneficial

for perceived knowledge of FMS ($\chi^2(4) = 145.83, p < .001$), and positively influenced whether or not schools currently assessed FMS ($\chi^2(2) = 36.57, p < .001$). Training also influenced the likelihood of reports that schools would be able to spend two hours at the start of the school year measuring the FMS of pupils ($\chi^2(3) = 20.01, p < .001$), and the perceptions regarding the benefit of knowledge of the outcome of such assessments would have on their teaching ($\chi^2(4) = 23.84, p < .001$). Job role was also found to play a role in the perceived benefit to teaching, with teaching assistants being more positive than other groups ($\chi^2(16) = 55.97, p < .001$). Age was predictive of an understanding of the social benefits that well-developed FMS bring ($\chi^2(80) = 164.29, p < .001$). No other demographic factors were found to influence the results. A full breakdown of these analyses can be seen in Additional File 1.

Discussion

For the first time, a behaviour change framework was utilised to understand barriers and facilitators to school-based assessments of FMS. The large number of teaching staff sampled offers a unique insight into the challenges that schools might face when attempting to introduce an assessment of FMS into their curriculum. Encouragingly, the responses demonstrate a large appetite for school-based assessments, with many believing that such initiatives could help to identify children who need extra support, whilst also aiding teachers. Despite this, only 15% of respondents were confident that such assessments already take place in their school. Using the COM-B model (18) alongside these insights enables behaviour change techniques to be paired with barriers to identify practical solutions for a school setting.

Results are in line with a previous, much smaller, study that showed knowledge is a barrier to school-based assessments of FMS (van Rossum et al., 2019). Approximately a quarter of teachers surveyed here indicated low or no perceived knowledge of FMS. This apparent gap in teachers' toolboxes was also highlighted by low levels of accuracy in discriminating movements defined as FMS. This finding is, perhaps, unsurprising as 85% of the sample do not recall having training on FMS. These responses, collectively, highlight that school-based FMS assessment tools will need to incorporate a teacher training session that educates staff on the rationale for testing FMS, if school-based assessments are to become a reality. Further behaviour change techniques that can be applied to ameliorate knowledge barriers include restructuring the social and physical environment (18). One way social barriers could be addressed is through ensuring that staff training is conducted specifically in a group setting. This would help create a culture of understanding about FMS and the role they play within a school environment. Research has shown that having senior leadership support new initiatives is beneficial to teachers' development (21), so ensuring members of the senior leadership team (SLT) are present during training may also be crucial. Additionally, in order to ensure that knowledge is retained, physical prompts should be provided to the school following training sessions. For example, placing this key contextual information at the front of a manual that explains the assessment tool. These methods have previously been found to be highly effective for teacher-led FMS interventions, in which teachers received both face-to-face training and resources to utilise afterwards (22).

Understanding barriers to school-based assessment of FMS must go beyond addressing shortcomings in knowledge though. A further barrier that was highlighted was the duration of assessments. Uniquely, the results revealed challenges with using pre-existing FMS assessments within the school setting. Teachers identified 30 to 60 minutes as a maximum time to assess a whole class, yet, current assessment tools require such durations per individual child (23). This highlights a gulf between current approaches and needs of schools, who have limited time and significant pressures in other areas of their provision. Additionally, while the majority of schools possessed basic equipment that could be used to assess FMS (e.g. beanbags), it is important to note that current assessment tools are burdensome on already pressured school budgets (24), often costing £500–1000 to purchase specific copyrighted resources. As these factors are unlikely to change within schools, the physical requirements of FMS assessment tools will need to be modified (18). In order for school-based FMS initiatives to become a reality, it will therefore be important that measures utilise equipment which is readily available in schools (23), and ensure that a whole class can be assessed within the time and space constraints of a P.E. lesson.

