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## The Development of an Interactive Multimedia E-Learning Module for Functional Cognition

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# The Development of an Interactive Multimedia E-Learning Module for Functional Cognition

## Abstract

The rise in technology, social media, and video has led to the desire for short, interactive, and visually appealing instructional materials. Modern learners want flexibility, repeatability, accessibility, and low-stakes knowledge checks. A multimedia e-learning module may meet the learner's desires. This article describes the conception, development, and implementation of a free, interactive, multimedia e-learning module designed to enhance understanding and application of occupational therapy (OT) theoretical approaches to address functional cognition. We discuss the considerations for choosing a multimedia e-learning module as an instructional tool, drawing from existing research demonstrating its effectiveness. Particularly, a multimedia e-learning module potentially benefits addressing complex topics such as functional cognition, and to our knowledge there appears to be no open-access e-learning modules on OT's role in addressing functional cognition. As this multimedia e-learning module is publicly available and provides opportunities for repeated use by many learners, its applicability extends beyond the classroom to practitioners. This article may guide future OT educators considering creating this teaching modality by detailing the development processes, skills, and supports needed for module creation. We outline collaborative team roles and responsibilities, the development timeline, incorporation of multimedia elements, and integration of accessibility features. We report on how tools and resources influenced the creation and assessed the use of our multimedia e-learning module. We highlight the benefits, challenges, and barriers to creating a multimedia e-learning module for a development team. Overall, developing a multimedia e-learning module is one way to contribute to the profession and promote scholarship among OT faculty and students.

## Keywords

Interactive multimedia e-learning module, innovation, occupational therapy, functional cognition

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## The Development of an Interactive Multimedia E-Learning Module for Functional Cognition

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### ABSTRACT

The rise in technology, social media, and video has led to the desire for short, interactive, and visually appealing instructional materials. Modern learners want flexibility, repeatability, accessibility, and low-stakes knowledge checks. A multimedia e-learning module may meet the learner's desires. This article describes the conception, development, and implementation of a free, interactive, multimedia e-learning module designed to enhance understanding and application of occupational therapy (OT) theoretical approaches to address functional cognition. We discuss the considerations for choosing a multimedia e-learning module as an instructional tool, drawing from existing research demonstrating its effectiveness. Particularly, a multimedia e-learning module potentially benefits addressing complex topics such as functional cognition, and to our knowledge there appears to be no open-access e-learning modules on OT's role in addressing functional cognition. As this multimedia e-learning module is publicly available and provides opportunities for repeated use by many learners, its applicability extends beyond the classroom to practitioners. This article may guide future OT educators considering creating this teaching modality by detailing the development processes, skills, and supports needed for module creation. We outline collaborative team roles and responsibilities, the development timeline, incorporation of multimedia elements, and integration of accessibility features. We report on how tools and resources influenced the creation and assessed the use of our multimedia e-learning module. We highlight the benefits, challenges, and barriers to creating a multimedia e-learning module for a development team. Overall, developing a multimedia e-learning module is one way to contribute to the profession and promote scholarship among OT faculty and students.

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## **Introduction**

The rise in technology, social media, and video platforms has led to the development of interactive, brief, and visually appealing instructional materials. Modern learners desire flexibility, repeatability, accessibility, and opportunities for formative assessment (Brown et al., 2022; Clark & Mayer, 2023; Zeldenryk & Bradley, 2013). Multimedia e-learning modules are one way to meet the needs of today's learners. Multimedia e-learning modules use technology to immerse the learner using a variety of senses with a blend of written text, visual images, animations, and audiovisual content (Digital Learning Institute, 2023). "E-learning modules focus on a few specific objectives in a short format of 10-15 minutes in length, with multimedia content and interactive elements" (Webster et al., 2021, p. 2). A multimedia e-learning module allows for asynchronous learning to occur at the learner's pace, which has been popular among modern learners to optimize and reinforce learning (Brown et al., 2022; Clark & Mayer, 2023; Kalogirou et al., 2021; Logan et al., 2020). The interactive nature containing strategic cognitive questioning allows for formative and summative feedback, and animated case-based learning assists the learner in translating knowledge into real-life practice (Brown et al., 2022; Frazee et al., 2022; Logan et al., 2020). Multimedia e-learning modules also provide opportunities for repetition, convenience, flexibility, and mastery (Giles et al., 2018; Sledders et al., 2016; Zeldenryk, 2013). A multimedia e-learning module enables learners to gain knowledge in an efficient, feasible, and engaging format, improving translation to practice.

