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Cognitive and Metacognitive Factors in Reading Comprehension for Occupational Therapy Assistant Students

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Cognitive and Metacognitive Factors in Reading Comprehension for Occupational Therapy Assistant Students

Presented in Partial Fulfillment of the
Requirements for the Degree of
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Eastern Kentucky University
College of Health Sciences
Department of Occupational Science and Occupational Therapy

Cynthia Lynn Meyer
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EASTERN KENTUCKY UNIVERSITY
COLLEGE OF HEALTH SCIENCES
DEPARTMENT OF OCCUPATIONAL SCIENCE AND OCCUPATIONAL THERAPY

Certification

We hereby certify that this Capstone project, submitted by Cynthia Lynn Meyer, conforms to acceptable standards and is fully adequate in scope and quality to fulfill the project requirement for the Doctor of Occupational Therapy degree.

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EASTERN KENTUCKY UNIVERSITY
COLLEGE OF HEALTH SCIENCES
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DOCTOR OF OCCUPATIONAL THERAPY

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Executive Summary

Background: This capstone project focused on occupational therapy assistant (OTA) students' perspectives of the cognitive factors and metacognitive factors associated with reading comprehension. A lack of reading comprehension causes difficulties for OTA students to understand didactic textual information and then transfer learned knowledge into completing exams and clinical performance. Reading comprehension difficulties can also impact OTA attrition rates and limit graduate success when completing the national certification examination.

Purpose: The purpose of this capstone project was to explore OTA students' perceptions of the effectiveness of cognitive and metacognitive strategies for learning and understanding text-based occupational therapy (OT) material. The hypotheses of the primary investigator were (a) OTA students' ability to take an OTA course examination, as evidenced by grades, will improve pre- and post-reading strategy instruction, (b) OTA students' perceptions of cognitive and metacognitive factors for studying OT text-based material for written examinations will change pre-and post-reading comprehension strategy information, and (c) OTA students' preferences of cognitive and metacognitive factors for studying OT text-based material for written examinations will change pre-and post-reading comprehension strategy instruction.

Theoretical Framework: Theoretical frameworks utilized for this project included pragmatism, constructivism, and *Mastery Learning*, as depicted through Bloom's revised taxonomy. The reading strategies intervention program was based on the *PQ5R Study Method* (Graham & Robinson, 1984) and included the concept of cognitive schematics for remembering.

Methods: This capstone project used a convergent mixed-method design (Creswell & Creswell, 2018). The quantitative components included the scores from two different OTA course examinations analyzed with a paired t-test and a 59-item survey assessment combining the *Text-*

Learning Strategies Inventory (TLSI) (Merchie, Van Keer, & Vandevelde, 2014) (Appendix B), the *Metacomprehension Scale* (MCS) (Moore, Zabrucky, & Commander, 1993) (Appendix C) that was analyzed with a Wilcoxon signed rank test. The qualitative component was three original open-ended questions analyzed using initial and focused codes (Charmaz, 2014) and conceptual labels and index codes (Peacock & Paul-Ward, 2017). The TLSI (Merchie et al., 2014), MCS (Moore et al., 1993), and open-ended questions were used as pre-tests and post-tests.

Results: The quantitative data showed a statistically significant change for examination scores after a reading comprehension strategy information session and for OTA student perceptions for the cognitive and metacognitive factors for reading techniques of text-based information. Qualitative data analysis revealed a change in OTA student preferences for the cognitive and metacognitive factors for reading techniques for learning text-based information and when completing examination questions.

Conclusion: The capstone project focused on determining if there was a change in OTA student examination ability and OTA student perceptions and preferences regarding reading comprehension techniques post a reading comprehension strategy information session. The participants examination performance improved after learning reading comprehension strategies for OTA academic material. The participants changed their perceptions and preferences for reading and demonstrated a deeper reading level with text-based information and examination questions. In addition, the data indicated a significant improvement in OTA student examination performance and change of OTA students' perceptions of cognitive factors and metacognitive factors associated with reading comprehension.

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CERTIFICATION OF AUTHORSHIP

Submitted to (Faculty Mentor's Name): Dr. Cindy Hayden, D.H. Ed., OTR/L, CHT
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Title of Submission: Cognitive and Metacognitive Factors in Reading Comprehension for Occupational Therapy Assistant Students

Certification of Authorship: I hereby certify that I am the author of this document and that any assistance I received in its preparation is fully acknowledged and disclosed in the document. I have also cited all sources from which I obtained data, ideas, or words that are copied directly or paraphrased in the document. Sources are properly credited according to accepted standards for professional publications. I also certify that this paper was prepared by me for this purpose.

Student's Signature: Cynthia Lynn Meyer

Date of Submission: 12/09/2018

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Section One:

Nature of the Project and Problem Identification

Introduction

New occupational therapy assistant (OTA) students are involved with memorizing, manipulating, and operationalizing didactic material related to occupational therapy (OT) (Accreditation Council for Occupational Therapy Education [ACOTE], 2011). They may be unaccustomed to learning this type of information and may demonstrate difficulties with this type of academic work (Boehm, Cordier, Yvonne, Tanner, & Salata, 2017). Occupational therapy students with the academic skills to produce higher course grades have been shown to be better prepared for clinical performance during fieldwork rotations (Tomlin, 2005). Unfortunately, there is not currently a standard format for teaching reading comprehension skills to OTA students. This capstone project was created to help fill this gap in the evidence for how to teach OTA students reading comprehension skills.

There is no specific evidence related to the topic of reading comprehension for OTA students. This section will address findings related to OT students, undergraduate students, and use of the revised Bloom's Taxonomy with designing learning material. Limited research is available about OT students and learning strategies (Avi-Itzhak & Krauss, 2014; Madill et al., 2001; Toth-Cohen, 1995). Additionally, a moderate amount of research is available on general undergraduates regarding examination preparation performance (Alden Rhodes, 2008; Alkhateeb & Nasser, 2014; Hartwig & Dunlosky, 2012). Finally, research studies have been done reviewing

the use of the revised Bloom's taxonomy (Anderson & Krathwohl, 2001) regarding test preparation.

Because of the importance of academic performance, faculty want to maximize student interaction to increase student success with learning and using OT academic information. This principal investigator was unable to locate any studies referencing academic performance specific to OTA students. However, the investigator found one study indicating grade point average (GPA) as the greatest predictor of OT students' clinical performance (Tan, Meredith, & McKenna, 2004). Another study indicated lack of academic skills was correlated to first-time pass rates for the national certification examination for OT students (Novalis, Cyranowski, & Dolhi, 2017). Three additional studies discussed the benefits of dynamic and engaged instructional strategies with OT students (Avi-Itzhak & Krauss, 2014; Madill et al., 2001; Toth-Cohen, 1995). According to the three studies the benefits included improved national certification examination scores with case study clinical reasoning activities, increased ability to problem solve with inquiry-based learning, and better ability to recall learned information when using computer-assisted visual demonstration versus textbook only information (Avi-Itzhak & Krauss, 2014; Madill et al., 2001; Toth-Cohen, 1995).

Evidence-based information is available regarding other allied health sciences and psychology undergraduates' academic achievement. Alkhateeb and Nasser (2014) determined higher education undergraduate students' self-testing and test strategies had a significant difference for those with higher GPAs. Reading comprehension has been shown, with baccalaureate level nursing students, to be a predictor for early academic success and has been shown to be significant for nursing program completion (Alden Rhodes, 2008). In a study with mostly freshman and sophomore psychology students, re-reading was positively associated with

GPA (Hartwig & Dunlosky, 2012). This information can shape the material presented to OTA students for an information session about reading strategies and testing techniques.

Finally, Bloom's revised taxonomy can be used as the base to build OTA student reading comprehension strategy material (Anderson & Krathwohl, 2001). Research studies have identified how to use the hierarchy skills of learning to understand complex educational concepts and to critically analyze academic material to determine an appropriate course of action (Lemon & Garvis, 2014; Thambyah, 2011). In addition, Krishnan and Idris (2012) identified how to format examination questions using the revised Bloom's taxonomy and Bloom's revised taxonomy has been used to develop curriculum scenarios based-on the question format from the nursing licensing examination (Moxley, Maturin, & Rakstang, 2017).

Thus, the lower order and higher order revised Bloom's taxonomy structure can be used to create test questions, can be the foundation to teach OTA students how to dissect test questions, and can be the processes for OTA students to comprehend and analyze test questions (Krishnan & Idris, 2012).

Problem

The problem this capstone project will address is the cognitive and metacognitive difficulties OTA students experience associated with reading comprehension of OT, medical, and rehabilitation text-based material. Reading comprehension includes the meanings of written language, the relationships among written ideas, and the abstract reasoning involved in the act of reading (King, Ellinger, & Wolf, 1967). Cognitive strategies focus on the acts of task performance and knowledge acquisition through recognition, usage of knowledge, estimating, extrapolation, use of written clues, word and phrase repetition, rehearsal, and seeking new information (Ahmadi, Ismail, & Abdullah, 2013). Metacognitive strategies for reading include

self-awareness of how the cognitive tasks have been performed and planning, monitoring, and evaluating reading self-performance (Ahmadi et al., 2013; Flavell, 1979).

Reading comprehension, cognitive strategies, and metacognitive strategies, bear examination as national retention rates and national certification pass rates for OTA programs are declining (Stagliano & Harvison, 2017). OTA Program attrition has steadily increased, causing retention rates to progressively drop from 91% in 2010 to 83% in 2016 and 85% in 2017 (American Occupational Therapy Association [AOTA], 2018a). Graduate OTA national pass rates for the written certification examination from the National Board for Certification in Occupational Therapy (NBCOT) were 95% in 2013, 93% in 2014 and 2016, and 91% in 2015 and 2017 (AOTA, 2018a). In contrast, pass rates for national certification examination graduates from entry-level master's and doctorate level OT programs from 2013 to 2015 were 98% and for 2016 to 2017 remained 98% for the entry-level master's level and increased to 100% for the entry-level doctorate level (AOTA, 2018a). Consideration for national certification examination pass rates should be given toward those with academic difficulty. Entry-level master's OT students, whom have similar OT text-based information, were found to correlate failing the national certification examination, upon the first-attempt, with lower pre-admission writing scores, lower in-program GPA, and modified academic program plans (Novalis, Cyranowski, & Dolhi, 2017).

The ability to pass written examinations and maintain a minimum required GPA is necessary for students to remain in OTA programs, complete didactic course semesters, and proceed to the fieldwork level II stage. In a study by Rachal, Daigle, and Rachal (2007), undergraduates, in general, regardless of the year of education in their undergraduate studies, reported problems associated with test taking. In addition, a study by Gallagher (2003) indicated,

after an eight-week study course with nursing students who had below-minimum reading comprehension scores for the academic admission assessment measurement into the nursing program, the students increased in study-behaviors with textbook reading, but not in academic achievement.

Purpose of the Capstone Project

The purpose of this capstone project was to explore OTA students' perceptions of the effectiveness of cognitive and metacognitive strategies for learning and understanding text-based OT material. Written examination study strategies encompass comprehending and remembering textbook material (Bartlett, 1995). The capstone project addressed OTA course work in a geriatric course and multiple-choice written examination questions. The reading comprehension strategy session intervention was designed to assist with improving the OTA student participants' preparation and test question reading ability, although immediate improvement of these skills was not the focus of this capstone project. The purpose of the reading comprehension strategy session was to focus the OTA student participants' attention on which cognitive factors and metacognitive factors they perceived to be as their best means to study and which factors they preferred to choose to use for studying for a course test.

This capstone project explored OTA students' perceptions of the effectiveness of cognitive strategies and metacognitive strategies with reading comprehension. Currently, there is not a standard method to teach reading comprehension associated with test preparation skills and testing skills targeted for the OTA student population. OTA students' academic ability and progress are crucial to completing their degree. In addition to degree completion, the OTA graduates must be certified by passing a 200-question multiple choice national certification examination (National Board for Certification in Occupational Therapy, 2018). This study

sought to specify cognitive factors and metacognitive factors associated with reading comprehension unique to the OTA student population coursework.

Project Objectives

- Identify the difference in OTA students' course examination taking ability pre-and post-reading strategy instruction.
- Explore OTA students' perceptions of cognitive and metacognitive factors affecting the studying of OT text-based material for written examinations.
- Identify OTA students' preference of cognitive and metacognitive factors for the studying of OT text-based material for written examinations.

