Examining the Efficacy of Reflection and Metacognitive Support in High Stakes Testing Preparation

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Abstract

Many states and universities have testing requirements within their undergraduate teacher education programs for obtaining teaching licensure. These tests include the Praxis Core in reading, writing, and mathematics taken at the beginning of their program and content area assessments near the end of their study. Many students struggle to pass these high-stakes exams on their own. Therefore, this study asks what can be done to ensure teacher candidates are competent in their content knowledge for teaching? The purpose of this paper is to examine the

effectiveness of two strategies that were integrated within a 13-week pilot course of 15 students. This course focused on the alignment of study materials to exam competencies and the use of exam wrappers as a metacognitive tool.

Keywords: exam preparation; licensure exams; metacognition, pre-service teacher education, test alignment, tutoring

Review of the Literature

High Stakes Testing: Praxis Core and State Licensure Exams

While states vary in the requirement of assessments within a teacher preparation program, the passing of these assessments causes many teacher candidates to switch career paths and leave the field of education. These assessments are also costly and require additional study or preparation beyond the traditional coursework for students, causing more stress because of limited time to prepare. It is for these reasons that many teacher education programs have initiated measures to increase the number of teacher candidates passing high-stakes tests and to ensure greater access to the teaching profession for minority candidates (Zhao, 2019). Tests such as the Praxis Core Academic Skills and the Educator Assessments within their content area are currently required within multiple states.

Subject Area Assessments

The Ohio Assessments for Educators (OAE) are state testing instruments used for licensure which measure professional, pedagogical, and subject-specific knowledge and skills. Testing requirements are dependent on licensure type and content. During the 2019-2020 program year, 52 OAE tests were available for test administration. The OAE program includes four professional (pedagogy) knowledge tests that are matched to Ohio licensure grade bands (Early Childhood, Middle Childhood, Adolescence to Young Adult, and Multi-Age). According to Pearson Education Technical Report (2014):

> The OAE tests are aligned with Ohio Educator Standards, Ohio Learning Standards, and other professional standards, as appropriate. Each test was validated for use in Ohio in accordance with the practices recommended by the Standards for Educational and Psychological Testing (AERA, APA, & NCME, 2014). The Standards require a clear definition of content domain and a rationale to support a claim that the knowledge, skills, and abilities being assessed in a licensure test are required for credential-worthy performance. Educators, educator preparation program faculty, and administrators from across Ohio were involved in reviewing the test materials for content, job-relatedness, and prevention of bias; validating their

appropriateness for use in Ohio, and making recommendations for the passing score for each test. (p. 1)

Praxis Core

According to the Educational Testing Service (ETS), The *Praxis*® Core Academic Skills assessments are currently required for teacher licensure in more than 40 states to evaluate individuals entering teacher educator programs within colleges and universities (ETS Praxis, 2021). These tests measure skills in reading, writing, and mathematics, and have been identified to be essential for all candidates preparing to be teachers, regardless of the content area or grade level they aspire to teach.

Testing of teachers by ETS began in 1998 to screen applicants within schools of education with the use of the Praxis I exam (Angrist & Guryan, 2008). In 2014, the *Praxis*® Core Academic Skills for Educators (*Praxis*® Core) exam replaced the original *Praxis*® I. An individual's results on the *Praxis*® Core exams are reported as a 100-200 scaled score, with high scores indicating better exam performance. ETS revised its core exams in reading, writing, and mathematics as of September 2019. The current scores for passing these exams are a 150 in mathematics, a 156 in reading, and a 162 in writing. As identified in Table 1, "The median and average performance range for the core academic skills for educator tests were calculated on college students" (ETS Praxis, 2021, p. 53).

Table 1.

Average Passing Scores Praxis Core: Academic Core Skills for Educators

Test	Range	Interval	Test Takers	Median	Average Performance	Mean	Standard Deviation	Standard Error of Measure	Standard Error of Scoring	Reliability
Mathematics (5733)	100-200	2	21806	168	154-182	166.2	21.5	7.7	0	0.89
Reading (5713)	100-200	2	18976	170	158-184	169.7	18.6	7.5	0	0.87
Writing (5723)	100-200	2	21477	164	154-170	161.9	13.0	6.3	1.9	0.80

Historically, students have struggled to pass these high-stakes exams due to high test anxiety and low cognitive abilities, which was also evidenced by their grade point average (Zhao, 2019). In this case, reviewing student grade point averages from high school could be a predictor for how well they would do without remediation on their high-stakes exams in college. Failure to pass these first exams causes students to withdraw or be removed from their education programs early in their academic careers and enter other pathways.

