A Qualitative Study on Occupational Therapy Students' Perceptions of Using Keyform Maps

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Abstract

A keyform map is an innovative tool, derived from Rasch analyzed measures, that reveals the relationship of a client to the item challenges on an assessment to reflect more clearly what the client can and cannot do. These maps offer increased ease and efficiency when using standardized evaluation measures. Keyform map use has been studied in clinical occupational therapy practice. Their use in occupational therapy education, however, has not been studied which creates a potential gap with the untapped student stakeholder. This qualitative study examined the impacts of using keyform maps in an online course with occupational therapy students during the evaluation and intervention planning process for different client case vignettes. A constant comparative analysis revealed that students perceived keyform maps show them two themes more clearly: (1) the just right challenge that is difficult but not impossible and (2) a task hierarchy that helps efficiently prioritize and justify choices specific to the client and decisions personalized to the client. By introducing pre-service learners to keyform maps, OT educators can take a huge step forward in meeting the profession's charge to increase efforts towards personalized measurement.

Keywords: keyform maps, personalized measurement, occupational therapy education, Rasch analysis

1. Introduction

The occupational therapy (OT) evaluation process typically requires the occupational therapist to administer a variety of assessments related to a client's ability to perform and participate in meaningful everyday activities (AOTA, 2020). Research, however, has found limited use of standardized assessments in occupational therapy (OT) practice (Velozo & Woodbury, 2011). The disproportionate use of non-standardized assessments to inform intervention planning is troubling in an era of evidence-based practice which implicitly mandates the use of standardized assessments. Even more troubling is that when standardized assessments are used, Velozo (2021) noted that the scores "go into the abyss" (p.2) and are rarely integrated meaningfully into practice. In the 2020 Eleanor Clarke Slagle Lecture, Dr. Craig Velozo (2021) addressed this concern head on and issued a professional call to action to embrace a personalized approach to measurement that "focuses on the client and provides a picture or pattern of the client's performance on our instruments" (p.1).

Keyform maps have been described as a possible tool to keep data out of the abyss and help clinicians incorporate assessment findings into practice in more meaningful and person-centered ways. Keyform maps are graphical representations which use a Rasch measurement model to convert raw standardized scores into a visual display of how a client actually performed task items. Given that keyform maps are ordered around a statistically derived item hierarchy from easiest (located at the bottom) to hardest (located at the top) instead of the order in which the questions appear on the assessment, it becomes easy for the clinician to quickly visualize the relationship between the client's performance and the level of difficulty of the task item (Velozo, 2021). More importantly, the maps allow the therapist to select interventions and develop goals in a more personalized manner based on the just-right challenge for each particular client.

Use of keyform maps has been published in occupational therapy clinical practice (Grattan, Velozo, Skidmore, Page, & Woodbury, 2019); however, the use of keyform maps in occupational therapy education is currently limited to an unpublished doctoral capstone (Sears, 2021). This is noteworthy since accreditation standards for entry-level occupational therapy education programs require evidence that learners meet benchmarks and competencies associated

with administering standardized assessments and synthesizing clinical assessment information across a variety of practice settings. Specifically, the American Council for Occupational Therapy Education (ACOTE) mandates the following related educational and training standards for entry-level practice:

- B.4.2 Demonstrate clinical reasoning to evaluate, analyze, diagnose, and provide occupation-based interventions to address client factors, performance patterns, and performance skills.

- B.4.4 Interpret evaluation findings of occupational performance and participation deficits to develop occupation-based intervention plans and strategies. Intervention plans and strategies must be client centered, culturally relevant, reflective of current occupational therapy practice, and based on available evidence.

- B.4.7 Interpret criterion-referenced and norm-referenced standardized test scores on the basis of an understanding of sampling, normative data, standard and criterion scores, reliability, and validity

- B.4.9 Design and implement intervention strategies to remediate and/or compensate for functional cognitive deficits, visual deficits, and psychosocial and behavioral health deficits that affect occupational performance (Accreditation Council for Occupational Therapy Education [ACOTE], 2018, pp. S39, S41).