Theoretical frameworks provide a foundation for the capstone project experience. The capstone project is grounded in the dynamic use of the OTA student participants' lived experience (Dewey, 2008) as a mechanism for reflection (Edwards, 2017) and for creation of their learning and studying activities (Creswell & Creswell, 2018). Cognitive factors and metacognitive factors are built into the reading comprehension strategy information through the revised Bloom's taxonomy (Anderson & Krathwohl, 2001), as well through the use of the *PQ5R Study Method* (preview, question, read, record, recite, review, reflect) (Graham & Robinson, 1984).

Theoretical Frameworks

The educational theories encompassing this capstone project were pragmatism and constructivism, as described by Creswell and Creswell (2018). Pragmatism allows for questioning of the lived experience. OTA students bring with them their own piece of the learning puzzle and they can formulate a thinking and learning framework from which to begin the study process. Learning and understanding is capitalized upon by the use of their lived experience (Dewey, 2008). This learning is then combined, as seen through the constructivism

view, with questioning of the text-based material (Creswell & Creswell, 2018); and with reflective thinking before (Edwards, 2017), during, and post learning (Musolino & Mostrom, 2005). The students' learning is also amplified by the addition of mature educator input (Creswell & Creswell, 2018).

Additionally, Bloom's revised taxonomy (Anderson & Krathwohl, 2001) and the concept of *Mastery Learning*, the idea that educators identify "what we mean by mastery of the subject and to search for the methods and materials which will enable the largest proportion of our students to attain such mastery" (Bloom, 1968, p. 1) was the framework from which the reading comprehension study information was developed. The revised Bloom's framework can be used to differentiate levels of learning and comprehension (Anderson & Krathwohl, 2001) as well as be used to assist with transferring learning across the OTA curriculum (Brewer & Brewer, 2010).

The programmatic structure in which to present reading comprehension strategies followed Thomas and Robinson's *PQ5R Study Method* (Graham & Robinson, 1984). This included the seven cognitive and metacognitive strategies of preview, questioning, reading, recording, reciting, reviewing, and reflecting. The seven steps in this process encompass both cognitive factors and metacognitive factors and utilize both lower order and higher order thinking skills. These learning concepts use the idea of cognitive schematic for remembering, the premise that one is influenced by past knowledge and activity during current learning and discovery (Bartlett, 1995).

Significance of the Capstone Project

This capstone project helps to address the gap in the evidence regarding how to improve academic resources for OTA students who wish to become OT professionals within the healthcare system. Working with OTA students to understand how to better instruct them in test

preparation skills will help to fulfill the future expectations of the higher education goal driven system and healthcare aspect of the OT profession. Higher education is becoming a profession driven by outcomes and public college funding is being determined by a school's ability to retain, graduate, and place graduates in healthcare employment (Kosten, 2016). Understanding how to tailor the test preparation materials for OTA students will help OTA programs achieve productivity-based and outcomes-based funding to achieve higher education goals.

As the American Occupational Therapy Association looks forward with its *Vision 2025* (American Occupational Therapy Association [AOTA], 2016), OT educators are concerned with ensuring students will be effective in determining evidence-based solutions to healthcare problems (American Occupational Therapy Association [AOTA], 2017). Students must also be able to further develop the profession's practice resources for various populations to promote greater participation with everyday activities (AOTA, 2017). A potentially significant consideration in OTA student education is the ability to move beyond the certified occupational therapy assistant (COTA) practitioner level. If the COTA chooses to advance to the entry-level master's degree level (MOT) practitioner, and therefore deepen the profession's body of knowledge, course completion grades from the OTA education can be considered toward admission requirements for COTA to MOT academic bridge programs. Out of 17 COTA to MOT bridge programs, 13 had at least a 3.0 minimum GPA requirement (out of a 4.0 scale) (American Occupational Therapy Association [AOTA], 2018b). OTA graduates seeking to earn an entry-level master's degree or entry-level doctorate degree, must have a solid academic record. If not, time is lost repeating undergraduate coursework and re-establishing themselves as competent candidates for graduate degrees in the OT profession.

Summary

OTA students lacking reading comprehension and test preparation skills can lead to attrition in OTA programs. In addition, low academic ability can lead to at-risk graduates failing the national credentialing examination. The goal of this capstone project was to better understand OTA students' perception on the use of cognitive and metacognitive strategies for reading comprehension of OTA educational material, thus improving OTA students' testing ability. This can, in turn, help to limit difficulties OTA students have with remaining in OTA programs, successfully becoming credentialed practitioners, and advancing toward graduate degrees within the OT profession. This capstone project was based on the constructivist and pragmatic world view regarding strengthening knowledge of studying and learning based on experience, interaction with others, and increased understanding of new situations, as well as the revised Bloom's taxonomy for the mastery of thinking and learning.

Section Two:

Review of the Literature

Introduction

OTA students are required to learn OT information in didactic courses, retain that information for clinical use, and reason clinically about how to improve their clients' occupations (ACOTE, 2011). In addition, OTA students are expected to use evidence-based resources, think independently about how evidence is used to improve client outcomes (Cohn, Coster, & Kramer, 2014), and know how to utilize theoretical knowledge during client interventions (Ikiugu & Smallfield, 2015). When OTA students participate in experiential coursework with practitioners, those students must use the knowledge they have comprehended to clinically reason not only what to do with clients, but how to interact with caregivers and other professionals (Mattila & Dolhi, 2016; Witchger Hansen, 2015). Finally, as OTA students become practitioners, they use the knowledge learned in didactic courses to understand client assessments, learn new models of practice, provide direct intervention, and continually develop their clinical reasoning (Nicola-Richmond, Pepin, & Larkin, 2016; Scanlan et al., 2015).

A search of occupational therapy, allied health, and educational databases (Academic Search Complete, CINAHL, Education Source, Google Scholar, JSOTR, OT Search, and ProQuest [Nursing & Allied Health database and Career & Technical Careers database]) yielded nothing specific about reading comprehension with OTA students or within OT education. The physical therapy (PT) literature included one study with physical therapist assistants (PTA) showing high reading comprehension scores on PTA school entrance examinations as a predictor for greater PTA school retention and first-time pass-rates for the PTA post-graduate national examination (Easley, 2016). Similarly, a study about academic performance, with entry-level

doctorate PT students, linked those with weak reading comprehension skills to attrition rates in PT programs (Domenech & Watkins, 2015). Thus, the literature to be discussed includes the defined key areas addressed in this capstone project. This is a general review of the reading comprehension literature with typically developed adults and general reading comprehension. This review is not of specialized circumstances, such as English-language-learners, those with medical diagnoses, those in particular age groups, or those in particular reading circumstances such as only in consideration of speed with reading, procrastination behaviors, prediction of academic ability based on previous skill or knowledge, or computerized learning. Several studies discussed various groups of undergraduate and graduate students, community college students, and the general adult population in connection among reading comprehension, cognitive factors, and metacognitive factors (Alden Rhodes, 2005; Alkhateeb & Nasser, 2014; Gallagher, 2003; Hartwig & Dunlosky, 2012; Lemon & Garvis, 2014; Rachal, Daigle, & Rachel, 2007).

Reading Comprehension

Reading comprehension is the process of decoding, or understanding, meaning from written language, and which involves use of text context, use of personal experience, and use of individual reasoning (Ahmadi, et al., 2013). Studies showed the use of past learning and knowledge of experience increased reading comprehension (Griffin, Jee, & Wiley, 2009; Jansiewicz, 2008; Landi, 2010; Taub & Benson, 2013). This past knowledge or experience can be thought of as a schema that was used as an image to help explain or retain information (Garrett, Alman, Gardner, & Born, 2007; Paul, 2007; Taub & Benson, 2013). Additional learner attributes that increased reading comprehension included a greater general ability with academic skills (Long, Oppy, & Seely, 1997), including processing a deeper understanding of domain knowledge (Pascual & Goikoetxea, 2014) and having a greater phonological awareness

(Macaruso & Shankweiler, 2010), as well as being more aware of the metacognitive aspects of learning (Amzil & Stine-Morrow, 2013).

Cognitive Factors

Cognitive factors associated with reading comprehension include acquisition, recognition, and the use of knowledge; the ability to estimate and to extrapolate information; the use of written language clues; the rehearsal and repetition of written language; and the skill to seek new information (Ahmadi et al., 2013). As the learner gains the meaning of the new information and understands how the information is utilized, the information becomes more malleable and the learner can engage in manipulating the learned information (Anderson & Krathwohl, 2001). Cognitive processes are separated into lower order thinking and higher order thinking (Anderson & Krathwohl, 2001).

Lower order thinking skills. Initially, the learner uses the lower order thinking skills of remembering the reading material, knowing its meaning and understanding the implications of a text, and finally applying the information situationally (Anderson & Krathwohl, 2001). Foundational abilities such as vocabulary knowledge (Freed, Hamilton, & Long, 2017; Landi, 2010), visual-spatial memory and recognition of key words in sentences (Gillioz, Gygax, & Tapiero, 2012; Guerard, Saint-Aubin, & Maltais, 2013), and use of images to supplement written information (Chou & Hsiao, 2010) have been found to positively influence reading comprehension. Mechanisms to better understand text information include surface reading for main ideas (McCrudden, 2010), re-reading to limit confusion (Griffin, Wiley, & Thiede, 2008; Miele, Molden, & Gardner, 2009; Pascual & Goikoetxea, 2014), organizing concepts with a mind map (Kalyanasundaram et al., 2017), and summarizing or describing the text information

(Griffin et al., 2008; Pascual & Goikoetxea, 2014). Use of these lower orders thinking skills lead to the use of higher order abilities.

Higher order thinking skills. Anderson and Krathwohl (2001) describe higher order thinking skills associated with reading comprehension as analysis, evaluation, and synthesis of the reading material. A learner who can execute these abilities processes more information simultaneously in working memory (Georgiou & Das, 2015) and can demonstrate a deeper level of reading and learning, which includes reflection of the reading material (McCrudden, 2010; Pascual & Goikoetxea, 2014). This learner also has a greater visual spatial perspective and can think perceptually to visualize ideas and interpret concepts from the readings (Garrett et al., 2007; Taub & Benson, 2013). All types of cognitive factors can be enhanced through metacognitive knowledge and factors.

Metacognitive Factors

Metacognitive factors include (a) the planning for the reading, which includes what will be read and how the reading process will be accomplished; (b) the monitoring of the reading process, the resources and tools used in the process, and one's own self-control surrounding one's learning; and (c) the evaluating of the result of the plan and its impact upon the learning (Ahmadi et al., 2013). These three focal processes on the part of the learner focus on how comprehension occurs, rather than on the action of comprehension itself (Ahmadi et al., 2013; Flavell, 1979). While each of the three aspects have distinct features, they are often performed together. As the assessment of learning changes, new information is gleaned from the reading material and paired with external sources and internal knowledge.

Planning includes predicting familiar relationships and causality within the text information (Griffin et al., 2009; Koornneef, 2006). Planning also involves the organization of

the reading process, including such aspects as allotted time for reading and sequencing of strategies (Garner, 2009), which leads to the monitoring of these actions and altering the plans as appropriate for learning (Wolters & Benzon, 2013). Monitoring how well reading comprehension strategies work for the individual (Castel, Rhodes, & Friedman, 2013; Gier, Kreiner, Natz-Gonzalez, 2009; Miele et al., 2009) and monitoring impulse control (Garner, 2009) have shown to benefit the learner. Being aware of self-control, as seen through self-efficacy with the reading comprehension process (Stine-Morrow, Shake, Miles, & Noh, 2006) and the use of motivational strategies (Wolters & Benzon, 2013), has correlated with greater reading comprehension. Finally, the learner evaluates how well the text material has been understood and if the learner has gained the knowledge the learner planned to achieve (Cubukcu, 2008).

PQ5R Study Method

The *PQ5R Study Method* uses the seven steps of preview, question, read, record, recite, review, and reflect (Graham & Robinson, 1984). This method of studying text-based material, for instance, has the user preview a segment of the text for various headings and subheadings, as well as captions by diagrams and pictures (AVID, n.d.). Another example is during the *PQ5R Study Method* (Graham & Robinson, 1984) the user needs to find definitions to any unknown vocabulary from reputable sources and when reviewing identify all aspects or steps of a topic (AVID, n.d.). This method of studying includes cognitive aspects such as read, record, and recite, and also metacognitive aspects such as preview, question, review, and reflect.

