Usability and Usefulness of VSTEP Examination Suite: Faculty Perspective

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ABSTRACT

VSTEP Examination Suite, a battery of evidence-based standardized assessments for persons post-stroke was evaluated as a teaching tool by physical therapy faculty. Six faculty from the US and Israel assessed the system using a talk aloud procedure. Transcripts were coded deductively with *a priori* themes of usability, usefulness, and suggestions and then inductively for emergent themes. Deductive codes were represented with frequencies and valences. The VSTEP Examination suite was viewed as useful and usable with themes emerging related to clinical reasoning, teaching and reliability.
The system is being iterated and tested with students.

1.   INTRODUCTION

Outcome measurement using standardized tests is a cornerstone of rehabilitation. Validity and reliability of the assessments are two requirements to assure the appropriate selection and administration of the instruments. Lack of time and knowledge and ability to interpret the of standardized assessments have been documented as barriers to apply them in physical therapy clinical practice (Jette 2009, Salbach, 2011). The VSTEP Examination Suite was developed as a training and clinical tool to address some of these barriers. The purpose of this study was to evaluate the usability and usefulness of VSTEP Examination Suite from the perspective of physical therapy faculty.

2.   METHODS

2.1   VSTEP Examination Suite

The VSTEP Examination Suite is an evidence-based battery of self-reported and performance-based assessments of balance, mobility, coordination and balance confidence. The system uses the Kinect camera to capture kinematics of selected tests and visual displays to facilitate administration. Each test has a set-up and test administration diagram, as well as an instructions and results screen. (Fig 1). The tests were selected using a subset of assessments from the Stroke EDGE II task force for persons with stroke (see link in references) that would be compatible with a camera system, vetted through focus groups with clinicians and further refined based on the Clinical Practice Guidelines for Outcome Assessment (Moore). It consists of five assessments: 2 performance-based tests in which kinematics are collected Five Times Sit-to-Stand (5XSTS) and Four-Square Test (4SQT), 2 performance-based tests in which the results are recorded 10 Meter Walk Test (10MWT) and 6 Minute Walk Test (6MWT), 1 self-report test, the Activities Balance Confidence Questionnaire (ABC).

Figure 1. Graphical User Interface sequence for instructions and results screens of the 5X Sit-to-Stand

2.2   Method

Participants were faculty in physical therapy programs in the United States and Israel who taught outcome assessments. Data were collected using a talk aloud procedure where faculty, either individually or in pairs used the VSTEP Examination Suite and executed the ABC, 5XSTS, 4SQT, 10 MWT and 6 MWT. The session was audio-recorded, transcribed and entered into NVIVO Pro 11. Content analysis was performed using deductive reasoning

with three *a priori* themes of Usefulness, Usability and Suggestions assigned positive, negative or neutral valence. Summary Statements were extracted based on the *a priori* themes, and emergent categories and themes were extracted (by three raters) using inductive reasoning of the summary statements (Hsieh 2005, Merriam 2009)

3.   RESULTS

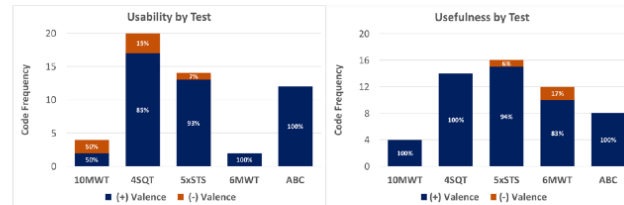### 3.1   *Frequency and Valence of Usability and Usefulness Codes*

Figure 2. Frequency of Usefulness and Usability and the percent of positive (dark color) and negative (light color) valence comments. Codes were primarily rated with a positive valence.

3.2   *Themes*

1. *FEATURES PROMPTED CLINICAL REASONING:* graphical representation of results, normative values, comments feature, assistive devices, sequential results allow for tracking progress, related to clients, bundling.
2. *TEACHING TOOL:* instructions for tests, bundling of materials and documentation, interpreting the results (clinical meaning and movement pattern), patient explanations, comments to interpret test modification or failure
3. *RELIABILITY IN TEST ADMINISTRATION AND INTERPRETATION:* standardized instructions provided before every exam, setup diagrams with distances labeled, cue for re-testing patients
4. *PREVIOUS KNOWLEDGE:* may affect test administration and interpretation (4SQT, ABC, 5XSTS) "even if they are professors!"
5. *CAMERA CHANGES THE WAY YOU CAN PERFORM THE TEST:* ascribe features to the system that it does not have, such as counting laps and automated start/end of trials
6. *USABILITY Navigation:* organization is intuitive (positive valence), *Ease of administration*: instructions and images (positive valence) *Graphical Representation*: needs labeling (negative valence)

4.   DISCUSSION and CONCLUSIONS

Faculty using the VSTEP Examination Suite determined it was usable and useful. It may be used as teaching tool as it was consistent with clinical reasoning, supported pedagogy and ensured reliability of testing. Interestingly, previous knowledge influenced the administration and interpretation of tests, re-enforcing the importance of having a consistent and vetted approach for instruction. As with any system there were suggestions to enhance its capabilities and improve existing features. However, usability was supported. The value of the VSTEP as a teaching tool will benefit from assessing student perspectives.

5.   REFERENCES

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