

## Guided Reading Questions as a Scaffolding Technique in a Flipped Graduate Metabolism Class

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*Abstract: This qualitative study evaluated the use of guided reading questions (GRQ) as a scaffolding technique in a flipped classroom among graduate dietetic interns to assess how their experience with a flipped classroom differed compared to previous cohorts without GRQ. Graduate Dietetic Interns (n=10) enrolled in a flipped graduate-level metabolism course completed 8 learning reflections. GRQ were provided for students to use when reading the textbook for the first 7 weeks of the semester. Content analysis was applied to the learning reflections to discover themes. Member checks were used to confirm themes. These findings were compared to themes of 2 previous cohorts that did not have GRQ. Students viewed the GRQ as instructor support and appreciated the GRQ at the beginning of the semester, but understood why they not receive them for the entirety of the semester. Students reported that the GRQ helped them develop reading comprehension and notetaking skills. Compared to previous cohorts, this cohort of students seemed to accept and trust in the flipped learning process at the beginning of the semester. They also took responsibility for their own learning early on and continue to progress through the Staged Self-Directed Learning Model. Additionally, compared to previous cohorts, this cohort felt that it was okay to ask questions and be wrong and they were not afraid or intimidated by the learning process. Providing students GRQ or other supports for learning from complex textbooks in a flipped class, especially at the beginning of the semester, may help students gain skills in learning on their own and reading comprehension, which will encourage students to advance in the Stages of Self-Directed Learning Model.*

*Keywords: flipped learning, graduate students, scaffolding, reading comprehension*

In a flipped learning approach, students engage in assignments before class to become familiar with content, such as videos and/or readings, and then spend class time applying their knowledge through various activities (McLean et al., 2016). While there have been some reported benefits to flipped learning, such as the ability to apply knowledge or a more engaging experience for students, students do not always fully understand, trust, or commit to the flipped learning process (Burkhart et al., 2020; Vollmer & Drake, 2020; McLean et al., 2016). Students may need time to adapt to this style of learning and feel that they need more instructor guidance during self-directed tasks outside of class (Akçayır & Akçayır, 2018; Vollmer & Drake, 2020).

In a previous investigation, students got frustrated with the difficulty of flipped learning after the initial excitement of a new course, struggled with textbook reading comprehension and becoming self-directed learners, and seemed to transition through the different stages of the Staged Self-Directed Learning Model (SSDL) (Akçayır & Akçayır, 2018; Vollmer & Drake, 2020; Grow, 1994). In the previous study, students began the semester in stage 2 of the SSDL model because they reflected on being excited and ready to learn the material; however, a few weeks into the semester, students regressed to stage 1 of the model and were seeking more support from the instructor because they were frustrated with learning complex material. Eventually, students did progress into stages 3 and 4

of the model in which they were able to learn independently and took responsibility for their own learning (Vollmer & Drake, 2020). While students did successfully become independent learners, there was a point in the semester that students struggled to learn on their own and wanted a little more guidance from the instructor, especially as it related to reading and learning from the textbook.

Textbooks may be written at a reading level higher than students' reading level, which may cause students to lose motivation to learn (Persky & McLaughlin, 2017). Across the US, upperclassmen college students at 4-year universities have higher literacy than national samples of adults (Baer et al., 2006). However, on average college students at 4-year universities score in the intermediate level for prose literacy, which is needed for comprehending textbooks. This means that many graduating college students may be able to summarize simple ideas but cannot synthesize information or use the information to solve complex problems (Baer et al., 2006). Furthermore, in a previous study among undergraduates in a nutrition education course, students reported that the textbook readings before class were unengaging and time consuming (Burkhart et al., 2020). Scaffolding has been recommended in a flipped course to improve students' understanding of a text; however, there is limited research in understanding reading comprehension and flipped learning among graduate students. (Vollmer & Drake, 2020; Clark & Graves, 2004; Hattan & Alexander, 2018).