Summary

The literature search did not yield any studies directly related to OTA education or OT education and reading comprehension for test preparation. The search did however find that

reading comprehension was linked to PTA student retention, (Easley, 2016). In addition, the outcomes of reading comprehension, clinically using OT knowledge and OT clinical reasoning were identified in several OT studies (Cohn, et al., 2014; Ikiugu & Smallfield, 2015; Mattila & Dolhi, 2016; Nicola-Richmond et al., 2016; Scanlan et al., 2015; Witchger Hansen, 2015).

Reading comprehension was shown to involve personal experience (Griffin et al., 2009), cognitive processes (Anderson & Krathwohl, 2001), and metacognitive processes (Ahmadi et al., 2013). The cognitive processes are a combination of lower order thinking skills and higher order thinking skills (Anderson & Krathwohl, 2001) and are affected by metacognitive factors (Ahmadi et al., 2013). The metacognitive factors involve planning, monitoring, and evaluating on how the learner reads and the learner's self-regulation during reading tasks (Ahmadi et al., 2013; Flavell, 1979). All the factors found in the literature help to identify the learning involved in reading comprehension which could be applied to OTA students. The information from this capstone project provided initial data to specifically identify the cognitive and metacognitive factors associated with the reading comprehension needs of the OTA population.

Section Three:
Methods

Project Design

This capstone project used a convergent mixed-method design. The quantitative components included the scores from two different OTA course examinations the participants completed and 5-point ordinal data from the *Text-Learning Strategies Inventory* (TLSI) (Merchie, Van Keer, & Vandevelde, 2014) (Appendix B), the *Metacomprehension Scale* (MCS) (Moore, Zabrucky, & Commander, 1993) (Appendix C). The qualitative component was the three original open-ended questions. The TLSI (Merchie et al., 2014), MCS (Moore et al., 1993), and open-ended questions were used as pre-tests and post-tests.

The objectives of this capstone project supported the use of a convergent mixed-method project design. By studying both quantitative and qualitative data, the results yielded measurable differences an intervention can provide, and the participants' perspective of the method being studied (Campbell & Fiske, 1959; Creswell & Creswell, 2018). The course examination scores evaluated any difference in examination ability pre-and post-reading comprehension strategy instruction. The quantitative data survey question and the qualitative open-ended question data furnished OTA students' views regarding cognitive and metacognitive factors affecting reading comprehension.

Institutional Review Board (IRB) approval for an exempt study was received from both Eastern Kentucky University (EKU) and the community college where the project occurred. *Informed Consent* (Appendix A) was obtained from the participants on August 23, 2018 and data collection began September 4, 2018.

Setting

The setting was in the southeastern part of the Unites States in a small, rural, public, associate degree college with a Basic Carnegie Classification (Carnegie Classification of Institutions of Higher Education, n.d.). The principal investigator is employed at this college as the OTA Program Director. The reading comprehension strategy information session took place in the OTA classroom/laboratory room. This was done to limit the disruptions which could be associated with relocating the OTA students to a different room. The pre-tests and post-tests of the TLSI (Merchie et al., 2014), MCS (Moore et al., 1993), and open-ended questions took place in a computer laboratory located adjacent to the OTA classroom/laboratory room. Additionally, the OTA course examinations took place in the same computer laboratory.

Inclusion/Exclusion Criteria

This was a convenience sample. All participants were members of the same OTA cohort. All participants were admitted into the 2018-2019 OTA cohort at the small, rural, public community college, and as such, had completed all pre-requisite general education courses (Composition I and II, Computers and Information Processing, College Algebra, Introduction to Sociology, General Psychology, Developmental Psychology, Abnormal Psychology, Anatomy and Physiology I and II, Kinesiology, and Introduction to Occupational Therapy) required for admission into the OTA program. All participants were entering the second semester of their OTA program and were enrolled in the course *OCCU 2203: Geriatrics and Occupational Therapy Interventions*. Participation in the capstone project was completely voluntary. All OTA students were invited to participate by the principal investigator. The principal investigator read the informed consent letter to the interested OTA students, answer all questions, and collected the signed informed consent letters. The pre-tests, post-tests, and reading comprehension strategy

information session were completed outside of class session time, thus, any OTA students who did not wish to participate in the research were not be mandated to listen to any information about the research. Any person not currently enrolled in the 2018-2019 community college's OTA cohort was excluded from this capstone project. There were 10 OTA student participants in this study.

Project Methods

Data collection. The quantitative data included the examination scores from the participants' *OCCU 2203: Geriatrics and Occupational Therapy Interventions* second and third course examinations. The score from each of the two examinations for each individual student were collected. Participants completed the examinations through the community college's hybrid course on-line platform, Blackboard. Participants' identification of their examinations was not made known to the principle investigator until after the data were gathered for the capstone project. Examination items were presented in random order for each participant and scored via the computer program. The examination scores were not entered into the course grading system, by OTA student name, until after data analysis was complete. Participants had access to their own examination record and they were able to access their individual examinations.

Examinations were multiple-choice, and each examination had 30 questions for a total of 150 points for each examination. All questions were taken from the text-book publisher's text-bank. Text questions were revised to remove distractors such as names and non-developmentally related ages. Both tests were assessed for format, in order to equalize as best as possible, for medical wording, syllabus amount, and sentence structure. Each test was analyzed with the use of the Readability Formulas (2018) website analysis tools. The "Readability Consensus" for the second course test was that the test was at an average reading level of grade 11 and for the third

course test the reading level was at an average reading level of grade 9 (Readability Formulas, 2018). Specific analyses are indicated in Table 1.

Table 1

Readability Formulas (2018) Analyses of OCCU 2203 two course examinations

Readability Test	Course Test Two	Course Test Three
Flesh Reading Ease Score	35.9 Difficult to Read	51.4 Fairly Difficult to Read
Gunning Fog	13.9 Hard to Read	11.8 Hard to Read
Flesch-Kincaid Grade Level	11.1 Grade Level	9.2 Grade Level
Coleman-Liau Index	15 College	12 Twelfth Grade
SMOG Index	10.1 Tenth Grade	8.7 Ninth Grade
Automated Readability Index	10.6 15-17 years old	8.7 13 to 15 years old
Linsear Write Formula	7.5 Eighth Grade	7.7 Eighth Grade

Additional quantitative data were collected using the TLSI (Merchie et al., 2014) (Appendix C) and MCS (Moore et al., 1993) (Appendix D). Both tests were formatted to use a five-point Likert scale. Both tests asked questions pertaining to cognitive factors and metacognitive factors associated with reading comprehension (Merchie et al., 2014; Moore et al., 1993). The TLSI (Merchie et al., 2014) was modified to change the original wording, that is specific to upper elementary students, to wording appropriate for the college-aged population. The TLSI (Merchie et al., 2014) has three questions specific to address the participants understanding to ‘seahorses’ and for this capstone project the word ‘seahorses’ was changed to ‘geriatrics’ (Merchie et al., 2014).

The qualitative, open-ended questions were collected at the same time the modified TLSI (Merchie et al., 2014) and MCS (Moore et al., 1993) were administered and are listed below.

- What strategies were you likely to use while studying for this examination?
- What strategies were you likely to use while answering the examination questions?
- Personally, what were you finding the most difficult about studying for tests?

The participants completed pre-tests and post-tests via Survey Monkey, which is a third-party website. There was no mechanism by which the principal investigator could link a participant's specific pre-tests and post-tests to a specific participant.

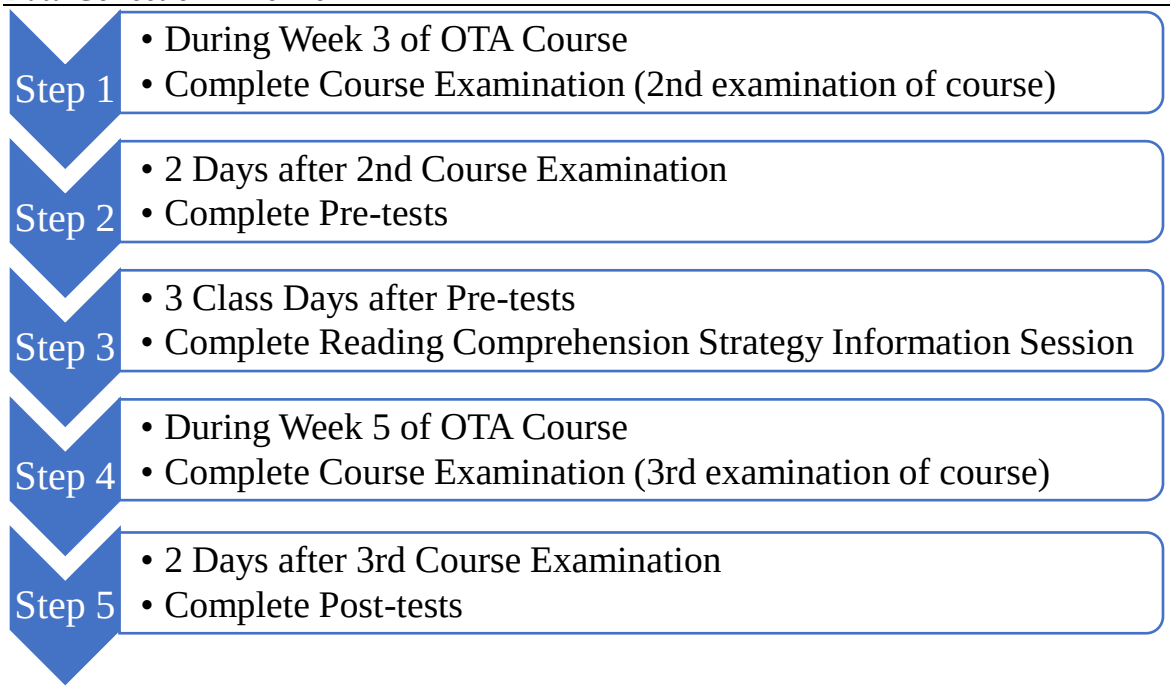
Data were collected in the following order, which is depicted in Figure 1.

1. During the third week of *OCCU 2203: Geriatrics and Occupational Therapy Interventions*, the OTA student participants completed the normally scheduled second course examination. This occurred in the computer laboratory room adjacent to the OTA classroom/laboratory room.
2. Two days after the second course examination was completed, the OTA student participants completed this study's pre-tests, which happened outside of class time. This occurred via Survey Monkey and included both pre-tests, the modified TLSI (Merchie et al., 2014) and the MCS (Moore et al., 1993), and the three additional open-ended survey questions. It was conducted in the computer laboratory room adjacent to the OTA classroom/laboratory room.
3. Three school days after completing the pre-tests, the OTA student participants attended the 90-minute reading comprehension strategy information session, which happened outside of class time. This occurred in the OTA Program classroom/laboratory room.
4. During the fifth week of *OCCU 2203: Geriatrics and Occupational Therapy Interventions*, the OTA student participants completed the normally scheduled third course examination. This occurred in the computer laboratory room adjacent to the OTA classroom/laboratory room.
5. Two days after the third course examination was completed, the OTA student

participants completed this study's post-tests, which happened outside of class time. This occurred via Survey Monkey and included both post-tests, the modified TLSI (Merchie et al., 2014) and the MCS (Moore et al., 1993), and the three additional open-ended survey questions. This occurred in the computer laboratory room adjacent to the OTA classroom/laboratory room.

Figure 1

Data Collection Timeline



Data analysis. Quantitative individual examination score data were analyzed by using a paired t-test to compare 2nd and 3rd course examination results. Analysis was done to determine any change in the two *OCCU 2203: Geriatrics and Occupational Therapy Interventions* course examination scores. Participants completed one course examination prior to the reading comprehension strategy information session and completed the other course examination after the reading comprehension strategy information session. Each examination had 30 multiple-choice questions with a total of 150 points per course examination.

The quantitative data from the modified TLSI (Merchie et al., 2014) and the MCS (Moore et al., 1993) were ranked on a five-point Likert scale as ordinal data and were analyzed with a Wilcoxon signed-rank test. Analysis was done on the participant group as a whole, for each item ranked on the pre-test as compared to how each item was ranked on the post-test. There were 59 items total from the three instruments. Microsoft Excel spreadsheet software and SPSS-25 software were used to facilitate the analysis process. Qualitative data from the three open-ended questions were analyzed through active reading to determine conceptual labels and memos, then index codes were used (Peacock & Paul-Ward, 2017). This process included initial coding and then focused codes (Charmaz, 2014).

