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Filling the gap. Clinical skill acquisition with interactive online modules to supplement traditional instruction

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Background and Purpose

- Online resources are highly favored to augment learning especially by millennials for convenience, self-paced content, and versatility in learning styles.[1] E-learning platforms are as effective as traditional face-to-face instruction but may be best utilized as an adjunctive resource for teaching psychomotor skills.[2-5]
- There are no studies investigating the use of online technologies to supplement range of motion (ROM) skill acquisition and an overall deficiency regarding interactive learning platforms in doctor of physical therapy (DPT) curriculum.
- During the last two years at one institution, only about half of the class passed the ROM lab practical on the first attempt.
- Requests by students for a supplemental resource beyond the textbook, as well as faculty searching for an option that would appeal to the millennial generation and address common errors, led to the development of interactive e-learning modules to fill in the gap.

- Purpose: To assess the effectiveness of interactive e-learning modules to supplement traditional instruction for ROM clinical skill acquisition in a DPT curriculum.
- Hypothesis: Modules would be highly regarded, utilized by students, and result in increased lab practical pass rates.

Methods

Study Participants: 52/53 first-year DPT students consented to participate in this study.

Study Design: This was a prospective cohort study about supplemental modules created by a faculty-student team to be highly engaging and media rich where the learner decides the pace and order of content delivered. Embedded quizzes provided immediate feedback for the learner to reflect on their understanding (Figure 1).

Students were randomly divided into two groups with one group receiving access to the upper extremity (UE) modules and the other having access to the lower extremity (LE) modules. To reduce the crossover effect between the groups and maintain the integrity of the study, students were educated on the importance of only viewing the modules they had access to and faculty were blinded to group assignment. Mid-way through the semester all students had the option to choose if they wanted access to the last set of modules focused on the spine.

Use of Modules in the Course: Modules supplemented 4 labs with faculty demonstrations, peer practice and lab assistant feedback. Students were assessed by a high-stakes lab practical of ROM measurements on a standardized patient: UE, LE and spine.

Analysis: Exact Chi-square tests were used to determine associations between groups for lab practical pass rates. Logistic regression was used to analyze differences between cohorts by year (α =.05).

Results

Data was analyzed from 44/52 students. 8 students were excluded (6 for not using the modules, 1 had previously taken the class, 1 viewed modules not of their assigned group). 34 females and 10 males with a mean age of 23 years (21-28), who reported race as Caucasian (n=41), Asian (n=2), and Hispanic (n=1).

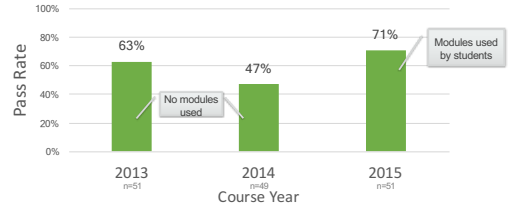
Pass Rate
High stakes lab practical with standardized patient
- Significant difference observed in first time pass rates between 2015 and 2014 (p=0.02), but no difference for 2015 and 2013 (p=0.40).

Confidence Rating
Self-reported confidence of performing the skill (0=not confident, 10=very confident)
- Average student confidence at start: 4.3/10
- Average student confidence at end: 9.0/10

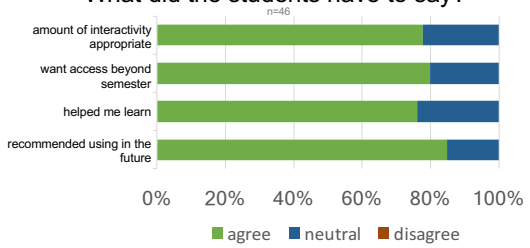
Module Usage
Learning management system analytics & self-report
- Average use per student during the semester: 2.4 hours (range: 10 min - 7 hours)

Student Satisfaction
Anonymous end of semester course assessment
- All students opted in for use of the spine modules when given the choice
- Favorable reports of interactivity, helping students learn, recommended use in the future and desired access beyond the semester.

What was the first-time lab practical pass rate?



What did the students have to say?



Modules

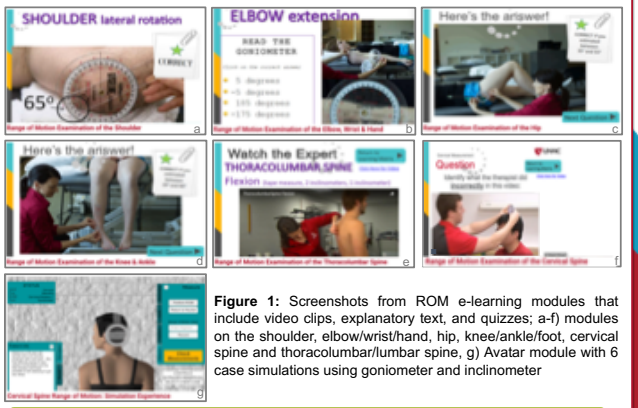


Figure 1: Screenshots from ROM e-learning modules that include video clips, explanatory text, and quizzes; a-f) modules on the shoulder, elbow/wrist/hand, hip, knee/ankle/foot, cervical spine and thoracolumbar/lumbar spine, g) Avatar module with 6 case simulations using goniometer and inclinometer

All modules available open access on the UNMC E-Gallery
www.unmc.edu/egallery

Conclusions

- There were significant improvements in first time pass rates from the previous year when the modules were not available.
- The modules were well utilized by the students, increased confidence, and had a high rate of satisfaction.
- This platform for supplemental materials should be strongly considered for attainment of ROM psychomotor skills and could be valuable for instruction of other foundational clinical skills in physical therapy.
- Strengths include outcomes that went beyond student satisfaction.
- Limitations include a small sample size from a single institution, and the inherent inaccuracies in students recall of self-reported data.

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