Scaffolding is a concept in Vygotsky's zone of proximal development in which a child learns how to independently complete tasks with the assistance of an adult (Vygotsky, 1978). With repeated attempts over time, the child eventually learns how to complete this task without assistance. While originally utilized in early and primary school settings, scaffolding has been applied to higher education (Sharma & Hannafin, 2005). Scaffolding allows students to complete a task that they would normally not be able to complete without assistance (Rogoff, 1992). Scaffolding can help reduce stress and anxiety, the time required to complete the task, and can help students understand how concepts learned from pre-class readings can be used to solve problems during class; however, scaffolding is meant to be temporary (Clark & Graves, 2004; Graves & Graves, 2003; Persky & McLaughlin, 2017). In the gradual release of responsibility model, students gradually take ownership of reading after being provided with a lot of initial teacher support and guided practice (Clark & Graves, 2004).

Varying techniques of scaffolding for reading comprehension in higher education has been evaluated, including guided notes. Guided notes can take several forms including fill-in-the-blank lecture slides, incomplete outlines, or notes with reflection questions (Biggers & Luo, 2020). According to a recent review, when guided notes were used in higher education it improved student quiz and test scores, accuracy of notes, recall, and improved learning self-regulation across a wide variety of disciplines (Biggers & Luo, 2020). Although the definition of guided notes in this review included both instructor-created materials for readings and/or lecture, scaffolding in the form of guided reading notes shows promise.

Undergraduate students, who were deemed competent readers in a cellular biology course were randomized into one of three groups: mobilization (write down everything they knew about cellular biology), concept mapping (create a concept map based on predetermined terms), or control (underline or highlight the text). Students in the scaffolding groups (mobilization or concept mapping) had significantly higher comprehension for short-answer questions (Hattan & Alexander, 2018). In another study among undergraduates in Singapore, students completed an online game that required them to comprehend the reading assignment. Qualitatively, students reported that the game helped them understand the reading better and identify misconceptions they had after reading the text (Ling, 2018). Structured notes or templates can be helpful when scaffolding reading comprehension. In a higher education setting, students were provided with four different note-taking templates that they could complete with the reading to prepare for a class discussion. These templates have guiding questions that help students identify the key ideas in the reading. Students reported that these

templates helped them think deeply about the readings, helped create meaning, and helped them remember concepts (West, 2018).

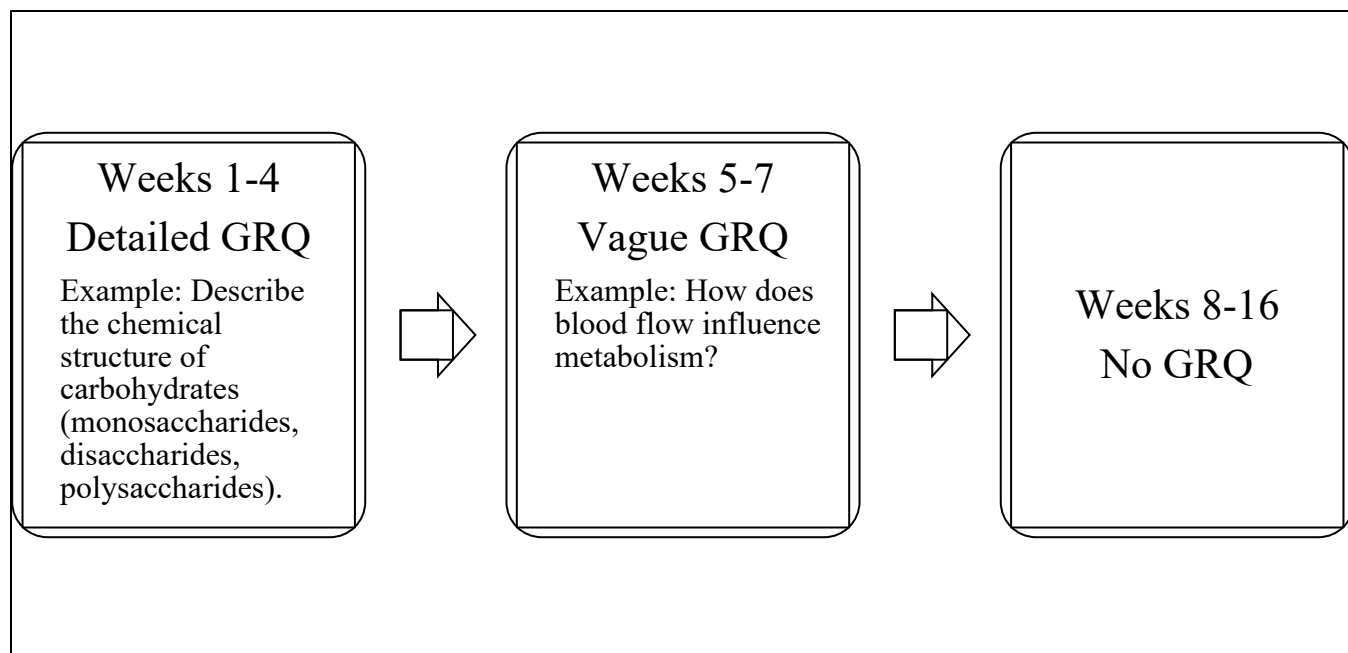
Thus, the objective of this study was to evaluate how the introduction of guided reading questions (GRQs) as a scaffolding technique changed the experience of graduate students in a flipped metabolism class compared to previous cohorts without GRQs.