The capstone project chair assisted and oversaw the data analysis process. Trustworthiness with the qualitative data collection involved four factors. It included managing the primary investigator's biases through the use of fieldnotes and identifying the topic of reading comprehension with OTA students based on a noticeable gap in evidence (Lysack, Luborsky, & Dillaway, 2017). In addition, reflexivity was used through initial and focused coding of open-ended questions and the primary investigator's field notes (Lysack, et al., 2017). Also, triangulation was done by having pre- and post-tests with both ordinal data survey questions and open-ended questions regarding the participants' perceptions of their use of cognitive and metacognitive strategies during reading comprehension (Lysack, et al., 2017). And finally, the four items of collected data, informed consent procedures, the primary investigator's personal notes, and the two pre-established assessments used for the pre- and post-tests provided an audit trail for qualitative evidence (Lysack, et al., 2017).

Outcome Measures

Validity measures. The two quantitative assessment measures used pre-tests and post-tests and were self-reported five-point Likert scale-based measures. The MCS (Moore et al., 1993) assesses metacognition within reading comprehension. It demonstrated homogeneity in its seven subscales and a simple structure in its subscales, thus exhibiting good factorial validity (Moore, Zabrucky, Commander, 1997). The criterion-related validity of the MCS (Moore et al., 1993) is a good predictor of comprehension performance, as compared to the *Metamemory in Adulthood Instrument* and somewhat better predictor of comprehension performance than the *Personality in Intellectual-Aging Contexts Inventory* (Moore, et al, 1997). The modified TLSI (Merchie et al., 2014) was correlated to have a moderate to high significance in five of eight subscales when compared with 'think a-loud' protocols (Merchie & Van Keer, 2014).

Open-ended question data analysis was checked for validity. Validity with the open-ended question analysis was done through reflective analysis by the principal investigator. As the participants' professor, field notes were made regarding how the lack of test preparedness was approached and any biases noted that may exist regarding students' overall academic performance (Krefting, 1991). Coding error analysis was done through questions that reflect the participants' point of view and not the researcher's point of view (Charmaz, 2014). These types of questions focused on identifying any such bias.

- coding reflecting the described experiences, versus the researcher's thoughts;
- analyses of codes beginning from the participants' experiences, versus from the researcher's actions; and
- clear links between the collected data and codes, versus the researcher's thoughts or actions and codes (Charmaz, 2014).

Analysis Methods for Project Objectives. This capstone project had three project objectives. The project objectives were revised based on input from the capstone committee. Two objectives were quantitative in nature and one objective was qualitative in nature. An analysis for each objective is as follows.

- Objective One - Identify the difference in OTA course examination ability pre-and post-reading strategy instruction.
    - Analysis was done to determine any change in the *OCCU 2203: Geriatrics and Occupational Therapy Interventions* course examination scores, with the second course examination taken prior to the reading comprehension strategy information session and third course examination taken after the reading comprehension strategy information session.
    - Quantitative individual examination score data were analyzed by using a paired t-test.
- Objective Two - Explore OTA students' perceptions of cognitive and metacognitive factors affecting studying of OT text-based material for written examinations.
    - Analysis was completed through use of the modified TLSI (Merchie et al., 2014) and the MCS (Moore et al., 1993) via Survey Monkey. Both assessments were completed as pre-tests and post-tests prior to and after the principal investigator provided the participants with a reading comprehension strategy information session and the post-tests were done after the participants complete the second of two OTA course examinations.

  - Quantitative data from the modified TLSI (Merchie et al., 2014) and the MCS (Moore et al., 1993) five-point Likert scale were entered as ordinal data and analyzed with a Wilcoxon signed-rank test.
  - Analysis was done on the participant group as a whole, for each item as ranked on the pre-test and compared to how each item was ranked on the post-test.
- Objective Three - Identify OTA students' preference of cognitive and metacognitive factors for studying of OT text material for written examinations.
  - Qualitative data from the three open-ended questions were analyzed through active reading to determine conceptual labels and memos, then index codes were used (Peacock & Paul-Ward, 2017).
  - The process included initial coding and then focused codes (Charmaz, 2014).

Ethical Considerations

Ethical concerns for this capstone project encompassed the areas of beneficence, autonomy, justice, veracity, and fidelity (American Occupational Therapy Association, 2015). The activities associated with this capstone project were conducted in accordance with current best practice standards and currently applicable teaching standards for OTA level education. All participants were students in the current OTA cohort and were invited to participate in the capstone project. All participants were informed of the possible risks and benefits associated with the capstone project. All research-based processes associated with this capstone were reviewed by the principal investigator's capstone mentor and the principal investigator also received input from the principal investigator's capstone committee member.

Participants were respected regarding their choices associated with the capstone project participation or non-participation. As students in the OTA program, participants could terminate

their participation in the capstone project and leave this capstone project at any time, and they could choose to never enter the capstone project. This capstone project's activities happened outside of class time; therefore, any OTA students who chose not to participate were not required to listen to the capstone project information.

The principal investigator is the participants' course professor and program director. As the course professor and program director, the principle investigator provides input for the OTA students' semester professionalism evaluations. Any activities or answers associated with the capstone project were not to be subject to consideration toward the professionalism evaluation. Anonymity was maintained by participants completing the pre-tests and post-tests, including open-ended questions, anonymously through Survey Monkey; and by assigning participants' non-sequential numbers for the scored OTA course examinations, thus removing principal investigator bias. The principal investigator kept fieldnotes, used coding error analysis, and used an electronic scoring mechanism for the OTA course examinations, thus removed any principal investigator bias.

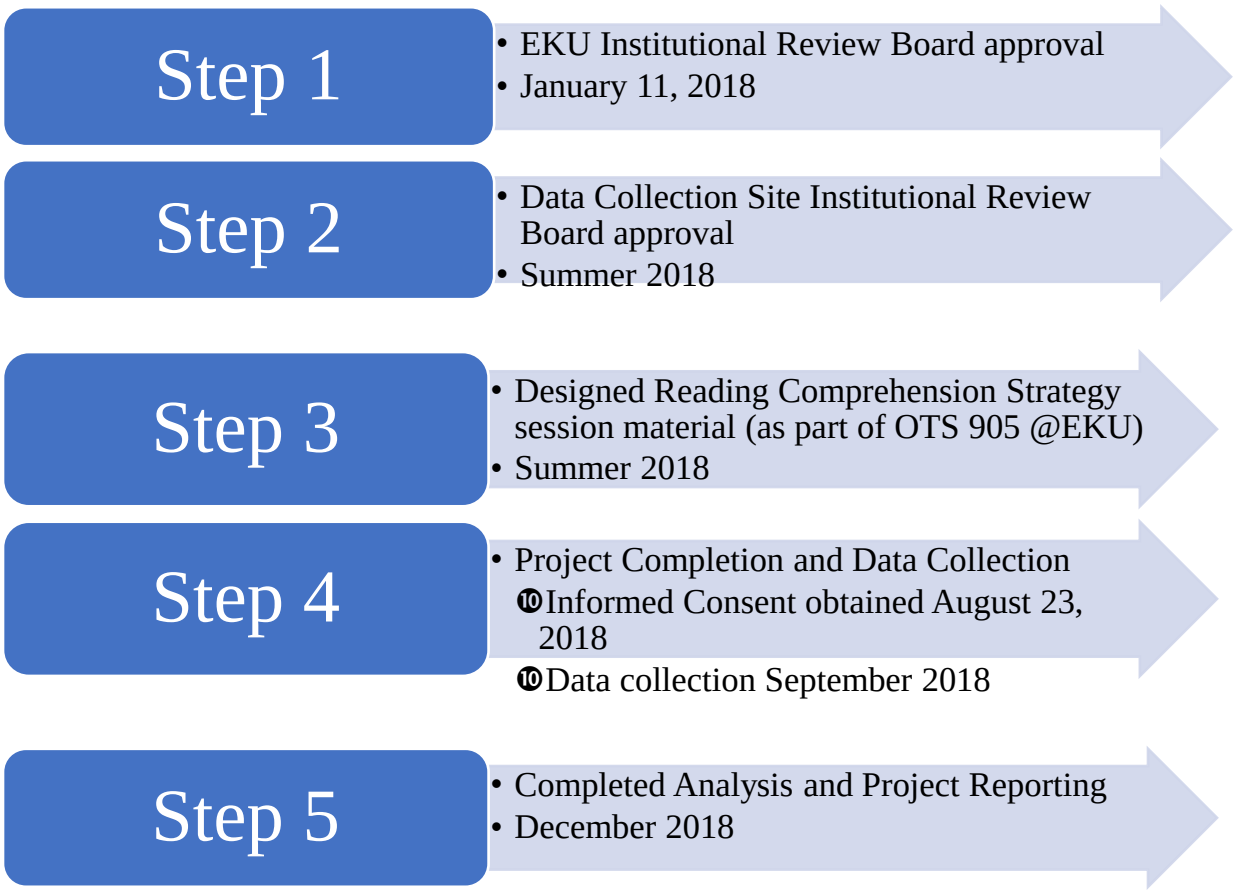
Documentation was stored in a secured area. Confidentiality of participant information and identity was maintained during and after the capstone project. All electronic information was maintained in a password-protected laptop computer. Storage of capstone project information and files were held in a password protected cloud-based system. Hard copies of the participants' informed consent forms were kept in a locked storage container. Participants will be identified in any and all public documents only as the randomized number assigned to them.

Project Timeline

The capstone project is as follows (Figure 2). The initial capstone project proposal and IRB application for EKU were completed in Fall 2017. Approval for the IRB from EKU was

obtained January 11, 2108. Additional IRB approval, from the community college where the project study took place was completed in Summer 2018. Invitation to the capstone project and informed consent procedures happened at the beginning of the Fall 2018 semester. Data collection begin during the third week of the Fall 2018 semester and was completed during the fifth week of the Fall 2018 semester. Data analysis begin thereafter. The capstone project was completed and presented in a written report format in the late fall of 2018.

Figure 2
Project Timeline



Section Four:
Results

Introduction

This capstone project assessed the participants' course examination ability pre and post a reading comprehension strategy information session and the participants' perception and preference of cognitive factors and metacognitive factors affecting their studying of OT text-based material. This capstone project examined the participants' testing ability through analysis of changes in course multiple-choice examination scores, (examinations administered through Blackboard) pre-and post reading comprehension strategy information session based on the *PQ5R Study Method* for reading comprehension (Graham & Robinson, 1984). Gathering of students' perceptions and preferences of cognitive factors and metacognitive factors was done through use of the modified TLSI (Merchie et al., 2014) and the MCS (Moore et al., 1993) and three open-ended qualitative questions administered as pre-and post-tests through Survey Monkey, respectively, pre and post reading comprehension strategy information session.

Results of Evaluation of Project Objectives

The aim of this capstone project was to determine any changes with testing ability post reading comprehension strategy information and to explore the perceptions and preferences of participants' cognitive factors and metacognitive factors associated with studying text-based OT material. The hypotheses of the primary investigator were (a) OTA students' ability to take an OTA course examination, as evidenced by grades, will improve pre-and post-reading strategy instruction, (b) OTA students have different perceptions of the cognitive and metacognitive factors affecting the studying of OT text-based material for written examinations and pre-and post-reading comprehension strategy information, and (c) OTA students' preferences of

cognitive and metacognitive factors for studying OT text-based material for written examinations will change pre-and post-reading strategy instruction.

Data collection was done over a three-week period in the sequential order outlined in the data collection timeline. Analysis of the data began after all data collection was completed (September 21, 2018). Quantitative individual examination score data were analyzed by using a paired t-test. The results are located in Table 2 and Table 3.

Table 2

Percentage Results of Individual Course Exams, Pre-and Post Reading Comprehension Strategy Instruction (Each course exam = 150 points)

	First Course Exam Grade Percent	Second Course Exam Grade Percent	Percent Change of Exam Percent Between First Course Exam and Second Course Exam
Student 1	63.3%	63.3%	00.00%
Student 2	73.3%	66.6%	- 09.09%
Student 3	83.3%	70.0%	- 16.00%
Student 4	63.3%	76.6%	+21.05%
Student 5	56.6%	76.6%	+35.29%
Student 6	66.6%	76.6%	+15.00%
Student 7	66.6%	80.0%	+20.00%
Student 8	70.0%	80.0%	+14.28%
Student 9	66.6%	83.3%	+25.00%
Student 10	73.3%	90.0%	+22.72%

Table 3

Results of Paired t-test for Course Exam Pre-and Post Reading Comprehension Strategy Instruction (Each course exam = 150 points). Data was analyzed as a whole, not for individual participant.