Moreover, effective evaluation and intervention planning skills are so crucial to entry-level practice that the American Occupational Therapy Association's Fieldwork Performance Evaluation (FWPE) for the Occupational Therapy Student addresses both areas with nine separate skill competencies that include stating precise and sensible reasoning for intervention choices, utilization of evidence to inform intervention decisions, selection of relevant, client-centered and motivational occupations that challenge clients, and the ability to implement, modify, update and document client intervention progression (American Occupational Therapy Association [AOTA], 2020). As such, occupational therapy educators can answer this call to action in part by teaching learners explicitly about keyform maps and providing opportunities to practice using them in various learning activities (Sears, 2021).

2. Purpose of the Study

The purpose of this study was to qualitatively evaluate the impact of an online, non-credit course designed to introduce preservice occupational therapy learners to personalized measurement and keyform ability maps. It was assumed that learners who enrolled in the course would complete all modules, discussion posts, and self-check quizzes. Given that preservice learners have not yet established practice-based habits, they were considered a untapped stakeholder group who could also benefit from explicit education and training on the use of keyform maps to apply person-centered measurement in practice.

3. Research Question

The research question was: How do occupational therapy students describe their experiences of using keyform maps in an online "Keyform Mapping" course?

4. Participant Details

Eligible research participants were purposively selected from a small, private liberal arts university in the Southeastern United States and were currently enrolled in the second didactic year of their entry-level Master of Science in Occupational Therapy (MSOT) program at either the main campus or its affiliated branch campus. Invitations to participate in the study were offered to 82 eligible students. Forty-six students accepted the invitation and completed the online "Keyform Mapping" course.

The majority (96%) of the participants identified as female; two identified as male. All 46 participants had previously completed three, one-week level 1 clinical occupational therapy fieldwork experiences. Forty students (87%) identified ethnically as Caucasian, two (4%) as African American, two (4%) as Asian, and two (4%) as Hispanic. Twenty-six (57%) attended classes on the main campus, and 20 (43%) were enrolled on the branch campus.

5. Intervention

The intervention consisted of a self-directed study, non-credit course introducing keyform maps, their use and application in the OT process. The online course was designed and offered through the University's learning management system, Canvas. The course was accessible through the student's laptop, phone or other technology source that supports the Canvas system. The intervention directed study course took place for a period of 30 days with the course opening on Saturday, December 12th, 2020, and remaining open through Monday, January 11th, 2021, during the students' winter break one month prior to students leaving for their first level II fieldwork experience. Students navigated the online course modules independently during the dates and times of their choosing. The course consisted of seven-unit modules including:

- Impacts of cognitive load to introduce the theory behind why the keyform maps will support the student's assessment and intervention planning skills.

- The history and purpose of Rasch analysis to support measurement and personalized therapy planning.

- The use of keyform maps as a cognitive prosthetic for activity analysis, goal setting, and treatment planning.

- keyform functional maps as a logical rationale for client centered intervention plans.

- Locating, selecting, and administering keyform functional maps relevant to client needs

- Synthesizing results of keyform maps to find patterns for problem solving client's needs

- Mastering personalized intervention planning and effective documentation writing using keyform maps

Units of instruction 1 and 2 ended with content self-check quizzes and units 3 through 7 included client cases, self-checks, and interactive discussions. The course also included a keyform functional map library as a module. The course concluded with a case study challenge that required the submission of a comprehensive client case that benefited from the use of keyform functional maps to support assessment, establishment of goals, and an intervention plan with activities. To offer the students an opportunity to practice in their preferred area of focus for their upcoming fieldwork level II placement, an option to choose from six unique client cases from a variety of client populations including orthopedics, stroke recovery, pediatrics, geriatrics, acute care, school systems, and mental health was given. The qualitative analysis was derived from the interactive case related discussion posts.   The average time spent in the directed study course over the 30-day period was just over 13 hours with times ranging from 2.5 hours to 115 hours.

6. Method

The authors used a descriptive qualitative design to answer our research question. All students provided consent for their discussion posts to be analyzed for research and quality improvement purposes. Learners participated in three discussion board activities that required them to use keyform maps. Ethical principles of research were closely protected throughout the entire data collection process, including ensuring that all data collection materials were kept confidential and secure. The first author solely developed the didactic content for all course modules and served as the instructor on record for this non-credit bearing course. This study was approved by the University's Institutional Review Board (IRB).

The authors reviewed each discussion board post submitted by students in the study and lifted sections from any responses that related to the phenomenon of using keyform maps. These statements were pasted into a separate Microsoft Word (Redmond, WA) document in a deidentified manner. A total of seven single spaced pages of text resulted. Data were analyzed manually and independently by each author respectively (Miles & Huberman, 1994).