A literature review revealed several previous studies on using e-learning in occupational therapy (OT) education. In 2017, Rudman studied the use of a biomechanics e-learning resource developed as an enrichment to course material in a convenience sample of 81 OT students in South Africa. Most participants found the e-learning resource to positively enhance their performance on multiple-choice exams covering the content. Giles et al. (2018) explored types of materials used to prepare students for a laboratory course on upper extremity goniometry and found students wanted learning tools that were convenient, accessible, and visually appealing. They preferred short videos within e-learning modules over live lab recordings. In a randomized controlled trial, Schwartz et al. (2021) studied using a self-paced learning module and a hands-on lab experience about community accessibility evaluation. They found an overall increase in learning for both methods; however, most learning occurred when the self-paced learning module was combined with the hands-on lab activity, thus providing support for self-paced learning prior to in-class learning activities. Hwang et al. (2023) systematically reviewed the literature about digital learning in OT. The most common types of digital learning designs were flipped, blended, hybrid, and distance learning, including e-learning. They found digital learning to be equivalent to or more effective than traditional face-to-face learning. Content most frequently taught digitally included professional reasoning and procedural knowledge. Other research described e-learning modules in content areas of sensory processing (Gee et al., 2017) and sensory integration theory (Kaye, 2020). While there is a growing body of knowledge on various forms of e-learning in OT education, currently there appears to be no literature describing e-learning in OT education focused on cognition. Furthermore, existing literature discusses the development of e-learning content broadly (Clark & Mayer, 2023) and within nursing

specifically (Logan et al, 2020), however there appears to be no existing literature describing the e-learning development process within OT that includes challenges, costs, and benefits.

Functional cognition, or the cognition needed to perform daily life tasks, is an essential element of OT practice and is interrelated with occupational performance (Baum et al., 2023). Occupational therapy education should emphasize assessment and intervention of functional cognition to equip learners with the knowledge and skills needed to address this domain of concern (American Occupational Therapy Association, 2021; Giles et al., 2020). It was essential to provide foundational knowledge of functional cognition content while integrating and applying concepts. Learning theoretical knowledge supporting OT practice may be challenging for a new learner (Mahoney & Smallfield, 2024); additional educational materials can assist learners in developing the professional reasoning needed to distinguish between various theoretical approaches to functional cognitive intervention. A multimedia e-learning module alleviates the heavy preparatory reading typically assigned to understand content. We also chose functional cognition because we felt the concepts would not change significantly within a short period of time, making the multimedia e-learning module sustainable. In short, we decided to use a multimedia e-learning platform as an instructional delivery method to be responsive to how modern students learn.

This article describes the development and implementation of a free, publicly available, multimedia e-learning module that illustrates four theoretical approaches to OT practice addressing functional cognition. This multimedia e-learning module can complement existing OT educational materials in developing critical reasoning in this important area of practice. Creating a robust multimedia e-learning module involves a collaborative development process consisting of various team members with intentional inclusion of student team members (Issac et al., 2017; Krishnan et al., 2013; Logan et al., 2020; University of Nebraska Medical Center Office of Interactive E-learning, 2023). We will outline the process by which the multimedia e-learning module was created, along with the necessary support and skills needed. We will also discuss the benefits and challenges of the development process.