## Method

### Setting

This flipped class was required as part of a 2-year Dietetic Internship-Master of Science program at a midsize, private midwestern university during the fall semester of 2018. The course content included macronutrient metabolism regulation and processes, metabolism in extreme situations (i.e. starvation), body weight regulation, cell signaling, etc. It was one of the courses that all students take during their first semester in the program. The overall structure of this flipped course was as follows: students completed an assigned reading (i.e. textbook chapter on lipoprotein metabolism) and watched videos posted on the learning management system prior to attending class. Students could also choose to complete the GRQs. Students were encouraged to take notes on the readings and videos regardless if they completed the GRQs. During class, learning activities were provided by the instructor to provide formative feedback about content learned and to allow students to apply the content, using team-based learning, which included activities such as case studies or problems that required them to explain why or how certain diet treatments were used for specific disease conditions (Michaelson et al., 2004). This class had been taught previously in fall 2016 and 2017 with the same instructor, textbook, and structure. Learning reflections from these cohorts were previously analyzed (Vollmer & Drake, 2020).

During fall 2018, everything remained the same (from fall 2016 and 2017) except for the introduction of the Guided Reading Questions (GRQs). For some textbook chapters, students were provided with questions they could answer to help them understand the content. These GRQs were written by the instructor and phased out during the semester. Specifically, the GRQs started very detailed for the first 4 weeks of the semester (4 chapters) by asking questions related to definitions, chemical structures, or simplifying and separating chemical processes into manageable parts. For the next 3 weeks (2 chapters), the questions became less specific by asking students to summarize many concepts together, for example, comparing how organs metabolize nutrients similarly or differently. For the remainder of the semester (9 weeks and 4 chapters) the GRQs were not provided (Figure). At the beginning of the semester, students were informed that the GRQs would be phased out. These GRQs were optional for students to complete, were not collected by the instructor, and were not worth any points. Students were encouraged to bring them to class to assist them in class activities.



**Figure 1.** Semester Timeline of Phased Out Guided Reading Questions (GRQ) for a Flipped Graduate Metabolism Course with Examples.

**Participant Recruitment and Data Collection**

This study was approved by the Bradley University Committee on the Use of Human Subjects in Research. Graduate students (n=10) completed written learning reflections at 8 different time points throughout the semester as part of the class. Students responded to instructor-authored prompts (usually 3-5 prompts) in the learning management system and focused on metacognition, successes, challenges, and how they can overcome these challenges. Different from the previous cohorts, in this study students were also asked to reflect on the GRQs at various times (Table). Once the semester was over, students were asked for permission to use their learning reflections for this study via Qualtrics Survey Software. After consenting, students provided their last name so that the instructor could collect the corresponding learning reflections and assign ID numbers for each student. Learning reflections were exported from the learning management system and organized by the original due date.