The authors used the constant comparative method (Miles & Huberman, 1994) and three distinct coding techniques described by Saldaña (2013). *In vivo* and open coding was used to identify codes that reflected the participants' exact words and key ideas from small segments of text. Axial coding techniques were used to identify redundant codes, consider synonyms, explore essential features and properties of the phenomenon, and dominant themes and subthemes. Lastly, selective coding was used to identify a core category that related to all identified themes and subthemes and helped to explain the phenomenon globally.

Qualitative researchers must intentionally and systematically consider many ethical principles and guidelines to preserve a balance of trust between the scientific community and society at large (Petousi & Sifaki, 2021). To establish trustworthiness and rigor, the authors developed research memos and completed member checking with two participants. The primary author sent initial themes back to the two participants for feedback. Both participants confirmed the truthfulness of the themes and subthemes and supporting quotes. Several memos were created and included in an audit trail to elucidate our thinking and decision-making process. Verbatim statements were chosen to illustrate the themes and subthemes and are included in the Results section.

7. Results

As a result of following three cycle coding: open, axial, and selective and using a constant comparative approach, one broad category, 2 themes, and 2 subthemes emerged. The major category to which all themes relate is: *keyforms show them things more clearly.* Themes, subthemes, and open codes are provided in the table below:

Table 1. Open, axial, and selective coding applied in the study

Core Category and Axial Coding	Open Coding (in vivo)
Keyforms show them things more clearly	
The just-right challenge that is difficult but not Impossible	just-right challenge
	success
	can do
	still able to do
	struggles with
	avoid impossible
	transition zone
	hard enough but not too hard
	difficult versus easy
	challenging things
A task hierarchy that helps efficiently prioritize and justify	
	task hierarchy
	priorities
Choices specific to the client	best choice for their interests
	motivating for them
	clear choice for them
	specific to the client
Decisions personalized to the client	client's abilities
	clinical rationale
	clinical justification
	client's goals

The first theme related to what keyforms show more clearly was ***the just-right challenge that's difficult but not impossible.*** Students described the importance of being able to provide clients with an intervention that was challenging enough to give them something to work towards but not impossible. Modifying interventions activities so that they become progressively more challenging is a foundational professional strategy for supporting clients to make changes in occupational performance. Moreover, disciplinary wisdom upholds the important link between leveraging a client's motivation to work towards goals and the just-right challenge. When therapists ask a client to engage in tasks that are either too easy or nearly impossible, motivation for therapy can erode quickly.

The theme of ***the just-right challenge that's difficult but not impossible*** was expressed by one of the participants as "brushing teeth was the best choice for the just-right challenge because in the keyform it showed it was not too difficult or too easy for her." Another learner used the keyform map and the client's stated interests in the case to consider "donning a backpack is hard for Polly (name of client in the fictional case vignette) but not the hardest skill on the assessment. I think it makes it the most realistic choice for a long-term goal, because it falls just outside the range, the just-right challenge." Another learner felt similarly and stated, "Getting dressed would be too difficult for her and drinking from a cup feels like it may be too easy for her. Using the keyform map and Polly's interests, I felt that brushing her teeth would be the best just-right challenge."

Analysis of discussion board posts revealed that keyform ability maps also showed a second theme more clearly: ***a task hierarchy that helps efficiently prioritize and justify***. Moreover, two subthemes were also identified related to what information was efficiently prioritized and justified: ***choices specific to the client*** and ***decisions personalized to the client.***

Choices specific to the client was expressed by participants as different task items associated with occupational therapy assessments. As mentioned earlier, a keyform ability map presents a task hierarchy based on how statistically easier it is to perform a task item relative to another task item. The item-difficulty hierarchy helps the clinician choose intervention activities that matter occupationally to the client. One student wrote, "…the keyform shows that Victor (client name in a fictional case vignette) has made the most progress in many of his IADL (instrumental activities of daily living) tasks, such as taking off his shoes, brushing his teeth, and holding the handles of his bike. Areas that he has made improvement but may need more work on [in occupational therapy], is pushing buttons, picking up small items, self-feeding with a utensil, and turning the pages of a book." Choosing activities to include in therapy sessions was