The importance of ensuring a supportive social environment in schools to enable the introduction of FMS assessments in schools was highlighted by the fact that over half of the sample perceived the opinion of other staff to be important to making the decision to assess FMS. Encouragingly, over three quarters of respondents believed that both immediate colleagues, such as teaching assistants, and senior school leaders would support FMS assessments. Rather, the main challenge facing such initiatives would appear to be competing pressures within a teacher's workload, as over half of the sample stated that assessing FMS in schools would increase workload stress. This is perhaps unsurprising with research finding that teachers increasingly feel time pressured to cover the core curriculum (25). Using the behaviour change techniques outlined by the behaviour change wheel (18), future assessment tools should ensure that emotional support is available for school staff. This could be achieved by changing the culture in schools, by using a whole school approach to promoting FMS development and physical activity (19).

The results of this questionnaire have demonstrated that the physical and social constraints within a school aren't compatible with the requirements of existing tests. Thus, as the school environment is unlikely to change, the nature of assessments must be adapted to suit (18). Current tools will therefore need to be revised, or new tools developed to account for the capacity issues that schools face and the constraints teachers perceive on their time. School-based FMS assessments should adhere to the following guidelines: (i) assessments should be quick (30–60 min per class) and supported by high-quality face-to-face training which makes them straightforward to implement; (ii) a member of the SLT should be present and engaged with training to promote its value; (iii) manuals should be provided for schools which encourage an understanding of what FMS are and why they are important, as well as detailing how to implement the assessment; (iv) assessments should only utilise equipment that schools already have, or provide equipment for schools that will enable testing, (v) space constraints should be taken into account, ensuring that FMS can be assessed in a relatively small indoor or outdoor space (e.g. $\leq 5 \text{ m}^2$); and (vi) teachers should be encouraged to set up a network of support within the school, to help

ease workload stress, and encourage a healthy working environment. All of these factors will help align provisions available in schools, and help enable the assessment of FMS in schools to be sustainable (19).

It is important to recognise that this questionnaire, in common with all such surveys, could be subject to response bias. As the questionnaire was online, and optional, it is likely that participants who volunteered to take part had some interest in FMS and/or FMS assessments. Thus, the respondents of this study may have responded in a more optimistic manner than Primary school teaching staff more generally. Moreover, due to the questionnaire being based online, it wasn't possible to measure 'actual' physical capability, and thus the questionnaire needed to rely on perceived capability to assess whether teachers would have the necessary skills to demonstrate FMS and accurately measure pupils' ability. Finally, the sample was relatively young, perhaps due to the manner in which the questionnaire was promoted, so the results may not accurately reflect the thoughts of older members of teaching staff.

Conclusion

A large proportion of teaching staff in primary schools would assess FMS if they had the training but the majority lack the expertise to do so (primarily due to a lack of training). Equipment and opportunity do not appear to present barriers, with many predicting supportive senior leadership. It is likely that the lack of action relates to a lack of capacity to practically assess FMS in schools, due to time and training constraints of current assessments, together with the possibility of increased stress involved with needing to embed assessments alongside other provision. It is likely that current assessment tools are not acceptable, or feasible for use in schools, and thus there is a need for modification to existing measures, or the development of new tools which take into account the key considerations outlined in this paper.

Abbreviations

FMS

fundamental movement skills

EYFSP

early years foundation stage profile

COM-B

capability, opportunity and motivation model of behaviour change

TDF

theoretical domains framework

SPSS

statistical package for social sciences

HLTA

higher level teaching assistant

TA

teaching assistant
P.E.
physical education
SLT
senior leadership team

Declarations

Ethics approval and consent to participate

Ethical approval for this study was granted by the University of Leeds School of Psychology Ethics Committee (reference: PSC-591).

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

LHE was involved design of the study, data acquisition, analysis, interpretation of the data and drafting of the manuscript. LJBH was involved in designing the study, data analysis, interpretation of the data and substantive revisions to the manuscript. MMW was involved in designing the study and substantive revisions to the manuscript. NP was involved in designing the study and substantive revisions to the manuscript.

ADS and GM were involved in substantive revisions to the manuscript. DDB was involved design of the study, data analysis, interpretation of the data and substantive revisions to the manuscript.