In terms of tutoring for the *Praxis*® Core in mathematics, results from a longitudinal study from the University of Wisconsin-Milwaukee suggested a pre-test, tutoring, post-test cycle is helpful with students who have average mathematical abilities (Longwell-Grice et al., 2013). However, students who struggle significantly on the pre-test are recommended to take further course work while higher ability math students could simply take the exam without tutoring. Although the tutoring program within this study was limited to one 45-minute session before a post-test was given, it does demonstrate the importance of tutoring in test preparation and the importance of diagnostic measures.

Metacognitive Strategies in Test Preparation

Although resources are available through a variety of study materials, many students may need more intensive assistance to help them pass high-stakes exams. All too often, when students receive results of a test, they focus only on the grade. While emphasis on the result of the assessment is understandable, it can lead students to miss learning opportunities that metacognitive strategies can provide. One such metacognitive strategy is the "exam wrapper," which was introduced by Lovett (2013) in response to her students' poor study strategies. An "exam wrapper" encourages students to reflect on their own learning. They typically consist of several questions and activities that students engage in before and/or after they complete an exam. The exam wrapper is designed to help students focus on their study strategies and encourage learning from mistakes.

Although Lovett (2013) was the first to use the term "exam wrapper," Achacoso (2004) introduced questions to form the structure of the exam wrappers in use today. The original exam wrapper consisted of the following three questions: (1) How did you prepare for the exam? (2) What kinds of errors did you make on the exam? and (3) What could you do differently next time? (Lovett, 2013).

Research Questions

Based on the need for additional support beyond an online learning environment in preparation for pre-service teacher exams, the following research questions framed this study:

1. What is the impact of using strategies such as alignment of test competencies with study materials and metacognitive exam wrappers in helping students prepare for high-stakes testing?
2. What are students' perceptions of their test readiness before, during, and after a comprehensive online test preparation program?

Methods

Participants

Participants for this study included a total of 15 undergraduate education students from one private and one public university in Ohio. The private university is located in a rural community and enrolled 1,355 undergraduate students in 2021. According to the university, the students were predominantly White (78%). Thirty-one percent were first-generation college students and 95% receive financial aid. Thirty-one total students were enrolled in the education program at the private university, but not all students needed to study for an exam during the 2021-2022 academic year. The public university is located in northeast Ohio with an undergraduate population of more than 19,000 students. Additionally, the public university had a predominantly White

population (74%) at the time of this research. Eighty-five percent of full-time undergraduate students received financial assistance, and 32% were first generation college students. There were over 1,000 total students enrolled in the education program at the public university, but only one class of fourth-year students taught by an author of the study was offered this opportunity.

All education students who needed to pass either a Praxis or an OAE exam (N=14 public; N=18 private) were emailed with an invitation to join a free, non-graded, non-credit, pilot course. The incentive offered extra tutoring and assistance using an online tutoring program. Students volunteered to participate in this study and signed a consent form explaining the purpose of the study. They were given permission to exit the course and study at any time. This pilot course consisted of students who chose to work on their own or to attend a seated class section that met once a week for three hours. All students were instructed to prepare for one Praxis or OAE assessment at a time. Five students enrolled in the self-guided pilot course, and ten students enrolled in the seated class section. Table 2 identifies a breakdown of the students that participated in this study.

Table 2.
Student Participants

# of Students	Course Completion Type	Test Preparation Type
5	Self-Guided Pilot Course	OAE
5	Pilot Course	Praxis Core
5	Pilot Course	OAE

Instruments

The online 240 Tutoring® program was selected to be used as the test preparation resource because of its alignment to competencies within the Praxis and OAE assessments. Students were provided access to study guides (instructional materials, flash cards, quizzes, etc.) in the online catalog with a monthly subscription paid for by the universities. The website allowed class administrators to monitor student progress throughout the semester – from an overall summary to detailed performance evaluations.