Task	Mean	Standard Deviation	Degrees of Freedom	Significance
First Course Exam	102.500	10.865		
Second Course Exam	114.500	11.891		
Total			9.00	0.047

Significance level $p<0.05$

The modified TLSI (Merchie et al., 2014) and the MCS (Moore et al., 1993) were combined into one questionnaire that included three main survey-type questions with a total of 59 items that the participants ranked with a five-point Likert scale. The ordinal data, for the participant group as a whole, was analyzed with the ranking for each item on the pre-test compared to the ranking on the post-test. Microsoft Excel spreadsheet software and SPSS-25 software were used to facilitate the analysis process. Results of the data collected from the modified TLSI (Merchie et al., 2014) and the MCS (Moore et al., 1993) were analyzed with a Wilcoxon-signed rank test. The results are summarized in Appendix D for the median ranking of each item from the pre- and post-tests and in Table 4 for the mean ranking of pre- and post- test medians.

Table 4

Mean Ranking of Pre-and Post-Tests (modified Text-Learning Strategies Inventory and Metacomprehension Scale) Questions (N=59). Completed with SPSS-25 software.

	Pre-Test	Post-Test	Total
Mean of Medians	3.70	4.00	
Standard Deviation	1.083	0.924	
Z score			3.146
Asymptotic Significance			.001

Significance level $p<0.05$

Qualitative data from the three open-ended questions were coded to find themes (Charmaz, 2014; Peacock & Paul-Ward, 2017). Analysis of the qualitative items began with initial coding (Charmaz, 2014) that was completed through removal of same-responses from the pre-and post-test and analyzing the remaining responses based on the *PQ5R Study Method* (Graham & Robinson, 1984). Next, conceptual labels, or tags, (Peacock & Paul-Ward, 2017) were determined based on evaluating the initial codes for connections to *PQ5R Study Method*

(Graham & Robinson, 1984). Conceptual labels (Peacock & Paul-Ward, 2017) were then evaluated based on similarities and differences found between the pre-test and post-test responses and the conceptual labels were then used to determine focused codes (Charmaz, 2014). Focused codes were evaluated in respect to the theoretical framework of social constructivism, as described by Creswell & Poth (2018). The student participants provided their view, or preference, in order to build meaning for learning and construct a better process for teaching. Index codes that emerged from each of the three open-ended questions are listed in Table 6. The individual question index codes were then synthesized, and overall themes of the students' preferences for the use of cognitive and metacognitive factors in reading comprehension emerged. In addition, recommendations when presenting reading comprehension strategy information became apparent (Figure 2). This sequence is depicted in Figure 3.The results are Figure 4.

Figure 3 *Qualitative Data Analysis Sequence*

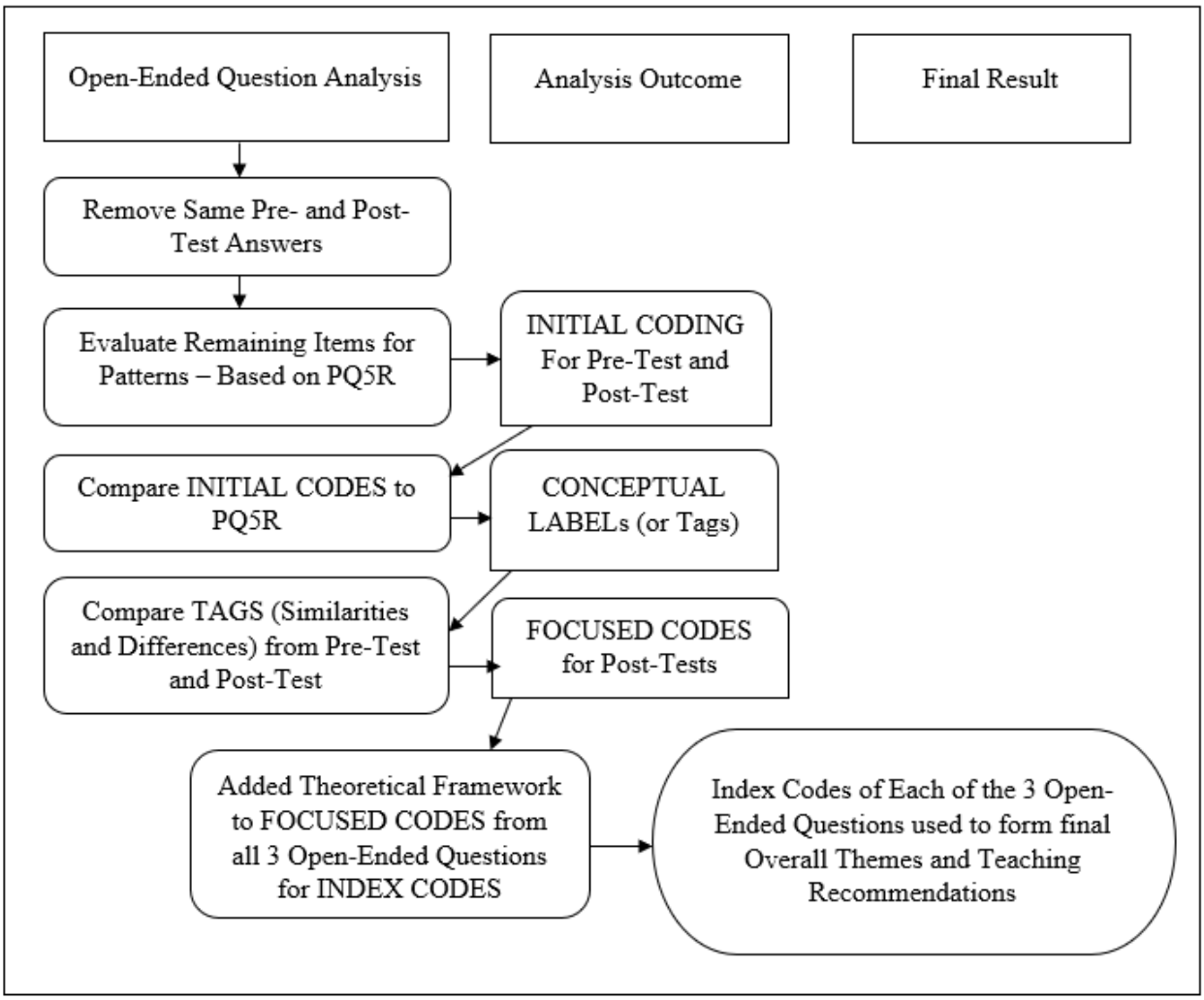
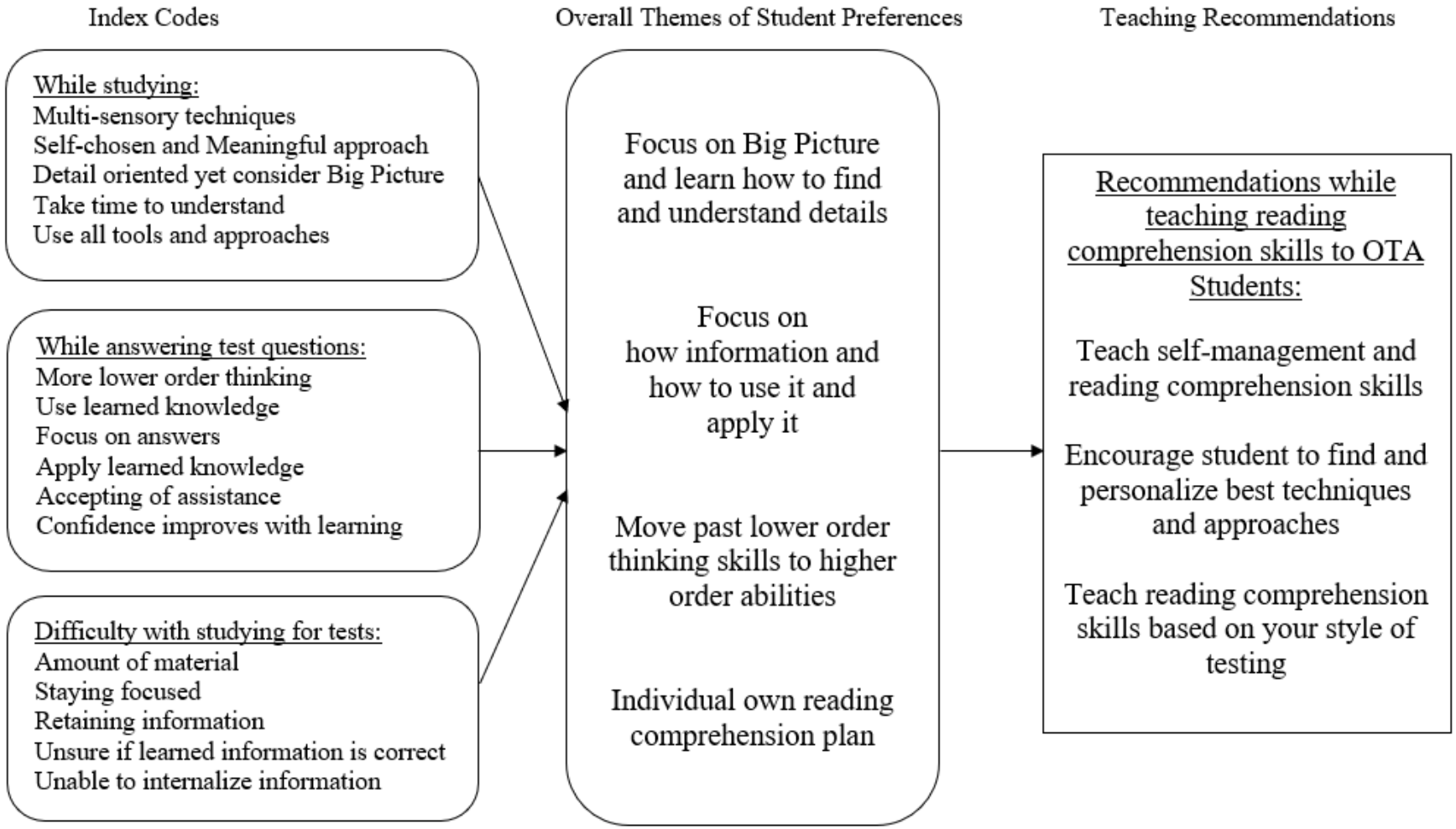


Figure 4

Overall Themes from Post-Test Open-Ended Questions and Teaching Recommendations



Data Analysis

A convergent mixed method research design was used for this capstone project (Creswell & Creswell, 2018). Through use of this design, detailed quantitative data was used to measure the change in the participants' testing ability, after intervention was provided (Creswell & Creswell, 2018), as well as the change in the participants' perceptions for cognitive and metacognitive factors for reading OT text-based material, also after intervention was provided. In addition, rich qualitative data was used to identify themes from the perspective of the participants regarding the participants' preferences for cognitive and meta cognitive factors for reading comprehension, post an intervention session. The open-ended responses were compared to determine similarities or differences within the qualitative data and any convergence or divergence between the qualitative and quantitative data.

Quantitative data analysis. The two sets of course examination scores from *OCCU 2203: Geriatrics and Occupational Therapy Interventions* were analyzed with a paired t-test. The paired t-test allowed review of individual participant scores from one group of participants at two different points in time and analysis of the participant group's mean score from each course examination occurrence (Taylor, 2017). This was done to determine any change in participants' testing ability pre-and post reading comprehension strategy instruction. The review of individual scores showed an increase in 7 of the 10 participants' testing ability and results of the statistical analysis showed the participant group had a significant increase, at a p=value of 0.047 (significant at a p=value of <0.05) in testing ability over time and with reading comprehension strategy information instruction. Thus, the hypothesis of OTA course examination ability will change pre-and post-reading comprehension strategy instruction was confirmed.