## **Innovation Description**

### **Participants**

After completing a literature review to understand the knowledge gap, the first step towards developing a multimedia e-learning module was identifying a development team (Logan et al., 2020). We intentionally included three students, two faculty, and a primary instructional technologist from the Office of Interactive E-Learning on the development team. This team collaboration fostered a dynamic environment that promoted learning, innovation, and the creation of a high-quality project (Issac et al., 2017; Krishnan et al., 2013; Logan et al., 2020). The students involved in this project were in semesters three through five of an eight-semester program. They received the foundational knowledge of functional cognition in semesters two and three. Faculty included one senior faculty member and one junior faculty member. The senior faculty member had 20 years of experience in academic education, a line of scholarship in

teaching and learning, and seven years of practice experience in physical rehabilitation with middle and older adults. The junior faculty member had over five years of practice experience in physical rehabilitation with middle and older adults, two years' experience in academic education, and a developing line of scholarship in teaching and learning. The instructional technologist had seven years of experience and a master's degree in education. This joint team offered diverse perspectives, complementary skills, knowledge translation, networking opportunities, quality assurance, and real-world experience.

### Procedures

We had strong institutional support from the Office of Interactive E-Learning, which is consistent with previous research for creating a substantial module (O'Doherty, 2018). The support from the Office of Interactive E-learning included being able to apply for a competitive award, which offered five months of collaboration, access to developmental software, templates, and a monetary stipend. After receipt of the e-learning award, the team met with the Office of Interactive E-Learning instructional designers and technologists to review the e-learning process, expectations, and timelines. The Office of Interactive E-Learning introduced the learning management system's resources and software. Refer to Table 1 for a project timeline.

The Office of Interactive E-learning provided hardware and software for the project. This included the storyboard (Microsoft PowerPoint template with essential elements to e-learning module content creation; <https://microsoft.com>), Articulate Storyline 360 (<https://articulate.com>), animation software (<https://vyond.com>), learning management system (included examples of completed modules; introduction to available multimedia software; database for music, icons, and images [<https://shutterstock.com>]; and due dates and submission areas for materials), recording studio (audio/visual equipment, quiet space), computers with needed software installed (available for check-out), e-learning lab (computers with software and Office of E-learning team members present for consultation), and advanced training sessions for animations and interactive elements. Early consultation with the Office of E-Learning equipped the student and faculty development team with the tools to implement the vision of the module with interactive, multimedia components.

**Table 1**

*Timeline of the E-learning Module Development (Academic Year 2022-2023)*

July-September	October-December	January-March	April-June
Connect with and understand Office of E-Learning resources	Submit and receive grant (optional)	Continue module development	Submit final module
Develop a project plan	Receive initial training and consult from the Office of E-Learning	Record transcript	Receive summative
Assemble team	Develop software	Receive formative feedback using NEscore	NEscore
			Publish module
			Initiate

July-September	October-December	January-March	April-June
Establish timeline	expertise	Revise module	dissemination
Create learning objectives	Design module	based on feedback	with E-Learning Showcase
Review literature and refine knowledge in content area	Ensure accessibility		
Draft content Outline dissemination plan			

We used a strengths-based approach to divide the module development roles and responsibilities. The role of the instructional technologist was to attend select team meetings and serve as a liaison between the team and the Office of Interactive E-Learning. Roles of the faculty team members included oversight of the whole module development, mentorship to enhance interactive and visual elements, word choice, slide content, assessment questions and feedback, and consistency between theoretical approaches included in the module. Student team members then developed the content for their assigned theoretical approach. Each student team member chose a functional cognitive theoretical approach to become the knowledge expert for the team. We outlined which key information should be covered for each theoretical approach to add a consistent look and feel to the presentation of each approach. This included the definition, intended population, key features and concepts, an example of the approach, and formative and summative assessment questions. Synchronous, weekly faculty and student team meetings moved the project forward. We used the time to develop content and brainstorm best visual, text, and assessment strategies. Refer to Table 2 for a description of each team member's responsibilities.