Many websites exist that offer free test preparation resources, but the depth and breadth of these materials may not fully align with the content of the exam. According to Biggs (2003), "Constructive alignment (CA) is more than criterion-referenced assessment, which aligns assessment to the objectives. CA includes that, but it differs (a) in talking not so much about the assessment matching the objectives, but of first expressing the objectives in terms of intended learning outcomes (ILOs), which then in effect define the assessment task; and (b) in aligning the 'learning' methods, with the

intended outcomes as well as aligning just the assessment tasks" (p. 3). Due to these reasons, a comprehensive and aligned online tutoring program was chosen as an instrument for this study.

Exams wrappers were also utilized as a metacognitive tool after students completed an initial diagnostic test (Appendix A) and again after they completed the post-test (Appendix B). The diagnostic exam wrapper consisted of four open-ended questions and the post-test exam wrapper included eight questions. The exam wrappers were adapted from Carnegie Mellon University (2022).

Finally, the researchers created an end-of-course survey (Appendix C), which was used to collect data on student perspectives, study strategies, and general reflections about participation in the pilot course. This end-of-course survey was given to students on their final day of class or was emailed to those who chose to work individually by the class instructor, who was not an author in this study. All survey data was then shared with the researchers by the class instructor.

Pilot Course Structure

On the first day of the pilot study course, students were provided login information through email to create an online account, registered themselves for one study guide to begin their test preparation, and took one diagnostic test in their required test area (Praxis, OAE subject areas). Students then reflected on their diagnostic results by completing an exam wrapper survey

(Appendix A). For both the seated and self-guided students, the instructor monitored student progress in the online system using the analytics of the program (i.e. last access date, time spent, percentage of flashcards accessed, percentage of material accessed, and the number of practice tests completed). Each student's progress was available as a downloadable transcript to identify the percentage of the study guide completed. During the seated class, the instructor was present in the classroom, monitoring progress, answering questions, and helping students stay on track by sharing note-taking strategies.

After 13 weeks of exam preparation aligned to testing competencies, the students took a post-test. After completion of the post-test, students used a second exam wrapper to compare their results to their diagnostic test and reflect upon their progress (Appendix B). During week 13, students completed a final survey (Appendix C) to reflect on their overall progress, the structure of the course, and the online program. All results were analyzed to address the research questions as specified in the following section. At the end of the pilot course, students were encouraged to schedule their test, whereas the first two attempts of each exam were paid for by the university.

Thematic Analysis

The intent of this research was to analyze the role and impact of strategies in preparation for high-stakes testing as well as to understand students' perceptions of their test readiness in relation to how they approach their test preparation. To make sense of the data collected, the researchers engaged in a thematic analysis process to bring "order, structure, and meaning to the mass of collected data" (Braun & Clarke, 2006, p. 111). According to Braun and Clarke (2006), a thematic analysis is "a method for identifying, analyzing and reporting patterns (themes) within data. It minimally organizes and describes the data set in (rich) detail" (p. 79). This process was particularly useful because it allowed the researchers to explore the students' initial perceptions of readiness and look for patterns in the ways they utilized metacognitive strategies in their test preparation.

Phase One of the thematic analysis consisted of becoming familiar with the data. In this phase, the researchers were immersed in the data to get a general sense of the depth and breadth of the content. This immersion involved 'repeated reading' of the data, reading the data in an active way, and searching for meanings and patterns (Braun & Clarke, 2006). During this phase, the researchers took notes and jotted ideas for coding. Phase Two involved generating initial codes. The codes "identify a feature of the data that appears interesting to the analyst, and refers to 'the most basic

segment,' or element, of the raw data or information that can be assessed in a meaningful way regarding the phenomenon" (Boyatzis, 1998, p. 63). Based on the principles of inductive content analysis, multiple codes emerged from the exam wrappers. In Phase Three, the analysis shifted to focus on broad themes. A theme, as opposed to a code, captures something important about the data in relation to the research question, and represents some level of patterned response or meaning within the data set. The researchers sorted the codes into potential themes and began to consider how they fit together. Phase Four involved the refinement of the potential themes previously created. During this phase, some potential themes were consolidated while others were separated depending on the data within the theme. In Phase Five, the themes were defined and refined. According to Braun and Clarke (2006), "define and refine" means "identifying the 'essence' of what each theme is about (as well as the themes overall) and determining what aspect of the data each theme captures" (p. 92). In this phase, the researchers thought about each theme in relation to the others and considered how each theme fit into the broader overall understanding of the data. Lastly, the themes were clearly defined by articulating what it was, and was not, and were formalized for reference in the results and discussion.