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Tables

Table 1

Questionnaire items in relation to the COM-B model of behaviour change

			Construct Measured	
Variable	Questionnaire item	Reponses	Component of COM-B model	Component of TDF
Perceived knowledge	How knowledgeable do you think you are about motor skills that are defined as 'Fundamental Movement Skills'?	1)Not knowledgeable at all, 2) , 3) , 4) , 5)Extremely knowledgeable	Capability (psychological)	Knowledge
Actual knowledge	Which of the following motor skill do you think comprise 'Fundamental Movement Skills'?	Running, Handwriting , Hopping, Jumping, Using cutlery, Balancing, Dressing oneself, Throwing, Catching, Kicking, Brushing teeth, Riding a bike, Swimming	Capability (psychological)	Knowledge
Knowledge of relationship between FMS and outcomes	On a scale of 1-5, to what extent do you think the development of fundamental movement skills has an impact upon: <ul style="list-style-type: none"> · Academic attainment? · Participation in PA? · Mental Health? · Physical Health? · Social Relationships? 	1)No impact at all, 2).....3).....4).....5)Large impact	Capability (psychological)	Knowledge
Confidence Demonstrating	On a scale of 1-5, how confident are you that you could demonstrate	1)Not confident at all, 2)...3)...4)... 5)Extremely Confident	Capability (physical)	Physical Skills

the following activities:

- Running between two markers for 15 seconds?

- Throwing beanbags into a target box two metres away?

- Hopping between two markers one metre apart?

Holding a balance (e.g. standing on one leg) whilst passing a beanbag around your body?

Confidence Assessing

On a scale of 1-5, how confident are you that yourself and one other member of staff could assess five children simultaneously in the following activities:

- Running between two markers for 15 seconds?

- Throwing beanbags into a target box two metres away?

- Hopping between two markers one metre apart?

Holding a balance (e.g.

1)Not confident at all,
2)...3)...4)...
5)Extremely Confident

Capability (physical)

Physical skills

	standing on one leg) whilst passing a beanbag around your body?			
Assessment of FMS in school	Do you/your school currently assess fundamental movement skill proficiency?	Yes, No, Unsure	Opportunity (physical)	Environmental context and resources
Support from senior leadership	Do you think the senior leadership team at your school would be supportive if you wanted to assess fundamental movement skill proficiency in your class?	Definitely yes, Probably yes, Probably not, Definitely not	Opportunity (social)	Social influences
Access to additional support staff resource	Would you be able to access support from another member of staff (e.g. teaching assistant) to help you deliver an assessment of fundamental movement skills to a whole class?	Definitely yes, Probably yes, Probably not, Definitely not	Opportunity (physical)	Environmental context and resources
Access to equipment	Does your school have the following equipment: <ul style="list-style-type: none"> · 25 beanbags? · Chalk? · A sports hall larger than 5m x 5m? · Outdoor space larger than 5m x 5m? 	Yes, No, Unsure	Opportunity (physical)	Environmental context and resources

	<ul style="list-style-type: none"> · Stop watch? · Tape measure or metre ruler? 			
Acceptable assessment time	<p>Over the course of a single school week, once per academic year, how long do you think is acceptable to spend assessing the fundamental movement skills of :</p> <ul style="list-style-type: none"> · one child · a whole class? 	<p><u>Per Child:</u> < 10 minutes, 10-30 minutes, 30-60 minutes, 60-90 minutes, Up to 2 hours, 2 - 3 hours, 3 hours +</p> <p>-</p> <p><u>Per class:</u> < 10 minutes, 10-30 minutes, 30-60 minutes, 60-90 minutes, Up to 2 hours, 2 - 3 hours, 3 hours +</p>	Opportunity (physical)	Environmental context and resources
2 hour start of school year assessment	Do you think you have would be able to make time in the curriculum to spend two hours at the start of the school year evaluating your class' fundamental movement skills?	Definitely yes, Probably yes, Probably not, Definitely not	Opportunity (physical)	Environmental context and resources
Time in school day most suitable to assess FMS	What time of the day would you be most likely be able to find time to assess fundamental movement skills?	Physical Education (P.E.) lessons, Core lessons (Maths, English and Science), Other lessons (e.g. Languages and Art), After school, Before school	Opportunity (physical)	Environmental context and resources
Perceptions of ability to identify children who need support	Do you think a school based assessment of fundamental movement	Yes, No, Maybe	Motivation (reflective)	Optimism