The ordinal data ranked from the modified TLSI (Merchie et al., 2014) and the MCS (Moore et al., 1993) were analyzed through use of the Wilcoxon-signed rank test. The Wilcoxon-signed rank test was used because there were two sets of data from the same group of participants, collected at different occurrences, and the data was ordinal in nature (Wilcoxon, 1945). In addition, the data was nonparametric in that it was ordinal in nature, there was not homogeneity of variance with the ranking, and the sample size was less than 30 participants (Taylor, 2017). Each item of the pre-test and post-test were analyzed to determine the median for each item on the pre-test and post-test. The median for each item was compared to determine participant differences in perceptions of the cognitive factors and metacognitive factors while studying OT text-based material before and after they were provided with reading comprehension strategy information. The hypothesis, OTA students can provide different perceptions of the cognitive and metacognitive factors affecting the studying of OT text-based material for written examinations and pre-and post-reading comprehension strategy information, with a significant p value of 0.001 (based on $p<0.05$) was found to be true.

Six of the 59 items were scored lower on the post-test, versus the pre-test. The items were as follows.

- I wrote down the most important information
- First, I read the whole text and then I started learning
- While learning, I checked what I had already done and how much I still had to do
- I worried a lot about the test afterward
- I would get very anxious if I had to read something new and explain it.
- I get anxious when I am asked to read something and answer questions.

Thirty of the 59 items were scored higher on the post-test. Twenty-three items were

scored the same for both the pre-and post-test. Thus, 50% of the items were scored higher after the participants received the 90-minute reading comprehension strategy information session, as compared to 10% of the items were scored lower after the reading comprehension strategy session, and 40% of the items were scored at the same level for both the pre-and post-test. It should be noted that three of the six items scored lower for the post-test can be viewed as an improvement, based on the Likert-scale type ranking used for the 59 items. A higher number of participants ranked the question toward the positive. See Table 7 *Analysis of Negatively Worded Items* for number of participants' responses for both pre-test and post-test.

Table 7

Analysis of Negatively Worded Items from modified Text-Learning Strategies Inventory [Merchie et al., 2014) and Metacomprehension Scale [Moore et al., 1993].

	Disagree		Somewhat Disagree		Neither Disagree nor Agree		Somewhat Agree		Agree	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
I worried a lot about the test afterward.	0	1	0	0	1	2	3	3	6	4
I would get very anxious if I had to read something new and explain it.	0	0	1	0	0	3	2	2	7	5
I get anxious when I am asked to read something and answer questions.	0	0	1	1	1	1	3	5	5	3

Number of participants per question for Pre-test and Post-test. N=10

The 59 items were analyzed based on the revised Bloom's taxonomy (Anderson & Krathwohl, 2001), the *PQ5R Study Method* steps (Graham & Robinson, 1984), and content (cognitive [Ahmadi et al., 2013] and metacognitive factors [Ahmadi et al., 2013; Flavell,1979]). Table 9 identifies the analysis of revised Bloom's levels (lower order thinking of remember, understand, and apply; higher order thinking of analyze, evaluate, and create) (Anderson &

Krathwohl, 2001), the *PQ5R Study Method* (preview, question, read, record, recite, review, reflect) (Graham & Robinson, 1984), and cognitive and metacognitive factors (Ahmadi et al., 2013; Flavell, 1979).

Pre-and post-testing using the modified TSLI (Merchie et al., 2014) and the MCS (Moore et al., 1993) demonstrated the following analysis of the revised Bloom's taxonomy (Anderson & Krathwohl, 2001), the *PQ5R Study Method* stages (Graham & Robinson, 1984), and use of metacognitive factors and cognitive factors indicate the following. Eleven items for higher order thinking were ranked higher at the post-test and 13 items for higher order thinking (Anderson & Krathwohl, 2001) were ranked the same for the pre-and post-test. Eighteen items for lower order thinking (were ranked higher at the post-test, and 11 items for lower order thinking (Anderson & Krathwohl, 2001) were ranked the same for both the pre-and post-test. The results indicate that after the reading comprehension strategy session students identified use of more specific skills, however the skills were lower order thinking skills.

More of the *PQ5R Study Method* (Graham & Robinson, 1984) foundational skills were ranked higher at post-test, versus skills requiring more complex processing ability. Items focusing on cognitive, or foundational learning skills for the actions of previewing, questioning, recording, and reciting were ranked higher at the time of post-test. Items focusing on the metacognitive aspects of reading, reviewing, and reflecting were more often ranked the same on both the pre-and post-test. Cognitive based items were more often ranked higher at post-test, versus metacognitive items, which were more often ranked the same for both the pre-and post-test.

Effect Size. Both the paired t-test and the Wilcoxon signed rank were analyzed for effect size. The course exam data was found to have a large effect size with a Cohen's d value of 0.608.

The 59-item pre-and post-test data was found to a medium effect size with a Cohen's d value of 0.314. The course exam data was found to have a large effect size with a Cohen's d value of 0.608.

Qualitative Data.

The three open-ended questioned were analyzed for themes around the participants' preferences related to cognitive factors and metacognitive factors while studying OT text-based material. Participant stated preferences toward reading comprehension skills are presented in Table 5. Participants' responses centered on lower order thinking and cognitive based strategies, such as reading, writing or rewriting information, recall, and finding key items. Fewer of the participants' responses were centered on higher order thinking and metacognitive based strategies, such as forming questions or thinking self-identified study questions while completing the course examination.

Pre-test responses from the participants lacked depth and focused primarily on cognitive-based skills. While reading text-based information the participants noted mainly using skills such as reading but not using the information with higher order thinking activities, copying, staying focused on the material, and thinking of how to retain the information. In the matter of reading during an examination, the participants' responses noted a focus on the question (versus the answer), feelings about the material while trying to remember the information, trying to choose an answer, and remembering key words. Finally, difficulties the participants noted with learning included needing to focus, wanting to know specifically what to study, studying form a variety of sources, studying from various types of information in the textbook (such as tables, charts, and terms), and being confused once presented with the examination.

The participants' preferences post-test responses remained weighted towards cognitive-based and lower order thinking skills but started to move toward higher level skills and metacognitive thinking. A summary of these responses is listed in Tables 5 and Table 6. While reading text-based material the participants identified preferences such as using meaningful and self-chosen approaches that encompassed multiple-sensory techniques, focusing on details and the larger picture of learning, and taking the time needed to understand the material. Test question reading preferences included using skills such as recall, finding, choosing, applying knowledge, accepting guidance from the instructor, and focused on examination answers versus examination questions. Additionally, the participants continued to demonstrate an external locus of control as identified in responses about difficulties with staying focused while studying and retaining the information, the amount of information to learn, and being unsure about the if they were learning the information correctly.

Table 5

Participant Post-Test Preferences for Reading Comprehension

Question	Participant identified items from posttest
Strategies use while studying for this examination	Read the entire chapter
	Write down material on scratch paper
	Forming questions about the text
	Rewrite the information in my own words then try to recall
	Reading one paragraph at a time, then highlighting the important information…went back and read the information aloud
Strategies use while answering examination questions	Recall the information I wrote down on my note cards
	Think about the questions I had asked myself about the material
	Narrow it down to two answers, to the two best choices
	Recall the information in my words, I read from the book, I wrote down into my notebook
	Finding key words

Table 6

Index Codes from Individual Post Open-Ended Questions

Question	Index Codes from posttest
Strategies use while studying for this examination	Multi-sensory techniques – visual, auditory, kinesthetic Own learning process – self-chosen framework for study and review Individualized work – writing and rewriting details in meaningful fashion Dig deeper for details, focus on Bigger Picture and take time to understand Use all available tools and approaches
Strategies use while answering examination questions	Mostly lower order skills – recall, remember, think, understand, choose, find Higher order skill - analyze Use learned knowledge rather than personal information Focus on knowing the answers versus thinking about the question Try to apply learned information, but difficult with complex information Accept guidance to learn and use new skills Confidence improves with learning reading comprehension skills
Find most difficult about studying for tests	Amount of material covered in one test Unsure of answers to study questions Reading material numerous times but unable to tell somewhat what was read Staying focused on learning material Retaining information

These themes support the hypothesis of OTA students' preferences of cognitive and metacognitive factors for studying OT text-based material for written examinations will change pre-and post-reading strategy instruction.

Discussion

Discussion of Findings

Data analysis supports the first, second, and third hypotheses. Quantitative data of the course examination results demonstrated that 70% of the participants improved their test taking ability after the reading comprehension strategy session. Survey quantitative data and qualitative

open-ended data relay that the participants had a more in-depth reading focus after the reading comprehensions strategy information session. Post the reading comprehension strategy information session, the participants indicated a greater ability to use more of the *PQ5R Study Method* (Graham & Robinson, 1984). Prior to the reading comprehension strategy session participants indicated using the techniques of preview, question, read, record, and review. After the reading comprehension strategy session, participants added using "recite" to the techniques when reading text-based material. The *PQ5R Study Method* (Graham & Robinson, 1984) was noted as being difficult to use, as seen by problems noted regarding applying information to complex situations. This result is consistent with the Lynch (2007) study involving college freshman and sophomores who indicated a high importance to rehearsal, versus faculty who indicated a high importance to elaboration and critical thinking.

Post-test results of the quantitative 59 survey items indicated the participants identified several cognitive factors, versus metacognitive factors, and many lower order thinking skills, versus higher order thinking skills, for use when completing reading comprehension of text-based material and examination questions. There was however a limited increase in the participants identifying more higher order skills and more metacognitive factors after experiencing the reading comprehension strategy session. This is seen in the quantitative data from the 59-item survey and in the qualitative responses. A lean toward lower order thinking skills is shown in the literature as noted by college students preferring rehearsal (Lynch, 2007) recitation (Haskell & Champion, 2008), and memorization (Al-Mohrej, Al-Ayedh, Masuadi, & Al-Kenani, 2017).

The participants indicated a preference to read and study a limited amount of text-based material and to not use multiple resources for learning. This request to center studying on limited

sources was also found in a study by Al-Mohrej, Al-Ayedh, Masuadi, and Al-Kenani, (2017) with medical students. In the Al-Mohrej et al. (2017) study the medical students indicated anatomy could be learned just from the textbooks and lecture. This focus on wanting to limit information was seen in the participants' preference to know the information to study for an examination and to limit the amount of material on an examination. The participants did indicate some metacognitive awareness of a lack of ability to remain focused on learning and difficulty with retaining information when completing an examination.

Convergence was achieved between the quantitative and qualitative measures. Both the quantitative measures were found to have a significant change, post the reading comprehension strategy information session. The participants' examination testing ability improved, and the participants' perceptions of cognitive factors and metacognitive factors that affected the participants' reading comprehension changed. The themes from the qualitative measure were congruent with the quantitative data of the 59 survey items ranked by the participants. Post the reading comprehension strategy information session, both types of data identified by the participants were similar.

The participants' perceptions and preferences for reading comprehension skills were based more with cognitive factors than with metacognitive factors. Participant perceptions and preferences also indicated a greater and more detailed use of lower order thinking skills with a slight increase in the use of higher order thinking skill of analysis. These results are substantiated through similar findings from previous research studies. In a study by Alsamadani (2012) with Saudi English-language teachers it was found the teachers identified more so with teaching cognitive strategies, than with metacognitive strategies. The participants of the study indicated cognitive strategies were a greater part of their training, versus metacognitive strategies

(Alsamadani, 2012). In a 2015 study by Kara, similar conclusions were found with fourth-year Turkish students learning to be English-language instructors. The study found the students more often used pragmatic-based cognitive reading strategies such as re-read, underline, and highlight, versus more dynamic metacognitive learning strategies such as consider, evaluate, and visualize (Kara, 2015).

Strengths and Limitations of the Project

Strengths. A strength of this capstone project was that all three hypotheses were met and congruency was identified between the quantitative data and qualitative data. All the data collected substantiates the use of the PQ5R method as a technique to teach and develop cognitive factors and metacognitive factors in OTA students' reading comprehension skills. The reading comprehensions strategy session demonstrated a greater depth of the participants' perceptions and preferences for how to use lower order and higher order thinking skills. The increase in the participants' examination testing ability further helps to provide evidence support of the use of the PQ5R method as a basis for teaching of reading comprehension skills.

Another strength of this study was the instrument used to collect the OTA student participant perceptions. The instrument was a 59-item survey developed from two Likert-scales assessments, both with proven validity (Merchie & Van Keer, 2014; Moore, et al., 1997) In addition, the survey instrument allowed for the OTA student participants to provide their perceptions for both cognitive factors and metacognitive factors regarding reading comprehension.