Trustworthiness

To ensure the trustworthiness of survey data analysis, the authors used the inter-rater reliability (IRR) test by Miles and Huberman (1994). Inter-rater reliability is 'a numerical measure of the agreement between different coders regarding how the same data should be coded' (O'Connor & Joffe, 2020, p. 1). Following the initial measurement of IRR, the coders discussed the questions and codes were modified or created until researchers reached 80% consensus (Miles and Huberman, 1994).

One of the most common analytical techniques to enhance the credibility of a qualitative study is triangulation. Triangulation is the use of different methods of gathering data or collecting data with different samples, at different times, or in different places (McMillan, 2008). The data collection occurred throughout the semester and the researchers utilized diagnostic test results, two exam wrappers, the analytics of the online program, a post-test, and a final survey to explore the research questions. To further increase the credibility of the study, the researchers chose to share the results using authentic student quotations. The students' voices were meaningful in understanding the role of metacognitive strategies in test preparation. Several data sources were drawn upon; therefore, the study had an acceptable level of trustworthiness.

Limitations

Limitations for this study included the lack of generalizability due to small class sizes, lack of student motivation, and incomplete

data collection. For the private institution, less than 50 percent of eligible students elected to participate whereas at the public institution, 14 percent of eligible students participated. The authors perceived a possible lack of student motivation expressed through limited time spent using the online program. Because the pilot course was a non-graded, non-credit course and the students were not required to pay for their exam, they may not have put forth optimal effort. A final limitation included incomplete data collection. For example, not all students completed a post-test due to lack of participation and poor attendance in the course. Students also showed limited self-regulation if they chose to complete the online preparation program independently.

Analysis of Data

Testing Data

To address the first research question, "What is the impact of using strategies, such as alignment of test competencies with study materials and metacognitive exam wrappers in helping students prepare for high-stakes testing?" the authors analyzed student data from the online program. The data for each individual student is found in Table 3.

Table 3.
Pre-Post Test Results

Student	Completion Type	Test Type	Subject	Pre-Test Score	Post-Test Score	Total % of study guides completed
1	Self-Guided Pilot Course	OAE	Math Middle School	N/A	72	73
2	Self-Guided Pilot Course	OAE	Math Middle School	40	56	58
3	Self-Guided Pilot Course	OAE	AYA Social Studies	74	n/a	46
4	Pilot Course	Praxis Core	Praxis Math	52	63	55
5	Pilot Course Pilot Course	Praxis Core Praxis Core	Math Readings	n/a n/a	63 82	32 73
6	Pilot Course	Praxis Core	Math Praxis	46	64	100
7	Pilot Course Pilot Course	Praxis Core Praxis Core	Praxis Writing Praxis Reading	50 41	63 n/a	100 34
8	Pilot Course *(Withdrew from course)*	Praxis Core	Math	n/a	n/a	2
9	Pilot Course	OAE	English	74	n/a	50
10	Pilot Course Pilot Course	OAE OAE	AYA History Prof Know	66 80	80 n/a	29 18
11	Pilot Course	OAE	AYA History	60	64	40
12	Pilot Course	OAE	AYA History	72	74	42
13	Pilot Course Pilot Course Pilot Course	OAE OAE OAE	M.S. History Prof Know Found of Read	60 82 66	62 n/a n/a	14 47 35

14	Self-Guided Pilot Course	OAE	Secondary Math	76	60	60
15	Self-Guided Pilot Course	OAE	Secondary Math	96	98	98

Observations from this data are as follows:

1. Five out of 10 students who took a pre and post-test increased by 9% or more (Students 2, 4, 6, 7, and 10)
2. Of the 15 students in this study, three scored 50% or less on at least one of their pre-tests, identifying a significant lack of conceptual understanding. All three of these students (Students 2, 6, and 7) attempted the state test. Student 2 failed twice, Student 6 passed on the second attempt, and Student 7 failed three times. When analyzing the program usage for these students, Student 2 completed 58% of the course, Student 6 completed 100%, and Student 7 completed 100%.
3. There were four students who did not complete a post-test (Student 3, 7, 9, and 13). These students were disengaged at the end of the course or began studying for a second assessment and did not have time to complete a post-test before the course ended.
4. Student 14 showed a decrease in the post-test score due to not having enough time to complete the entire test in one sitting. This student worked full-time, was a full-time student and struggled to find time to use this program regularly.