through FMS assessment in schools	skills has the ability to identify children who need additional support?			
Perceived benefit of knowledge of pupils' FMS for teaching	On a scale of 1-5, how beneficial to your teaching would it be to have knowledge about your pupils' fundamental movement skills?	1)Not beneficial at all, 2)...3)...4)... 5)Extremely beneficial	Motivation (reflective)	Beliefs about consequences
Workload stress	Do you think that assessing childhood fundamental movement skills in school would increase your workload stress?	Definitely yes, Probably yes, Probably not, Definitely not	Motivation (automatic)	Emotion
Likelihood of assessing FMS	On a scale of 1-5, if you had training and support available, how likely would you be to assess the fundamental movement skills of the children in your class?	1)Not likely at all, 2)....3)... 4)....5)Extremely likely	Motivation (reflective)	Intentions & beliefs about capabilities
Peer influence	How likely would your decision regarding whether to assess the fundamental movement skills be influenced by the opinions of other teachers in your school?	1)Not likely at all, 2)....3)... 4)....5)Extremely likely	Motivation (reflective)	Professional/social role and identity

NB: TDF = theoretical domains framework (20)

Table 2

Demographic information

Demographic Variable	n	%
Gender		
Male	54	6.4
Female	788	92.9
Prefer not to say	6	0.7
Age		
18-25	170	20
26-35	345	40.6
36-45	203	23.9
46-55	113	13.3
56-65	17	2
66+	1	0.1
Highest Qualification		
General Certificate of Secondary Education	7	0.8
Advanced Subsidiary Level	2	0.2
Advanced Level	26	3.1
Undergraduate degree	280	32.9
Masters Degree	89	10.4
Professional Degree (e.g. PGCE)	441	52.1
Doctoral Degree	2	0.2
Job Role		
Teacher	701	82.3
Teacher Assistant	37	4.3
Headteacher	21	2.5
Special Educational Needs Coordinator	58	6.8
Other	83	9.7
Age Groups of Children Taught		
4-5 years	204	23.9
5-6 years	221	25.5

6-7 years	217	25.4
7-8 years	262	30.8
8-9 years	269	31.6
9-10 years	224	26.3
10-11 years	216	25.4
Type of School Taught In		
State	543	64.1
Private	66	7.8
Academy	212	25
Other	26	3.1
Training on FMS		
Yes	128	15.1
No	719	84.4

Table 3

Capability Results

Variable	N	%
Perceived knowledge of FMS		
1 (Not knowledgeable at all)	225	26.6
2	322	38
3	254	30
4	43	5.1
5 (Extremely knowledgeable)	3	0.4
Knowledge of FMS		
Running	615	72.2
Handwriting	317	37.2
Hopping	553	64.9
Jumping	626	73.5
Using cutlery	351	41.2
Balancing	736	86.4
Dressing oneself	371	43.5
Throwing	554	65
Catching	544	63.8
Kicking	489	57.4
Brushing teeth	290	34
Riding a bike	219	25.7
Swimming	214	25.1
All correct	356	48.1
All correct no incorrect	128	15
All answers on the list	111	13
All incorrect	118	13.8
All incorrect no correct	1	0.1
Knowledge of relationship between FMS and outcomes		
<i>Academic Attainment</i>		

1 (No impact at all)	3	0.4
2	34	4
3	223	26.3
4	350	41.1
5 (Large impact)	239	28.1
<i>Physical Activity</i>		
1 (No impact at all)	2	0.2
2	11	1.3
3	53	6.2
4	203	23.8
5 (Large impact)	579	68.3
<i>Mental Health</i>		
1 (No impact at all)	2	0.2
2	31	3.6
3	141	16.5
4	371	43.5
5 (Large impact)	301	35.6
<i>Physical Health</i>		
1 (No impact at all)	2	0.2
2	23	2.7
3	79	9.3
4	281	33
5 (Large impact)	462	54.2
<i>Social Relationships</i>		
1 (No impact at all)	8	0.9

2	57	6.7
3	220	25.8
4	385	45.2
5 (Large impact)	177	20.8

Table 4

Opportunity Results

Variable	N	%
Assessment of FMS in school		
Yes	128	15
No	403	47.3
Unsure	317	37.2
Support from senior leadership		
Definitely yes	212	24.9
Probably yes	524	61.5
Probably not	109	12.8
Definitely not	3	0.4
Access to additional support staff resource		
Definitely yes	276	32.4
Probably yes	387	45.4
Probably not	149	17.5
Definitely not	36	4.2
Access to equipment		
<i>25 beanbags</i>		
Yes	696	81.7
No	77	9
Unsure	75	08.8
<i>Chalk</i>		
Yes	774	90.8
No	35	4.1
Unsure	38	4.5
<i>Sports hall larger than 5x5 metres</i>		
Yes	741	87
No	69	8.1

Unsure	37	4.3
<i>Outdoor space larger than 5x5 metres</i>		
Yes	832	97.9
No	11	1.3
Unsure	5	0.6
<i>Stopwatch</i>		
Yes	789	92.3
No	25	2.9
Unsure	37	4.3
Acceptable assessment time		
<i>Per child</i>		
<10 mins	393	46.1
10-30 mins	327	38.4
30-60 mins	73	8.6
60-90 mins	13	1.5
Up to 2 hours	8	0.9
2-3 hours	3	0.4
3 hours+	2	0.2
<i>Whole class</i>		
<10 mins	5	0.6
10-30 mins	80	9.4
30-60 mins	205	24.1
60-90 mins	166	19.5
Up to 2 hours	132	15.5
2-3 hours	113	13.3
3 hours+	132	15.5

Two hour start of school year assessment		
Definitely yes	194	22.8
Probably yes	478	56.1
Probably not	157	18.4
Definitely not	18	2.1
Time in school day most suitable to assess FMS		
PE lessons	730	85.7
Core lessons	22	2.6
Other lessons	17	2
After school	13	1.5
Before school	20	2.3

Table 5

Motivation Results

Variable	N	%
Confidence Demonstrating		
<i>Running between two markers</i>		
1 (not confident at all)	1	0.1
2	12	1.4
3	62	7.3
4	152	17.8
5 (extremely confident)	621	72.9
<i>Throwing beanbags to a target</i>		
1 (not confident at all)	2	0.2
2	12	1.4
3	121	14.2
4	242	28.4
5 (extremely confident)	472	55.4
<i>Hopping between two markers</i>		
1 (not confident at all)	5	0.6
2	21	2.5
3	94	11
4	194	22.8
5 (extremely confident)	531	62.3
<i>Holding a balance whilst passing a beanbag</i>		
1 (not confident at all)	4	0.5
2	37	4.3
3	132	15.5
4	227	26.6
5 (extremely confident)	446	52.3

Confidence assessing		
<i>Running between two markers</i>		
1 (not confident at all)	1	0.1
2	28	3.3
3	176	20.7
4	278	32.6
5 (extremely confident)	363	42.6
<i>Throwing beanbags to a target</i>		
1 (not confident at all)	1	0.1
2	25	2.9
3	133	15.6
4	300	35.2
5 (extremely confident)	388	45.5
<i>Hopping between two markers</i>		
1 (not confident at all)	2	0.2
2	33	3.9
3	155	18.2
4	291	34.2
5 (extremely confident)	364	42.7
<i>Holding a balance whilst passing a beanbag</i>		
1 (not confident at all)	7	0.8
2	42	4.9
3	160	18.8
4	286	33.6
5 (extremely confident)	352	41.3
Perceptions of ability to identify children who need support through FMS assessment in schools		

Yes	618	72.5
No	14	1.6
Maybe	216	25.4
Perceived benefit of knowledge of pupils' FMS for teaching		
1 (not beneficial at all)	2	0.2
2	42	4.9
3	251	29.5
4	322	37.8
5 (extremely beneficial)	229	26.9
Workload stress		
Definitely yes	94	11
Probably yes	394	46.2
Probably not	330	38.7
Definitely not	30	3.5
Likelihood of assessing FMS		
1 (not likely at all)	3	0.4
2	45	5.3
3	190	22.3
4	322	37.8
5 (extremely likely)	285	33.5
Peer influence		
1 (not likely at all)	44	5.2
2	84	9.9
3	226	26.5
4	380	44.6
5 (extremely likely)	114	13.4

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [supplement4.docx](#)