A significant strength of this capstone project is the cultivation of data toward the development of a reading comprehension strategy program geared toward OTA students. There is a gap in the literature for this population regarding reading comprehension strategies of OT

text-based material. The participants' perceptions and preferences of cognitive factors and metacognitive factors associated with reading comprehension of OT text-based material afford a more substantial resource to OTA students. As the OT profession continues to broaden its clinical expectations (AOTA, 2016), OTA student needs also broaden, and thus they can benefit from learning OT text-based material on a deeper level and with a greater understanding of OT constructs.

Limitations. The main limitation of this research was the sample size and type. The small number of participants (N=10) were from one cohort of OTA students at one small rural public community college. Thus, while all OTA students learn the same standard information (ACOTE, 2011), generalizability is limited. These participants' perceptions and preferences are not necessarily the same as all OTA students, especially as teaching styles among professors will differ at various higher education institutions.

An additional limitation was the reading comprehension strategy information session could have been lengthened to allow for increased instructional depth. Ninety minutes was allotted for this instructional session. There was an approximately 15-minute break provided, which resulted in a total of closer to a 105-minute session. The session included information on both the *PQ5R Study Method* (Graham & Robinson, 1984) and information on test question reading, self-management, and personal motivation. Presentation of the *PQ5R Study Method* (Graham & Robinson, 1984) information lasted approximately 60 minutes, leaving minimum time to cover the remaining three sections of information.

One other limitation was the placement of the *PQ5R Study Method* (Graham & Robinson, 1984) reading comprehension material in the OTA program curriculum. The participants had

already completed one semester in the OTA program. Poor performance behaviors may have already become habitual on the part of the participants.

Implications for Practice

This capstone project was initiated to learn the cognitive and metacognitive factors OTA students prefer to use when studying OTA text-based materials and to identify any gains associated with testing, post reading comprehension strategy intervention session. Student identified themes from the qualitative data provide for recommendations when teaching OTA students reading comprehension. These recommendations include (a) teaching students how to self-manage stress while reading and learning new material, (b) encouraging students to find the learning strategies and approaches that best fit their individual needs, and (c) instructing students how to read and learn information based on how the individual professor constructs test questions. This information can lead to enhanced teaching methods through the use of a systematic sequence of reading comprehension strategies, such as presented in the *PQ5R Study Method* (Graham & Robinson, 1984). The information gained from the post-test data can be used to enhance reading comprehension information to future OTA student cohorts. The time used for the reading comprehension strategy information session could be lengthened. The information can be presented in shorter, multiple sessions to allow students to concentrate on text-based reading separately from examination-question reading.

The participants' desire to accept more intervention from the professor and their preference with using more in-depth techniques such as the mind map, thinking about learning questions, and recording and reciting information in their own words can help to move students toward higher level thinking abilities with examination questions. In a study by Agarwal (2018) with college students it was shown the students performed better with delayed higher order

activity if learning the text-based information involved higher order thinking skills while learning the information.

Use of these strategies can extend beyond classroom testing and may assist with pass rates for the national credentialing examination. Improvements in reading comprehension and testing taking ability can also lead to OTA graduates feeling more prepared and confident to further their clinical credentials towards a graduate degree in occupational therapy.

Future Research

This capstone research showed how reading comprehension strategy information can positively impact academic learning and change OTA student attitudes toward reading text-based information. Additional study with reading comprehension strategies is needed. Research with OTA cohorts presented with this information earlier in the curriculum and at a greater depth can yield additional data toward improving student success. In addition, continued research with new cohorts of OTA students and their preference toward reading can provide more teaching and learning best practice data for this population.

Examining this method of reading comprehension with additional cohorts of OTA students, and cohorts from other geographically located academic institutions would strengthen this project's findings. Educational programs for OTA students differ in curriculum formats, thus, placement of this study at different temporal points in an OTA educational curriculum could lead to beneficial results that could be more readily generalized in more OTA educational programs. Now that this study has been completed, using the participants' post-test perceptions and preferences of cognitive factors and metacognitive factors, the reading comprehension strategy session can be revised. Continued study could then be done exploring any changes in

OTA student testing ability, which could yield helpful data toward furthering developing best practices when teaching this population.

Future research could include the same reading comprehension strategy session and pre-and post-tests with additional OTA student cohorts both at the same institution and at other institutions. In addition, the data from this study could be used to revise the reading comprehension strategy session, and then further use of these strategy materials could be explored.

Summary

The purpose of this capstone project was to investigate the perceptions and preferences of OTA students' cognitive factors and metacognitive factors associated with reading comprehension. In addition, this capstone project explored OTA student testing ability with multiple choice questions pre-and post a session of reading comprehension strategy information. Participants perceptions and preferences were collected through pre-and post-testing done via Survey Monkey and use of a modified TLSI (Merchie et al., 2014) and the MCS (Moore et al., 1993), as well as three open-ended questions. The participants' testing ability was measured through scores from a course examination, pre and post a reading comprehension strategy information session. Results indicated OTA students can change their perceptions and preferences for reading comprehension techniques with reading comprehension strategy information. The results indicated that OTA students can increase examination scores with reading comprehension strategy information. Both the quantitative and qualitative data support the results.

This capstone project was designed to explore OTA students' perceptions and preferences for reading and studying OT-text based material. It was found that with reading

comprehension strategy instruction, OTA students changed their perceptions of strategy use and their preferences for which strategies they used. Post reading comprehension strategy information session, participants began to use higher order thinking skills and use more specificity with lower order thinking techniques to read and learn text-based information. These differences in perceptions and preferences, as well as improved performance for course examination testing demonstrated a significant change for all three of the study research objectives.

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Appendix A: Informed Consent

Consent to Participate in a Research Study

Cognitive and Metacognitive Factors in Reading Comprehension for Occupational Therapy Assistant Students

Why am I being asked to participate in this research? You are being invited to take part in a research study about cognitive and metacognitive difficulties Occupational Therapy Assistant (OTA) students experience, associated with reading comprehension of Occupational Therapy (OT), medical, and rehabilitation text material. You are being invited to participate in this study because you are currently in the OTA Program at South Arkansas Community College. If you take part in this study, you will be one of about 20 people to do so.

Who is doing the study? The person in charge of this study is Cynthia Lynn Meyer (Principal Investigator) at Eastern Kentucky University. She is being guided in this research by Dr. Cynthia Lee Hayden, D.H. Ed., OTR/L, CHT [Advisor].

What is the purpose of the study? The purpose of the study is to explore OTA students' perceptions of the effectiveness of cognitive and metacognitive strategies for learning and understanding text-based OT material. By doing this study, we hope to learn specific cognitive factors and metacognitive factors associated with reading comprehension unique to the OTA student population coursework.

Where is the study going to take place and how long will it last? The research procedures will be conducted at South Arkansas Community College. You will need to come to Health Science Center rooms 274/276/272 3 times during the study. The 2 Pre/Post Test sessions will each take about 20 minutes. The 1 reading strategy session will take about 90 minutes. The total amount of time you will be asked to volunteer for this study is approximately 2 hours and 15 minutes over the next month.

What will I be asked to do?

1. Electronically complete this study's pre-tests (to happen outside of class time). (20 minutes)
2. Attend the face-to-face reading strategy session (to happen outside of class time). (90 minutes)
3. Electronically complete the study's post-tests (to happen outside of class time). (20 minutes)

There is only 1 group of participants for this study. You are all part of the same group. The data collected for this study are the completed electronic pre-tests and post-tests via Survey Monkey. You will go to the Survey Monkey website and complete the pretests and posttests. There will be no mechanism by which the principle investigator could link your specific pretests and posttests to you. In addition, scores from 2 course examinations will be correlated in respect to your performance before and after the reading strategy session. Data from the course examinations will be reported based on a randomized numerical identification system of all the participants and your scores will be kept confidential.

Are there reasons why I should not take part in this study?

You should not take part in this study if you do not wish to attend the reading strategy session. You should not take part in this study if you do not wish to share the perceptions of cognitive and metacognitive strategies you used for learning and understanding text-based OT material.

What are the possible risks and discomforts? To the best of our knowledge, the things you will be doing have no more risk of harm than you would experience in everyday life.

Will I benefit from taking part in this study? There is no guarantee that you will get any benefit from taking part in this study. However, some students may gain knowledge of reading comprehension strategies when studying or reading OT text material.
Do I have to take part in this study? If you decide to take part in the study, it should be because you want to volunteer. You will not lose any benefits or rights you would normally have if you choose not to volunteer. You can stop at any time during the study and still keep the benefits and rights you had before volunteering.
If I don't take part in this study, are there other choices? If you do not want to be in the study, there are no other choices except to not take part in the study.
What will it cost me to participate? There are no costs associated with taking part in this study.
Will I receive any payment or rewards for taking part in the study? You will not receive any payment or reward for taking part in this study.
Who will see the information I give? Your information will be combined with information from other students taking part in the study. When the study is shared with other researchers, all information is deidentified and aggregated in combined information. This means you will not be identified in these written materials. This study is anonymous. That means that no one, not even members of the research team, will know that the information you give came from you.
Can my taking part in the study end early? If you decide to take part in the study, you still have the right to decide at any time that you no longer want to participate. You will not be treated differently if you decide to stop taking part in the study.
What if I have questions? Before you decide whether to accept this invitation to take part in the study, please ask any questions that might come to mind now. Later, if you have questions about the study, you can contact the investigator, Cynthia Lynn Meyer at 870-864-9442. If you have any questions about your rights as a research volunteer, contact the staff in the Division of Sponsored Programs at Eastern Kentucky University at 859-622-3636. We will give you a copy of this consent form to take with you.
What else do I need to know? You will be told if any new information is learned which may affect your condition or influence your willingness to continue taking part in this study.

I have thoroughly read this document, understand its contents, have been given an opportunity to have my questions answered, and agree to participate in this research study.

_____

Signature of person agreeing to take part in the study Date

_____

Printed name of person taking part in the study

Cynthia Lynn Meyer

Name of person providing information to subject

Appendix B: Text Learning Strategies Inventory (TLSI) (Merchie et al., 2014)
What did you do while learning this test?

Code	Item
Summarizing and schematizing	
SS1	I wrote a summary
SS2	I wrote down the most important information
SS3	I used scratch paper
SS4	I made a graphic organizer or a mind map
SS5	To learn the text, I used the graphic organizer or a mind map
SS6	To learn the text, I copied it on my scratch paper
SS7	I repeated the text with my summary or graphic organizer on my scratch paper
Highlighting	
HL1	I marked the most important things
Rereading	
RR1	To learn the text, I read the text a lot of times
RR2	I repeatedly read or recalled everything until I knew it
RR3	I repeated the text until I knew it all
Paraphrasing	
PAR1	I tried to repeat the text in my own words
PAR2	In my head, I retold the information as it was written down in the text
PAR3	In my head, I retold the information from the text in my own words
PAR4	I covered up a part of the text and I tried to recall it
PAR5	I stopped once in a while to repeat
PAR6	While learning, I asked myself questions about the text and answered them to check whether I still knew what I had learned
PAR7	Afterward, I asked myself questions to check whether I still knew what I had learned
Linking with prior knowledge	
LPK1	Before learning, I thought about what I already knew about seahorses
LPK2	I related the text about seahorses to what I already knew
LPK3	I thought about what I already knew about seahorses
Studying titles and pictures	
TP1	I looked at the titles to understand the text
TP2	I looked at the pictures to understand the text
TP3	I looked at the pictures to remember the information
Planful approach	
PA1	First, I read the whole text and then I started learning
PA2	I immediately started learning, without reading the whole text first
PA3	Before highlighting, I read the paragraphs first

Monitoring

MON1 While learning, I checked what I had already done and how much I still had to do
MON2 While learning, I asked myself: “Do I still have enough time?”
MON3 While learning, I asked myself: “Am I doing well?”
MON4 While learning, I asked myself: “Is it working well this way?”
MON5 I worried a lot about the test afterward

Self-Evaluation

SE1 I immediately knew how to start learning the text
SE2 While learning, I managed to stay attentive and concentrated
SE3 While learning, I made sure I understood everything
SE4 I managed to learn the text in a good way
SE5 I did well in learning this text

(Adapted “Linking with prior knowledge” section by changing seahorses to geriatrics)

Appendix C: Metacomprehension Scale (MCS) (Moore et al., 1993)

Subscale	Number	Item
Anxiety	3	I feel jittery if I have to explain something that I have just read.
Anxiety	8	I would get very anxious if I had to read something new and explain it.
Anxiety	12	I get anxious when I am asked to read something and answer questions.
Anxiety	13	I do get flustered when I am put on the spot to read and understand something new.
Achievement	4	I admire people with good reading comprehension abilities.
Achievement	10	It is important to have good reading comprehension skills.
Achievement	18	I think good reading skills are something of which to be proud
Strategy	6	I usually scan difficult material before trying to read it.
Strategy	7	When reading, do you search for key words or information that you think are essential for understanding?
Strategy	11	Before reading difficult material, I usually formulate in my mind the questions that I hope to answer from reading.
Capacity	1	Whenever I read a news article, I understand most of it.
Capacity	2	I am good at understanding newspaper articles.
Capacity	14	I am good at understanding news articles like those found in *Time* or *Newsweek*.
Task	20	For most people, it is easier to understand topics they know nothing about than topics they are familiar with.
Task	21	Most people find it easier to understand abstract information rather than concrete information.
Task	16	For most people, reading materials that is not interesting is easier to understand than reading material that is interesting.
Locus of Control	9	No matter how hard a person works on their reading comprehension ability, it cannot be improved much.
Locus of Control	15	I know that if I keep reading I will never lose my reading c comprehension ability.
Locus of Control	22	It is up to me to keep my reading skills from deteriorating.
Regulation	19	When you are reading something that is difficult to understand, do you reread passages that were particularly different to get a better understand of the?
Regulation	5	Do you read difficult to understand material slowly and carefully to make sure that you fully understood it?
Regulation	17	When reading, I usually look up words that I don’t understand in the dictionary.