5. All students showed significantly less than three hours a week spent in the program.
6. One student withdrew from the course (Student 8).

Diagnostic Exam Wrapper

To address the second research question, the researchers reviewed the survey data from students' diagnostic tests and their exam wrappers after completing the pre and post-test. The qualitative analysis of the diagnostic exam wrapper showed evidence of metacognition. The themes that emerged from the data included: unexpected or expected results and plans to use a specific study strategy. This section will describe students' perspectives as they considered their initial diagnostic test results. Only 10 students were able to complete the diagnostic exam wrapper because completion of the post-test was required.

Of the students who responded, many were surprised by their diagnostic test scores (both positively and negatively) due to over or under-estimating their abilities. To illustrate the essence of over-estimating their abilities (n=3), one student expressed "This was a good wake-up call to realize I don't remember everything I thought I did." Other students under-estimated their abilities (n=3), sharing that "They [the scores] honestly impressed me because I thought I knew nothing." If students were not surprised with their results, they tended to show a neutral attitude toward their scores (n=5). For example, students expected results due to their current or past

experiences and circumstances. One student stated, “I was not super surprised because it has been a while since I have taken a math course.” While another student expressed, “I knew what questions I would get wrong, for the most part.” Overall, students did not illustrate strong metacognitive awareness when it came to understanding their own content knowledge.

The thematic data analysis also showed that students often chose the test they wanted to prepare for (if they had more than one) based on their perceived understanding of the subject matter. Some chose the test because they felt confident in the subject matter (n=4) and stated reasons such as, “I took the math diagnostic test first because I thought it would go better than the reading.” Others chose to begin with their more challenging area of study (n=4); “I chose this one first because it is math and math is my worst subject. So, I wanted to get it done and over with.” Differences in choice for test preparation came down to confidence levels, prior knowledge, and prior experiences with the content.

When analyzing how students planned to use what they learned from the diagnostic test results, students suggested a variety of strategies they felt would help them achieve success. Some students expressed specific strategies to prepare (n=6). For example, “Based on my results, I will plan on reviewing the economics portion as this is the area where my knowledge seems to need review.” Another student stated, “I will probably focus more on broad view topics

instead of tiny details, but still focus more on world history." Other students were vague in describing their study plan (n=5), "I will study longer and harder." Another student mentioned, "It will definitely encourage me to prepare more than I thought I needed to." In addition, there were some students who did not have a study plan but focused on positive thinking (n=2); "I think this will help me a lot," or "I will continue with this course in hopes of passing my exam." Many students did not have a specific study plan but expressed an awareness that they needed to prepare based on their diagnostic score results.

Post-Test Exam Wrapper

After 13 weeks in the program, students took a post-test to assess their knowledge and reflect upon their progress and growth throughout the course. Not all students were able to complete their post-test due to attendance, lack of participation, or poor time management. Those who were completing the program in class did not always attend, and those who were working on their own did not always follow the directions or hold themselves accountable. Time management was a common theme throughout the students' reflections. Overall, students were aware of the limited amount of time they spent productively working during the course. Students were aware that they did not complete the three hours per week allotted for test preparation using the online tutoring program and expressed multiple reasons for the lack of time spent. For example,

one student stated “I personally tried to stay on task while in the course however, being a leader and resident assistant on campus sometimes I would have to fill out emails quickly or send out information,” while another student stated “I wanted to pace myself so I would do like 5-10% of the material each class period and use the rest of the time to work on other homework. I wanted to make the completion percentage increase about the same amount each week.” One student mentioned the need to “Try to stay focused, stay off my phone, cut out an hour each day to work on it, if I don’t understand go back and look at the reading to show me how to do the problem.”