**Table 2**

*Team Responsibilities in E-Learning Module Development*

<i>Team Member</i>	<i>Responsibilities</i>
Faculty	<ul style="list-style-type: none"> <li>▸ Connect with University resources</li> <li>▸ Assemble project team</li> <li>▸ Establish project timeline</li> <li>▸ Guide student learning of content</li> <li>▸ Review and approve storyboard draft</li> <li>▸ Edit and revise module content</li> <li>▸ Refine formative and summative quiz questions and feedback</li> <li>▸ Provide feedback to students</li> <li>▸ Ensure project completion</li> <li>▸ Develop a data collection plan to monitor learner performance</li> </ul>

<i>Team Member</i>	<i>Responsibilities</i>
Students	<ul style="list-style-type: none"> <li>• Identify strengths to bring to the team</li> <li>• Conduct literature review</li> <li>• Develop content expertise</li> <li>• Create content by drafting storyboard</li> <li>• Select photos and design animations</li> <li>• Draft formative and summative quiz questions and feedback</li> <li>• Write and narrate the transcript</li> <li>• Consult the Office of E-Learning with questions</li> <li>• Refine content based on feedback</li> </ul>
Instructional Technologist	<ul style="list-style-type: none"> <li>• Provide group or 1:1 training in multimedia software</li> <li>• Attend select team meetings</li> <li>• Connect team to Office of E-Learning</li> <li>• Provide technology support and specific guidance to use advanced software features</li> <li>• Ensures adherence to timelines</li> <li>• Assess quality of module and provide formative and summative feedback</li> <li>• Publish the module</li> <li>• Host and maintain the e-learning gallery website</li> <li>• Implement data collection plan regarding learner performance</li> </ul>
Team	<ul style="list-style-type: none"> <li>• Receive training in multimedia software</li> <li>• Attend team meetings</li> <li>• Attend Office of E-Learning consultations</li> <li>• Review storyboard and provide suggestions</li> <li>• Ensure module accessibility</li> <li>• Final review of module and transcript</li> <li>• Disseminate module at campus showcase event</li> </ul>

Finalizing the storyboard was essential before starting other areas of the multimedia e-learning module as it decreases time-intensive revisions within the module development software. We extensively refined the module's content, assessment questions, and interactivity. Storyboard slides were labeled by numbered scenes to aid in understanding the module's navigation and chunking of the content. Each slide outlined the audio, visual, and interactive elements, including the words appearing on the slide, a colored textbox that conveyed ideas for the animations and interactions, and the script for the narration. Refer to Figure 1 for an example storyboard slide. Sample interactions included drag and drop, hover, matching, click-and-reveal, and labeled graphics. We used a freely available online tool to estimate the overall length of the e-learning module narration.