**Table 1. Learning Reflection Prompts Used During the Fall 2018 Semester for a Graduate Level Metabolism Course by Time Point.**

Learning Reflection # Week of Semester	Learning Reflection Prompts
1	1. How would you describe your efforts to learn so far in this class?
Week 2	2. What do you think your strengths and weaknesses are as a learner? 3. Complete this sentence and elaborate. One thing I learned about the way I learn is... 4. How have you been connecting new information to what you already know?

2 Week 4	<p>5. Please write 3 goals for yourself that you hope to achieve by the end of this course. These goals cannot include grades. For example, a goal cannot be “I hope to get an A in this class.”</p> <p>1. Do you see a benefit in learning in teams? How will you use this in the future?                  2. Describe the most difficult things about this course so far.                  3. Describe the most beneficial things about this course so far.                  4. If you could ask last year’s interns anything about this course, what would you want to know?                  5. Think back over the past couple weeks and reflect on your progress on the goals you wrote at the beginning of the semester. Have you made progress? Have you encountered any barriers to need to address?</p>
3 Week 6	<p>1. We have had our first Quest [exam]. What were your thoughts when I first told you that one of the Quests would be group-based? How has your opinion changed or not? If you were to explain to another student the pros and cons of a group-based exam/quiz, what would you say? What are your thoughts on having 2 days of class devoted to the Quests? What kinds of strategies did you use to prepare for both of the group and individual Quests?                  2. How do you feel you contributed to the group Quest?                  3. Reflect on and discuss your learning so far in this class and how the Quest assessed that learning.                  4. What are your thoughts on the 1st book club discussion? How did you do? How could you improve your contribution to the discussion? How do you think the book contributes to this course?                  5. The Guided Reading Questions have gotten less detailed. What has been your reaction to this? If you don’t use the Guided Reading Questions, explain why you don’t use them.</p>
4 Week 8	<p>1. Goal check-in time. How are you progressing on the goals you made for yourself before our 1<sup>st</sup> day? Have you made progress? Relapses? How do you plan to achieve these goals?                  2. Think of yourself on an education journey. Where are you now? Where do you want to be? How will you get there?                  3. Has there been anything that has changed the way you think about metabolism?</p>
5 Week 10	<p>1. We just had our second round of Quests. How did it go? Compare to the first round.                  2. Have you developed any skills in this class beyond the content knowledge? How will these help you as a future dietitian?                  3. What are the most important learning moments you've had in this course so far? What makes them so important?                  4. How have you been challenged in this class? How did you overcome those challenges?                  5. The guided reading questions have been completely eliminated. How did reading and class preparation go for you without them?</p>

6 Week 12	<ol style="list-style-type: none"> <li>1. You have been working as a team member for a long time now. Identify and describe your approach to the team-based learning.</li> <li>2. Describe how your learning has been enhanced or hindered by the team-based approach.</li> <li>3. What do you think your most valued contribution to your team is?</li> <li>4. How important do you think team-based learning is in this course. In other words, if I had you work independently on every activity, how do you think your learning would be different?</li> <li>5. Goals check-in. How are you progressing? Any set-backs?</li> </ol>
7 Week 14	<ol style="list-style-type: none"> <li>1. Think about the learning process that took place this semester. How would you summarize and characterize your learning process?</li> <li>2. In what ways have you gotten better as a learner?</li> <li>3. Now that Book Club is over, reflect on how it contributed, or did not contribute, to your learning.</li> </ol>
8 Week 17	<ol style="list-style-type: none"> <li>1. I want you to reflect on three things from the beginning to the end of the semester. Think about your confidence with metabolism, your perception of the importance of metabolism for a RDN, and your interest in metabolism before you started this class. Now, reflect on those three things now. How have any of those changed? Stayed the same? Were there particular moments in class or out of class that changed (or didn't change) your confidence, perception of, or interest in metabolism?</li> <li>2. What did you think of the guided reading questions being phased out as the semester progressed?</li> <li>3. If you could talk to next year's interns, what advice would you give them about succeeding in this course?</li> <li>3. Did you achieve the goals you wrote before our 1<sup>st</sup> day of class? What helped you achieve them or interfered with achieving these goals? If you didn't achieve them, do you feel like you can still work on achieving them on your own?</li> </ol>
RDN indicates Registered Dietitian Nutritionist	