Despite the minimal time spent using the online program, students’ scores showed an over-all improvement. Students were able to recognize this progress and reflected upon how the course benefitted them. For example, students discussed an increase in confidence and understanding of content, and many appreciated how the exam wrappers guided them to identify their strengths and weaknesses. One student stated, “The online program had me revisit content that had faded due to time as well as go over concepts/periods that confused me.” In addition, another student expressed, “I was exposed to more content so I was a little more prepared, but still have a ways to go.”

Students chose to spend their time in the online program in the following manner: 1) doing practice problems, 2) viewing

instructional content, and 3) reviewing with flashcards. In addition, a few students chose to take their own notes and used them to help review for the test. These study choices were made individually by students. Many students approached their test preparation by jumping to the practice problems/questions and would engage with the instructional content and flashcards only when they were unable to answer the questions. Students expressed that content knowledge was their weakness, but they often skipped the instructional content resources and went immediately to the problem/questions without taking the time to learn the material first. The instructional content was what the students needed in order to make improvements, but they did not always take advantage of the available resources. These weaknesses may be why some students did not show much improvement (for example, students 11, 12, and 15).

Results/Findings

End of Course Survey

Overall, students felt supported by the instructional materials of the course. One student expressed, "I think the tutoring really helped because I was able to pass the math Praxis." They found the instructional materials in the study guides were aligned and noticed the consistency of the material with the testing competencies. The explicit alignment often helped students when they took the test. For example, one student mentioned, "The online program gave a

lot of valuable information, and I was able to take my own notes. I also think the quizzes are beneficial because the wording is similar to the actual test."

Students expressed on the end of course survey that the structure of the pilot course was not compatible with their preferences and personal schedules. One student stated, "This semester was tough so trying to do the study guide outside class hours was difficult." Students also requested more interaction with others during class time and suggested that personal tutors be available during class. They believed that the materials were overwhelming, which led them to complete less than what was expected. For example, one student stated "I struggled to stay focused the whole time. I also feel that there was so much content to get through for meeting only one time a week even though I try to work on it outside of class." Students also expressed that the seated pilot course meeting for three hours once a week was too long. One student suggested "cut the time in half so the students aren't staring at a computer for over two hours and make a plan for students if they don't finish what is required for that day."

The data showed that students were generally aware of their lack of study skills; yet, they could not articulate strategies to address their deficiencies. One student stated, "I thought I was doing really well in the online program, and I did not pass." In addition, they often did not set a study plan for themselves. When asked if having

a checklist to complete each week would be helpful, students responded, “I do think this would have been helpful to keep me on track and motivate me,” and “It would've motivated me to get more done.” Another student recognized, “It [a weekly checklist] would've been good just to plan out time.” This survey item showed a lack of self-regulation strategies by students in their test preparation.

Conclusion and Recommendations

In more than 40 states, the requirement to pass a licensure exam is a pre-service teacher’s reality. Based on the data from this pilot course, several implications for educator preparation programs became evident. First, if a tutoring program is in place, strong conceptual understanding of the material needs to be emphasized. If students simply possess surface knowledge (e.g. mnemonics, memorized procedures), they will lack the ability to connect knowledge to complex applications requiring deeper knowledge. This is evident because students who started the course with very low pre-test and diagnostic scores struggled to be successful. In such cases, a test preparation program may not be adequate in addressing the educational needs of severe content knowledge deficits.

Students in this study were sometimes unaware of what they knew, did not yet know, and what they needed to know to pass the test. A test preparation course of this nature is effective in the sense

that it pushes students to systematically review previously learned material and engage with materials specifically aligned to the test. For many students, a preparation course of this nature is needed because strategic preparation is not likely to occur without designated time set aside.

A second recommendation is for tutoring programs to strategically align the curricula to the specific objectives and competencies assessed on standardized tests. Students within this pilot course recognized the test alignment within the online program as a critical facet of their preparation efforts. The direct alignment to the test allowed students to feel that their time and effort were well-spent. Knowing that they had access to and were studying the "right" content helped them feel more confident in achieving a passing score.