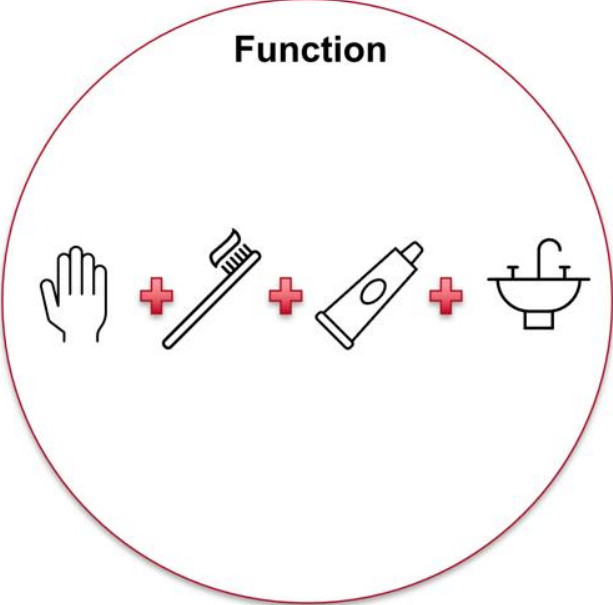
## Figure 1

### Sample Storyboard Slide

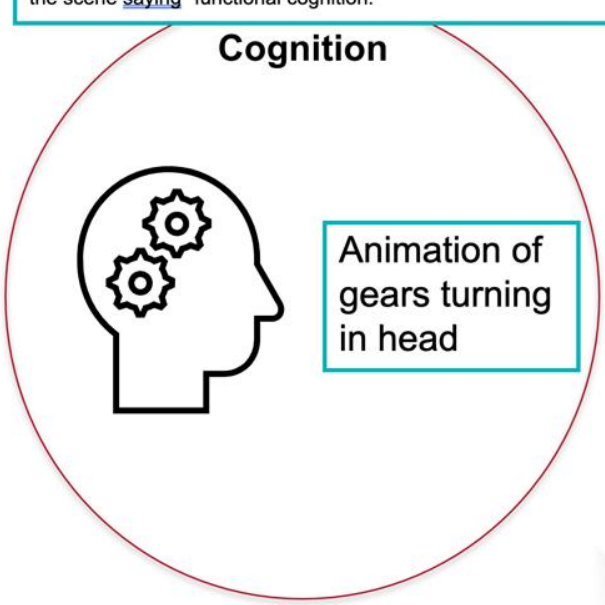
**Scene 2: Defining functional cognition**  
**Slide 2.1: What is functional cognition?**

What is Functional Cognition?

**Function**



**Cognition**



Animation of gears turning in head

**Animation** – start with a picture of someone brushing teeth, the image disappears when we say "let's break this occupation down." Have two circles right away with one saying function, other saying cognition, then have the hand appear in the circle when saying "body functions" the toothbrush and toothpaste appear when saying "tools" and the sink appear when saying "environment". When saying Cognition, have the animation of the head with gears turning. Have these two circles merge together when saying "functional cognition" then the middle part expands to a larger view to show someone successfully brushing their teeth with words above the scene saying "functional cognition."

**Narration:** Functional cognition can be defined as the cognitive ability needed to perform daily life tasks. (Animation – show person tooth brushing). Let's break this occupation down. In this example, function is having all of the necessary parts to the task like body functions (Animation: hand appears in circle), tools (animation: a toothbrush and toothpaste appear in circle), and environment (Animation: sink appears in circle). Cognition is knowing how to brush your teeth. Functional cognition is the merging of these to successfully brush your teeth.

We developed five formative and ten summative questions to assess mastery of content. These quiz questions were embedded in the e-learning module. Both the literature and the Office of Interactive E-Learning encouraged interactive formative questions (Clark & Mayer, 2023; Halpin, 2022). Examples of interactive elements of formative questions included drag and drop, matching, and pop-up feedback. Each formative and summative question allowed two attempts with correct answer feedback and first and second attempts incorrect response feedback. Two incorrect responses of formative questions lead learners back to review the content in the module. Formative questions were asked after chunks of content (i.e., after each theoretical approach) to provide learners with opportunities to check their knowledge comprehension. The questions were both theoretical and practical. Figure 2 provides an example. A summative quiz at the end consisting of mostly case-based questions assessed comprehension of the four functional cognitive approaches.

Team members individually and collectively analyzed and revised the storyboard based on best practices outlined in the Nebraska E-Learning Scorecard (NEscore; Webster et al., 2020) and an e-learning module development checklist provided by the Office of Interactive E-Learning (2023). We capitalized on the strengths of each team member to divide tasks and move the project forward. Tasks included recording the narration, timing the narration with the visuals, creating animations and interactions, and ensuring the module met accessibility standards. An Office of Interactive E-Learning survey indicated faculty reported investing 160+ hours in module creation and students reported investing between 210–233+ hours, ranging from 50 to 100+ hours for each student.

The Office of Interactive E-Learning reviewed a final draft of the e-learning module based on the NEscore, and the development team made revisions based on the feedback. After the e-learning module was complete, we developed a transcript. The Office of Interactive E-Learning published the final module (Behrendt et al., 2023) through a free open-access e-learning gallery. This multimedia e-learning module, titled *Approaching Functional Cognition Part 1: Introduction* is on the University of Nebraska Medical Center E-learning gallery website (Behrendt et al., 2023). It was disseminated and featured in a virtual and in-person showcase.