Appendix D: Median Ranking of Pre-and Post-Tests - (modified Text-Learning Strategies Inventory [Merchie et al., 2014) and Metacomprehension Scale [Moore et al., 1993]) Questions (based on five-point Likert type scale)

Item		Pre-Test	Post-Test
Summarizing and schematizing			
SS1	I wrote a summary	2.00	3.50
SS2	I wrote down the most important information	5.00	4.00
SS3	I used scratch paper	3.50	5.00
SS4	I made a graphic organizer or a mind map	2.00	3.50
SS5	To learn the text, I used the graphic organizer or a mind map	2.50	3.50
SS6	To learn the text, I copied it on my scratch paper	4.00	5.00
SS7	I repeated the text with my summary or graphic organizer on my scratch paper	2.00	3.00
Highlighting			
HL1	I marked the most important things	5.00	5.00
Rereading			
RR1	To learn the text, I read the text a lot of times	4.00	4.00
RR2	I repeatedly read or recalled everything until I knew it	4.00	4.00
RR3	I repeated the text until I knew it all	3.50	4.00
Paraphrasing			
PAR1	I tried to repeat the text in my own words	4.00	4.50
PAR2	In my head, I retold the information as it was written down in the text	4.00	4.00
PAR3	In my head, I retold the information from the text in my own words	4.00	4.50
PAR4	I covered up a part of the text and I tried to recall it	3.50	4.50
PAR5	I stopped once in a while to repeat	4.00	4.50
PAR6	While learning, I asked myself questions about the text and answered them to check whether I still knew what I had learned	4.00	4.00
PAR7	Afterward, I asked myself questions to check whether I still knew what I had learned	4.00	4.00
Linking with prior knowledge			
LPK1	Before learning, I thought about what I already knew about geriatrics	3.50	4.00
LPK2	I related the text about geriatrics to what I already knew	4.00	4.50
LPK3	I thought about what I already knew about geriatrics	4.00	4.50
Studying titles and pictures			
TP1	I looked at the titles to understand the text	4.50	5.00
TP2	I looked at the pictures to understand the text	4.50	4.50
TP3	I looked at the pictures to remember the information	4.00	4.50
Planful approach			
PA1	First, I read the whole text and then I started learning	3.00	2.00
PA2	I immediately started learning, without reading the whole text first	2.00	4.00
PA3	Before highlighting, I read the paragraphs first	4.00	4.00
Monitoring			
MON1	While learning, I checked what I had already done and how much I still had to do	4.50	4.00
MON2	While learning, I asked myself: “Do I still have enough time?”	4.00	4.00
MON3	While learning, I asked myself: “Am I doing well?”	4.00	4.50
MON4	While learning, I asked myself: “Is it working well this way?”	4.00	4.50
MON5	I worried a lot about the test afterward	5.00	4.00**Self-**
Evaluation			
SE1	I immediately knew how to start learning the text	2.00	2.50
SE2	While learning, I managed to stay attentive and concentrated	2.50	3.50
SE3	While learning, I made sure I understood everything	4.00	4.00
SE4	I managed to learn the text in a good way	3.50	4.00

SE5	I did well in learning this text	3.00	4.00
Anxiety			
3	I feel jittery if I have to explain something that I have just read.	4.50	4.50
8	I would get very anxious if I had to read something new and explain it.	5.00	4.50
12	I get anxious when I am asked to read something and answer questions.	4.50	4.00
Achievement			
13	I do get flustered when I am put on the spot to read and understand something new.	5.00	5.00
4	I admire people with good reading comprehension abilities.	5.00	5.00
10	It is important to have good reading comprehension skills.	5.00	5.00
18	I think good reading skills are something of which to be proud.	5.00	5.00
Strategy			
6	I usually scan difficult material before trying to read it.	4.00	4.50
7	When reading, do you search for key words or information that you think are essential for understanding?	5.00	5.00
11	Before reading difficult material, I usually formulate in my mind the questions that I hope to answer from reading.	2.50	3.50
Capacity			
1	Whenever I read a news article, I understand most of it.	4.00	4.00
2	I am good at understanding newspaper articles.	4.00	4.00
14	I am good at understanding news articles like those found in *Time* or *Newsweek*.	3.00	3.50
Task			
20	For most people, it is easier to understand topics they know nothing about than topics they are familiar with.	1.00	1.50
21	Most people find it easier to understand abstract information rather than concrete information.	2.00	2.50
16	For most people, reading materials that is not interesting is easier to understand than reading material that is interesting.	1.00	3.50
Locus of Control			
9	No matter how hard a person works on their reading comprehension ability, it cannot be improved much.	1.00	1.00
15	I know that if I keep reading I will never lose my reading comprehension ability.	4.00	4.00
22	It is up to me to keep my reading skills from deteriorating.	5.00	5.00
Regulation			
19	When you are reading something that is difficult to understand, do you reread passages that were particularly different to get a better understand of the?	4.50	5.00
5	Do you read difficult to understand material slowly and carefully to make sure that you fully understood it?	4.00	4.00
17	When reading, I usually look up words that I don't understand in the dictionary.	4.00	4.00

Note: Item two only had 9 responses, out of a N of 10.

Appendix E: Analysis of Factors - from modified Text-Learning Strategies Inventory [Merchie et al., 2014) and Metacomprehension Scale [Moore et al., 1993]

Items with Greater Median Score for Pre-Test	Bloom's Level	PQ5R Level	Metacognitive Factor	Cognitive Factor
I wrote down the most important information	LO*	Record		Yes
First, I read the whole text and then I started learning	LO	Recite		Yes
While learning, I checked what I had already done and how much I still had to do	HO*	Reflect	Yes	
I worried a lot about the test afterward	HO	Reflect	Yes	
I would get very anxious if I had to read something new and explain it.	LO	Recite	Yes	
I get anxious when I am asked to read something and answer questions.	LO	Read	Yes	

Items with Greater Median Score for Post-Test	Bloom's Level	PQ5R Level	Metacognitive Factor	Cognitive Factor
I wrote a summary	LO	Record		Yes
I used scratch paper	LO	Record		Yes
I made a graphic organizer or a mind map	LO	Record		Yes
To learn the text I used the graphic organizer or mind map on my piece of scratch paper	LO	Record		Yes
To learn the text, I copied it on my scratch paper	LO	Record		Yes

Items with Greater Median Score for Post Test	Bloom's Level	PQ5R Level	Metacognitive Factor	Cognitive Factor
I repeated the text with my summary or graphic organizer on my scratch paper	LO	Record		Yes
I repeated the text until I knew it all	LO	Recite		Yes
I tried to repeat the text in my own words	LO	Recite	Yes	Yes
In my head, I retold the information from the text in my own words	LO	Recite	Yes	Yes
I covered up a part of the text and I tried to recall it	LO	Recite	Yes	Yes
I stopped once in a while to repeat	LO	Recite	Yes	Yes
Before learning, I thought about what I already knew about geriatrics	HO	Question	Yes	Yes
I related the text about geriatrics to what I already knew	LO	Read	Yes	Yes

I thought about what I already knew about geriatrics	LO	Preview	Yes	Yes
I looked at the titles to understand the text	LO	Read	Yes	Yes
I looked at the pictures to remember the information	LO	Read	Yes	Yes
I immediately started learning, without reading the whole text first	LO	Question		Yes
While learning, I asked myself: "Am I doing well?"	HO	Review	Yes	
While learning, I asked myself: "Is it working well this way?"	HO	Review	Yes	
I immediately knew how to start learning the text	HO	Preview	Yes	
While learning, I managed to stay attentive and concentrated	HO	Reflect	Yes	
I managed to learn the text in a good way	HO	Reflect	Yes	
I did well in learning this text	HO	Reflect	Yes	
I usually scan difficult material before trying to read it.	HO	Preview	Yes	

Items with Greater Median Score for Post Test	**Bloom's Level**	**PQ5R Level**	**Metacognitive Factor**	**Cognitive Factor**
Before reading difficult material, I usually formulate in my mind the questions that I hope to answer from reading.	HO	Question	Yes	
I feel jittery if I have to explain something that I have just read.	LO	Recite	Yes	
I am good at understanding news articles like those found in *Time* or *Newsweek*.	HO	Review	Yes	
For most people, it is easier to understand topics they know nothing about than topics they are familiar with.	LO	Reflect	Yes	
Most people find it easier to understand abstract information rather than concrete information.	HO	Reflect	Yes	

Items with No Change with Median Score from Pre-Test to Post-Test	**Bloom's Level**	**PQ5R Level**	**Metacognitive Factor**	**Cognitive Factor**
I marked the most important things	LO	Record		Yes
To learn the text, I read the text a lot of times	LO	Read		Yes
I repeatedly read or recalled everything until I knew it	LO	Review		Yes

In my head, I retold the information as it was written down in the text	LO	Recite	Yes	Yes
While learning, I asked myself questions about the text and answered them to check whether I still knew what I had learned	LO	Review	Yes	Yes
Afterward, I asked myself questions to check whether I still knew what I had learned	LO	Review	Yes	Yes
I looked at the pictures to understand the text	LO	Read	Yes	Yes
Before highlighting, I read the paragraphs first	LO	Read	Yes	
While learning, I asked myself: "Do I still have enough time?"	HO	Reflect	Yes	
While learning I made sure I understood everything	HO	Review	Yes	
Do you read difficult to understand material slowly and carefully to make sure that you fully understood it?	HO	Read	Yes	
When reading, do you search for key words or information that you think are essential for understanding?	HO	Preview	Yes	
When reading, I usually look up words that I don't understand in the dictionary.	HO	Record	Yes	
When you are reading something that is difficult to understand, do you reread passages that were particularly different to get a better understand of the?	LO	Read	Yes	
Whenever I read a news article, I understand most of it.	HO	Reflect	Yes	
I am good at understanding newspaper articles.	HO	Review	Yes	
I admire people with good reading comprehension abilities.	HO	Reflect	Yes	
No matter how hard a person works on their reading comprehension ability, it cannot be improved much.	HO	Reflect	Yes	
It is important to have good reading comprehension skills.	HO	Reflect	Yes	
I do get flustered when I am put on the spot to read and understand something new.	LO	Reflect	Yes	
I know that if I keep reading I will never lose my reading comprehension ability.	HO	Reflect	Yes	
For most people, reading materials that is not interesting is	LO	Reflect	Yes	

easier to understand than reading material that is interesting.				
I think good reading skills are something of which to be proud.	HO	Reflect	Yes	
It is up to me to keep my reading skills from deteriorating.	HO	Reflect	Yes	

*****LO = Lower Order; HO = Higher Order