justified by using the map to better identify a client's skills and strengths while also identifying areas that need improvement and should be targeted in therapy. While using the findings from the keyform map, one learner stated "Currently his strengths include doffing his socks and shoes, brushing his teeth, steadying himself, pushing large objects across the floor, and using appropriate gestures all with his affected arm. He struggles with consistently using his affected arm to point at objects, push buttons, self-feed with a fork or spoon, throw a ball, and reach for an object above his head," which were activities the learner prioritized to include in future therapy sessions.   Task difficulty was also used by a learner to justify that "donning a backpack is one of the harder tasks on the list. This is just above her current capabilities, which makes it a good task to focus on creating independence. Polly is also about to start school and being able to don and doff her backpack is a skill she will need at school."

Decisions personalized to the client, the second subtheme, exclusively related to deciding on short-term and long-term therapy goals. Specifically, the task hierarchy supported participants in prioritizing easier tasks as short-term goals and harder tasks as long-term goals. In response to a clinical case vignette, one student noted, "for short-term goals, I would address traveling and social life as short-term goals, as they scored within the transition zone on the keyform. For long-term goals, I would address pain management and sex life, as they fell into the harder categories and were scored lower on by Bruce (a fictional client in a case vignette)." Another learner considered keyform data to justify a long-term goal; According to the learner's rationale, "based on the difficulty of the tasks, it seemed that the buttoning up trousers and shirts would be way too hard for her…and the long-term goals should be right above the short-term goals on the hierarchical list. Thus, making sense that putting on a backpack would be a LTG (long-term goal)." Another student noted a similar justification, "donning a backpack was the best choice for a long term goal because it relates directly to the occupation of being a student. I think this choice is motivating, because Polly will want to be able to do the same thing as other students. Also, via the assessment donning a backpack is hard for Polly but not the hardest skill on the assessment. I think it makes it the most realistic choice for a long-term goal, because it falls just outside the range of the just-right challenge."

8. Conclusion

This study revealed that students found that keyform maps show them things more clearly. The maps supported their ability to see the just-right challenge for the client by revealing tasks that were difficult but not impossible. They were also able to use the keyform maps to conceive an efficient process that allowed them to prioritize and justify choices specific to the client and make personalized decisions for the client case that prior to the map use were reported as inefficient and based almost entirely on trial and error.

9. Implications and Significance for OT Education, Research and Practice

The findings from this study have direct implications for occupational therapy educators.   Student experiences reflect that keyform maps helped them visualize elements of the occupational therapy process more clearly and efficiently. By introducing keyform maps in OT education and supporting student use of the maps as a visual aid for the complex OT process, educators can simplify and clarify the complex OT process and reduce cognitive load as an instructional design support (Sweller, Van Merrienboer, & Paas, 1998). Understanding and using the keyform maps allows students to tether the client's skills and abilities to their client's story to create a personalized plan of care that is supported by empirical evidence versus trial and error or solely based on client collaboration without the use of data.

This study opens the door to expanded research on the use of keyform functional maps as an innovative tool to be used in OT education to support activity analysis, standardized assessment use, goal writing, personalized intervention planning, as well as the potential use of keyform maps to help prepare or remediate students for fieldwork experiences. OT educators may also consider using keyform maps as a clinical conversation tool when reviewing the OT process using a case example and as an evidenced-based rubric for assessing accuracy with case study assignments. Finally, by introducing pre-service learners to keyform maps we can take a huge step forward in meeting the 2020 Slagle call to action to "lead health care in implementing person-centered measurement" (Velozo, 2021, p. 11) and mitigating recent findings that suggest clinicians have limited knowledge of keyform maps and an understanding of how to use them in occupational therapy practice (Grattan et al., 2019).

10. Limitations

This study provided an analysis of one particular course with one particular cohort of learners. Thus, the results of this study are not generalizable to other situations or populations. Due to COVID-19 restrictions and changes to the schedule of fieldwork experiences, the course had to be offered during a holiday break. The authors of this study also had well established relationships with the students at the time they enrolled in the course which could have created an inherent bias in both how students described the usefulness of the keyform maps and how the authors interpreted their experiences. Future studies should include other student populations and learning activities. Because this study did not

include pretest or posttest, future studies may want to consider objectively measuring the impact of keyform use on certain clinical competencies.

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