Although alignment is necessary, this recommendation alone does not ensure success on a test. It is not enough to merely provide access to test-aligned materials. A significant amount of focused preparation is also essential. It would be beneficial to integrate more explicit metacognitive strategy instruction into the course design. For example, students could be guided to set specific and attainable goals as they progress through the test preparation program. Although course grades and requirements for licensure should act as strong incentives and motivation for success, many students balance other classes, work schedules, and family life. Therefore,

strategies to encourage self-regulation are also necessary within future test preparation courses.

The metacognitive exam wrappers utilized within this pilot course helped students to "see" their weakness and articulate steps that could address them. Although students identified some necessary changes and action steps, they did not often act upon their own recommendations. The researchers recommend that students create an individualized action plan (with assistance if needed) to be more efficient and effective in their preparation. It is also recommended to incorporate interactive tutoring sessions which enable students to prepare together for the exams through peer tutoring situations. Lastly, the researchers highly recommend having an on-site instructor that not only monitors progress, but also shares study strategies, teaches notetaking skills, guides reflective activities, discusses metacognition and helps students be held more accountable and motivated to stay on track within the program.

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Appendix A

Exam Wrapper After Diagnostic Test

Complete after the Diagnostic Test:

1. Which Diagnostic Test did you take and why did you choose this content area to complete first?

2. What are your thoughts and perceptions of your diagnostic results?

3. How do your results compare with what you thought you knew?

4. Based upon your results, how will it affect how you prepare for the exam?

Appendix B

Exam Wrapper After the Post Test

1. What test were you preparing for and take: OAE or Praxis?

2. What content area (Middle school math, etc.)?

3. Approximately how much time did you spend preparing for this exam?

4. Compare your 1st Diagnostic score with this 2nd Score. Describe areas of improvement. Describe any areas where your score decreased.

5. What percentage of your test-preparation time was spent in each of these activities?
    - Reading/watching instructional content for the first time
    - Re-Reading/Re-Watching instructional content
    - Using Flashcards for the first time
    - Re-Visiting flashcards
    - Solving problems for practice
    - Reviewing your own notes
    - Reviewing outside materials

6. What aspect(s) of your preparation for this exam seemed different from your prior exam or test preparations?

7. Now that you have looked over your 2nd Diagnostic Test, estimate the percentage of points you lost due to each of the following:
    - Not understanding the question being asked
    - Not knowing how to approach the problem
    - Careless Mistakes
    - Lack of understanding of the concept
    - Other
        - Please specify:

8. Based on the estimates above, what are at least 3 things you will do differently in preparing for the exam? Please be specific. Also, what can we do to help you?

Appendix C

End of Course Survey

1. Describe the progress that you made from day 1 to today in the online program. What helped you make gains in the program? Or, what kept you from completing a test study guide?

2. This semester, as it was a pilot course, this was not required and you did not have to pay any fees for the program. Would you have paid out of your own pocket if you had the choice to use this as a study resource? Please explain your answer.

3. What did you like about the online study guides and why? Be specific (Instructional materials, flashcards, quizzes, practice tests, format, percentages/data, etc.).

4. Did you make it far enough to complete a practice test? If so, what was your strategy? If not, what obstacles stood in your way?

5. In what ways do you feel this course could be improved? Describe in detail why you feel this way.

6. This course combined both those taking the Praxis with those taking the OAE. Did you find that you were able to support each other? Thoughts on this combination?

7. Do you feel having a weekly checklist of what to accomplish each week in the program would have been helpful for you? If so, how, and if not, why not?

8. Did you feel like the questions you answered after taking the diagnostic tests helped you reflect on your strengths and weaknesses (these are called exam wrappers)? If so, why, and if not, why do you feel this way?

9. Did the exam wrappers help guide how you approached the study guides (for example, what sections you decided to complete first, etc.) or your study strategy? Please explain.

10. Compared to other times when you prepared for a test, how was using the online program similar? How was it different?

11. Was there any point during the program that you felt prepared to take the actual exam even though you had not completed the full study guide or any of the practice tests? If so, please explain. In addition, if you took the test without fully preparing, how did you feel it went, and what were your final scores (did you pass)?

12. If you were to give advice to other students using the online program to prepare for their exam, what would it be? Please be specific.

13. Any additional comments: