Developing fundamental motor pattern analysis skills using online mastery-based modules: Comparing different groups

Bryan Nardo (B.Sc. Candidate) & Nicholas Vachon (B.Sc. Candidate)
Advisors: Helena Baert (Ph.D.), Matthew Madden (Ph.D.), Larissa True (Ph.D.)

Introduction
Physical education (PE) teachers must observe, assess, and analyze motor skills in order to enhance their students’ skills. As children develop, a variety of locomotor, manipulative, and non-locomotor skills are learned (Gallahue, 1989). Children are developing across the various stages of motor development, and are learning how to move more efficiently and effectively. A physical education teacher must develop the ability of analyzing basic fundamental movement skills (FMS) to ensure that children become physically literate. Teacher candidates enrolled in the SUNY Cortland PE program complete a motor development course and field experience during the first block of their curriculum. Content specialty exam data have revealed that motor skill analysis proved to be a challenge when compared to other pedagogical competencies analysis.

Purpose
The purpose of this study was to investigate the effects of motor development content modules of three skills (balance, jumping, and ball rolling). The individuals who participated in this study were recruited and randomly assigned their role. This poster presents data comparing the pre- and post-test results from students with different experience levels.

Research Questions
What are the differences in scores between the two experience levels (students with and students without FMS analysis experience)?
1. For the total group (control + experimental), are there differences in pre-test scores in the two levels?
2. For the total group (control + experimental), are there differences in post-test scores in the two levels?
3. For the experimental group only, are there differences in pre-test scores in the two levels?
4. For the experimental group only, are there differences in post-test scores in the two levels?

Methods
Participants: Two groups: teacher candidates without fundamental motor skill analysis experience (No FMS) (n=38) and those with fundamental motor skill analysis experience (Some FMS) (n=18).
Instrumentation: All students completed an online pre- and post-test. The test included videos of young movers that required the participants (Teacher Candidates) to assess the FMS by answering multiple questions upon completion.

Data Analysis:
• Q1/2: An independent samples t-test was run to determine if there were differences in pre-test scores between the No FMS experience students (n=38) and Some FMS experience students (n=18).
• Q3/4: An independent samples t-test was run to determine if there were differences in post-test scores between the No FMS (n=17) and Some FMS students (n=18) who were in the experimental group.

Results

<table>
<thead>
<tr>
<th>Test Scores (Total Group)</th>
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</thead>
<tbody>
<tr>
<td>No FMS</td>
</tr>
<tr>
<td>Pre-Test</td>
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<tr>
<td>Post-Test</td>
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</tbody>
</table>

**Q1.** The Some FMS students demonstrated higher pre-test scores ($M = 77.22, SD = 19.94$) than did the No FMS students ($M = 57.11, SD = 21.55$), a difference that was statistically significant, $M = 20.12, 95\% CI [8.038, 32.196]$, $t(54) = -3.339, p < .002$. 

**Q2.** The Some FMS students demonstrated higher post-test scores ($M = 102.78, SD = 13.20$) than the No FMS students ($M = 72.89, SD = 23.56$), a difference that was statistically significant, $M = 29.88, 95\% CI [17.90, 41.861]$, $t(54) = -5.002, p < .0005$. 

<table>
<thead>
<tr>
<th>Test Scores (Experimental)</th>
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<tbody>
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<td>No FMS</td>
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<tr>
<td>Post-Test</td>
</tr>
</tbody>
</table>

**Q3.** The Some FMS students demonstrated higher pre-test scores ($M = 77.22, SD = 19.94$) than did the No FMS students ($M = 58.24, SD = 28.56$), a difference that was statistically significantly different, $M = 18.987, 95\% CI [2.129, 35.848]$, $t(33) = -2.291, p < .05$. 

**Q4.** The Some FMS students demonstrated higher post-test scores ($M = 102.78, SD = 13.20$) than the No FMS students ($M = 88.82, SD = 20.88$), a difference that was statistically significantly different, $M = 13.95, 95\% CI [2.014, 25.895]$, $t(33) = -2.921, p < .05$. 

Discussion
• The Some FMS students may have scored higher on the pre-test because they have been enrolled in the PE program longer. They have more exposure to content than the No FMS students. The Some FMS students have had more opportunities to assess and analyze movement skills.
• In the experimental group, both pre and post-test scores are higher for the Some FMS students. However, the post-test scores are significantly higher than the pre-test scores. The experimental group were exposed to more content through the completion of the modules which resulted in an increase of their post-test scores.

Implications for Practice
• According to the results, the online modules would be more useful to incorporate in initial program courses that focus on motor development and movement analysis.
• With an earlier exposure to FMS, teacher candidates will have a higher potential for growth by completing mastery-based learning supplements focusing on content knowledge. Consequently, teacher candidates would benefit from a supplement where they are provided with more practice in skill analysis.
• The module would still be effective to use during the later course work, however, it would be used as a way to reinforce or review the material instead of introducing it. Planned strategic redundancy is key for beginning teacher candidates.

Acknowledgements
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