We intend to use the multimedia e-learning module as a required preparatory class activity. Our goal is to aid learners in grasping the basic concepts of four theoretical approaches to OT assessment and intervention for cognitive impairment in a universally accessible format. This pre-work is combined with hands-on laboratory experiences where students apply the concepts they learned in this multimedia e-learning module. Logan and colleagues (2020) recognize this learning modality fosters a safe learning environment, self-efficacy, and motivation to learn. This e-learning module may enhance OT students' knowledge of functional cognition.

## Figure 2

### Example of Formative Question with Feedback

**REVIEW QUESTION** ?

Which global strategy option aligns with CO-OP principles? [Hear Options](#)

Goal	Plan	Do	Check
Client selects a desired occupation-based goal.	Therapist asks client questions to guide in problem solving a plan.	Significant other is involved in the activity.	<p>Therapist points out errors the client made during the process.</p> <p>Client reflects on their satisfaction with goal attainment and process.</p>

**Incorrect**

Incorrect, the client reflects on their satisfaction with goal attainment and process. The therapist role is to guide clients to recognize their errors. You have completed your introduction to the CO-OP approach. Click the "return to cognitive intervention approaches" button.

[Return to cognitive intervention approaches](#)

### Innovation Assessment

The e-learning module received formative and summative evaluation from the Office of Interactive E-Learning based on the NEScore (Webster, 2020) which assessed best practices in e-learning. We received the formative feedback approximately midway through the development process and made revisions accordingly. Revisions improved the module from adequate (total score of 34/48) to well-done (total score of 41/48). The only summative NEScore item identified as needing improvement was the total length of the module. However, we did not shorten the length of the module because the team reached consensus that content was a higher priority than strictly adhering to module length. The NEScore assesses best practices in e-learning module development; however, it does not assess content quality. Rather, it has two primary subsections: one assesses method and practice and the other assesses instructional design. The Method and Practice of Education NEScore subsection had the greatest improvements from the formative to the summative evaluation, specifically within knowledge checks and closed captioning. The Instructional Design NEScore subsection had the most improvements in the explanation of module navigation and effectiveness of design layout. Refer to Table 3 for formative and summative NEScore results.

**Table 3**

#### *Nebraska E-Learning Scorecard (NEScore) Formative and Summative Evaluation*

NEScore Criteria	Formative evaluation	Summative evaluation
Subsection scores		
Method & Practice of Education (up to 21 points)	13	16
Instructional Design (up to 27 points)	21	25
Total score (up to 48 points)	34	41

*Note.* Total scores indicate the following: Well done = 41 – 48 points, significant evidence of mastery content and delivery; adequate = 32 – 40 points, meets the basic criteria for e-learning modules; needs improvement = <32 points, does not meet the basic criteria for e-learning modules.

The Office of Interactive E-Learning provided qualitative formative and summative feedback for areas of strength and opportunities for improvement. While areas of strength did not change from the formative to the summative feedback, reviewers identified fewer opportunities for improvement with the summative scorecard. Refer to Table 4 for qualitative comments from reviewers.

**Table 4***Qualitative Reviewer Feedback*

Areas of Strength	
Formative and summative scorecard	<ul style="list-style-type: none"> <li>▸ The use of videos and characters engage the learner and illustrate key points.</li> <li>▸ Multiple types of interactions allow the learner to apply the content in various ways, leading to deeper understanding.</li> <li>▸ Multiple branching interactions engage the learner, organize the content, and allow for student choice.</li> <li>▸ Content is described in a clear, easy to follow manner and chunked logically.</li> </ul>
Opportunities for Improvement	
Formative scorecard	<ul style="list-style-type: none"> <li>▸ Overall, the branching and click to reveal interactions are meaningful and beneficial.</li> <li>▸ The interactions on slide 3.2 and 3.3 just unlock additional audio, with no visual changes. Either change these to normal slide, with no branching, or add visuals to each interaction.</li> <li>▸ Learner instructions (i.e., “Click the statement that aligns with the CO-OP principles”) to each interaction are included verbally. To minimize potential user error, also include them visually.</li> <li>▸ Timing of animations are off on some slides. Revise for images appearing at odd times and slides that last longer than the audio.</li> </ul>
Summative scorecard	<ul style="list-style-type: none"> <li>▸ Descriptive feedback is present, adequate, and offers reinforcement of content, but does not fully explain question.</li> <li>▸ Interactive elements are interspersed throughout module and test the learners knowledge, but do not offer new insights to the content.</li> <li>▸ Module length is above recommended for e-learning content.</li> </ul>

One benefit of using our university’s e-learning multimedia software tool was our ability to connect it with a learning analytic platform, Watershed LRS (<https://watershed.com>), to assess the use of the module. Watershed’s range of evaluation features and capabilities can support the instructor and program’s goals. Robust data analytic capabilities track learner engagement, progress, and performance (e.g., completion rates, quiz scores, and time spent from the whole module to individual parts). Some key Watershed features include integration into learning management systems, user statistics, options for anonymous data, learning path analysis, and compliance tracking. For example, 247 unique users accessed this module within six months of publication. The development team desired an outside perspective to assess the content. An OT educator external to the development team with clinical experience in functional cognition informally assessed content accuracy. This educator provided minor suggestions for improvement and the development team integrated these suggestions into the final version of the module.

## **Discussion**

In this article we described the development and implementation of one of the first free, publicly available, multimedia e-learning modules about OT theoretical approaches to address cognitive impairment. The instructional design of an interactive e-learning module grounded in best teaching practices can aid in comprehension and retention of content within this important domain of practice.

### **Benefits to Student Multimedia E-Learning Module Developers**

An intentional collaboration between students, the Office of Interactive E-Learning experts, and faculty contributed to the institution's overall educational value, experience, and academic goals. As Logan and colleagues (2020) discovered, a collaborative, multidisciplinary project team ensures a successful e-learning module. Whereas Logan et al. (2020) only involved faculty members and a librarian/instructional designer, our project encouraged students to be the center of the development team. As knowledge users, they ensured the content, format, and delivery methods aligned with their needs, preferences, and learning styles, consistent with findings from Issac et al. (2017) and Krishnan et al. (2013). Student perspectives and ideas can bring richer, more comprehensive e-learning solutions that are user-friendly and relatable (Krishnan, 2013).

Student assistance in the development of a multimedia e-learning module may provide opportunity for professional and scholarly growth. Participation in such development may afford students the opportunity to gain practical skills and a deeper understanding of the relevant topic, in this case, functional cognition (Isaacs et al., 2017; UNMC Office of Interactive E-Learning, 2023). While not formally assessed, anecdotal conversations with student developers highlighted professional growth through this experience; one student went on to complete a doctoral capstone on functional cognition because of this project. Additionally, students on the development team enhanced their resumes through tangible rewards such as grants, honors, presentations, publications, and recognition of their dedication, contributions, and highlighting skills developed through their work on the project (UNMC Office of Interactive E-Learning, 2023). The students who developed this module wrote and received a grant, an audio-visual publication, and presented locally and nationally. Through e-learning module development, students gain skills in teaching and learning by designing and implementing educational content (Belfi & Jordan, 2022; UNMC Office of Interactive E-Learning, 2023). They are exposed to pedagogical principles and strategies for effective teaching to create optimal comprehension and retention. They attain real-world experience in instructional design, multimedia production, content creation and structuring, project management, taking initiative, and teamwork. This helps them contribute to the profession's body of knowledge while better understanding one aspect of academia (Belfi & Jordan, 2022). Incorporating students into e-learning development teams benefits the development process and provides students with valuable educational and career experiences, making it a win-win situation for both academic institutions and learners.

### **Benefits to Faculty as Multimedia E-Learning Module Developers**

Creating an e-learning module with students can offer several benefits to faculty (UNMC Office of Interactive E-Learning, 2023). Partnering with students offsets the workload involved in content creation by capitalizing on students' strengths and diverse skills and knowledge. While faculty focus on content, students may complete background research, module design, and peer review. The development of e-learning modules aids in networking with campus community members and encourages interprofessional teamwork that can promote professional development, collaboration, information sharing, and motivational accountability (Heffernan, 2020). Additionally, creating a multimedia e-learning module may be the teaching enhancement needed in a specific content area (Belfi & Jordan, 2022). Finally, developing an e-learning module can be considered scholarly work and mentorship of students, which is a valuable addition to a faculty member's curriculum vitae, portfolio for promotion and tenure, and contribution to the broader educational mission of the institution (Belfi & Jordan, 2022). It demonstrates a commitment to pedagogical innovation and collaboration. In summary, developing multimedia e-learning modules helps faculty enhance teaching of a topic area, contribute to their professional development, and add to the body of scholarly work. The development of a high-quality multimedia e-learning module required the use of many resources. Specifically, human resources included collaboration between the student, faculty, and instructional designer. This collaboration and work required extensive time, attention to detail, background research, and a willingness to build skills. However, once the multimedia e-learning module was published publicly, it required minimal maintenance. While regular review of content due to emerging evidence is needed for any topic, we expect the content and technology platform to remain relevant for at least three to five years. The non-human resources included the use of technology and other tools outside the discipline-specific program, structured e-learning module assessments, and an analytical platform for measuring effectiveness of the module in delivering the content to learners. Combined, students and faculty e-learning module development leads to more effective, engaging, and relevant educational materials while providing students with valuable real-world experience and fostering a sense of ownership in their learning journey (Isaacs et al., 2017).

### **Challenges and Barriers to Developing a Multimedia E-learning Module**

Developing a multimedia e-learning module must be carefully considered as it entails several challenges and barriers. One challenge is the extensive time devoted to one focused topic and the knowledge and skills needed to learn and use the software. Specifically in our experience, students worked outside of class, requiring dedicated time, often during evenings, weekends, or academic breaks, to create the multimedia e-learning module. Student developers were also on various courseload tracks with one student out on fieldwork. Additionally, students needed to master specific software that they may not use again to develop the module. We also experienced a technical barrier to having the equipment to make the module, as the software allowed only one user at a time. The project required going to the e-learning lab or checking out a computer for an allotted amount of time. These technical barriers, such as limited equipment availability, impede progress. Finally, administrative costs and barriers included faculty and instructional designer salaries and time.

In general, creating interactive multimedia tools like a freely available e-learning module is an extensive endeavor that requires advanced planning and coordination. While not a requirement, a centralized office of instructional design is a helpful resource for interactive e-learning module development; institutions without the human resources and technology available from such an office may have limited capacity to participate in this type of content creation.

### **Future Directions**

There are several potential future directions for this project. First, while this article reports on the quality of the multimedia e-learning module using the NEScore, future assessment of the module content, intended student learning outcomes, and perspectives of usefulness by students are needed. Second, because this module introduced foundational knowledge, developing an additional module focusing on case application is warranted to help students connect theories to practice (Kalogirou et al., 2021). Finally, future research could assess the module's influence on students' preparation for lab and compare the effectiveness of e-learning with traditional learning modalities in OT education.

### **Implications for Occupational Therapy Education**

The *Approaching Functional Cognition* multimedia e-learning module is one way to support the American Occupational Therapy Association's (2021) position of the importance of addressing functional cognition in education and practice. It is a free, publicly available, multimedia resource and provides opportunities for repeated use for students, other OT education programs, and practitioners. The succinct nature of e-learning modules may enhance knowledge translation because key information is delivered in a chunked, easily digestible format (Clark & Mayer, 2023). The multimedia e-learning module incorporates visuals, audio, and interactive elements to engage learners and promote universal design in a user-friendly manner. In general, developing a multimedia e-learning module in OT is one way to promote scholarship among OT faculty and students that can positively contribute to the profession.

### **Conclusion**

This article detailed the conception, development, and evaluation of an interactive multimedia e-learning module designed to enrich understanding and application of OT theoretical approaches to address functional cognition. An interdisciplinary team of faculty, students, and an instructional technologist was instrumental in developing a robust multimedia e-learning module. Including students on the design team ensured a student-centered perspective, which may enhance learner engagement with the content. This innovative, high-quality module enhanced OT education and provided an opportunity for professional growth among faculty and students.

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