## Data Analysis

Content analysis was utilized to discover themes (Merriam & Tisdell, 2016) from the learning reflections without qualitative analysis software and began during summer 2019 by two researchers experienced in qualitative analysis. The investigators analyzed the reflections independently and developed codes by time point to understand how graduate students experienced the course throughout the semester. Codes were utilized to label segments of the qualitative data to help identify patterns across the reflections related to the objective for this study. Each researcher also developed a description of their code so that they could discuss their code when they met. When the researchers met, they compared their codes and the accompanying descriptions to identify similarities in the codes. This then allowed the researchers to identify what codes may be related to one another and collapsed to create a broader theme. For example, codes emerged about the guided reading questions over time (i.e. how students used them, the value of them, how they were perceived, etc.). While each of these could be its own code, for example, “value of guided reading questions”, all of these codes were collapsed into one theme, “Guided Reading Questions”, so that the authors can describe changes over time and a more holistic picture of the students’ experience with them. These codes and themes were

then compared to the themes discovered from the fall 2016 and fall 2017 cohorts that did not have GRQs. Investigators then met to discuss codes and develop themes. If there was a disagreement about a code and/or theme, the two investigators re-read the reflections independently and then discussed again. Saturation was reached.

To improve validity a member check was conducted (Merriam & Tisdell, 2016). Students were asked to participate in an online focus group during the spring 2020 semester to complete a member check of the themes discovered. A total of 6 out of the 10 eligible students participated in the focus group. This focus group was conducted via Zoom and moderated by one graduate assistant who had not taken this course and was trained in conducting focus groups. Another graduate assistant who had not taken the course and was trained in conducting focus groups served as a note taker. The focus group moderator had a document that summarized the themes developed by the 2 investigators and screen shared the document. The moderator read the themes and description of the themes and asked the participants to confirm, revise, or provide feedback on each theme. The note taker's role was to make changes to the document based on the focus group's feedback. No changes were made and the participants confirmed the themes reported.

## Results

Six total themes were discovered from the learning reflections: responsibility for learning, metacognition, team-based learning, transfer of skills, trust/comfort, and guided reading questions. Four out of six of these themes were also discovered in the previous investigation of this course without the GRQs; however, there were some differences within the themes in this cohort compared to the previous two cohorts without GRQs (Vollmer & Drake, 2020). Trust/comfort and guided reading questions were newly discovered themes in this cohort only.

### Responsibility for Learning

Similar to previous cohorts, students reflected that they did not need to read the textbook to be successful in previous classes because the teacher may have lectured over the content and they would use PowerPoints or class notes to study. Even though they found learning on their own difficult and challenging in this course, they still were motivated to learn. Students were determined to learn independently the whole semester and were hopeful that they could achieve this goal, even though they expressed some anxiety prior to the first exam.

This cohort differed from previous cohorts because students seemed to buy into the flipped learning process at the beginning of the semester. In previous cohorts, students did not buy into the flipped learning format until approximately week 6 of the semester, while this cohort accepted this format from the beginning. Additionally, in previous cohorts the learning reflections showed evidence of a graduate acceptance of responsibility for learning, but in this cohort, there was no large shift in the responsibility for learning. This cohort took ownership of their own learning from the start of the semester while previous cohorts were resistant to taking ownership and wanted more guidance from the instructor. For example:

The flipped classroom is working very well for me. I like that we come to class already familiar with the topics we will discuss so we can get more into detail and focus on certain topics once we meet as a class. I also really enjoy how interactive the class is, and I think the interactive aspect will help me retain the information. (Student ID #1, Week 4, Learning Reflection 2)

I definitely feel that this struggle helped me get settled into this course. The flipped learning is something that is certainly new to me, but I think I have a better idea of how to approach things now. Rather than having feelings of panic, discouragement, or feeling like I'm falling behind, I now see the value of in-class discussion and how complementary it is to my out-of-class struggles. (Student ID #3, Week 4, Learning Reflection 2)

Similar to previous cohorts, by the end of the semester, students wanted to be lifelong learners and acknowledged that they did not know everything. They were interested in the class subject matter and wanted to continue learning about it. One student reflected on where they would go now that the semester was over:

All I can do in the future is to remain curious, with intent to use my knowledge to help others. This will help to drive further acquisition of learning, compared to paying too much attention to insecurities that only hinder progress. (Student ID #8, Week 16, Learning Reflection 8)

### **Metacognition**

Similar to previous cohorts, students in this cohort learned how they learn best throughout the entire semester by experimenting with different study strategies and reflecting on how well they thought it worked for them. Even though the students reflected on the time-intensive nature of preparing for class, they felt that it was worth the time and struggle. Instead, students tended to reflect on what adjustments and adaptations they could make to succeed in the class, and not their frustration with how long preparing for class took. In previous cohorts, students tended to focus on their feelings of frustration more and for more learning reflections compared to this cohort. This cohort was also different in that they acknowledged that they needed to practice the skills they wanted to development (i.e. reading comprehension) as well as prepare for future experiences (i.e. clinical rotations). For example:

I don't want to brag on myself or sound full of myself, but in high school I didn't really have to study, which means I never formed great study habits. My junior and senior year of undergrad, I did need to start studying and I feel that I've never found the best way to retain the material. I have tried flashcards, taking notes, reading the notes, and rewriting the notes; drawings do typically help me though. I used to think I was an audio learner, but maybe I am actually more visual and I need to draw out more of the concepts. I also like studying in groups and talking concepts out, especially the ones I don't understand. One thing I learned about how I learn is that it has changed in the past few years as my classes have gotten more difficult. I need to find new techniques and work with the ones I know work for me. (Student ID #2, Week 2, Learning Reflection 1)

I think the realization that my reading plays such a critical role in my preparation and ultimately my learning certainly has helped to motivate me thus far and will continue to do so. (Student ID #3, Week 8, Learning Reflection 4)

### **Team-Based Learning**

Consistent with previous cohorts, students in this cohort felt that the learning teams were imperative to their success because they helped one another understand the content. They felt accountable to their team members and reflected that they would have gotten discouraged or would have given up if



they did not have the team. Learning teams provided social support, helped fill in gaps, answer questions, and provided feedback. In previous cohorts, students reflected on bad group project experiences from their undergraduate education and they were worried their team members may not adequately prepare for class. Unlike previous cohorts, students in this cohort were not worried about their team members being prepared for class, but were afraid that they would let their team members down. They acknowledged their own limitations and wanted to step back to let others take charge or talk in order to help the entire team. One student reflected on their worry that they were letting their team members down:

My team members reach a solution or problem faster than me and usually are discussing, which makes me feel bad because I'm not yet on the same page as them. It takes me longer to work through a problem. My team helps me to see different ways to reach an answer and since we all think differently it has given me different tools as far as how to understand certain situations. I am just at a different speed than them. Which isn't a bad thing, but it's frustrating. I don't want any of them to feel like I'm not trying to contribute. (Student ID #4, Week 12, Learning Reflection 6)

### **Transfer of Skills**

This theme did not differ between the present cohort and previous cohorts. Students connected skills they were gaining in class to skills required of them during their dietetic rotations or future professional life as a registered dietitian. These skills were identified by students due to the flipped and team-based learning approach and included verbal and written communication, handling conflict or disagreements, teamwork to achieve a goal, time management, and organization. One student reflected on the importance of written communication:

During the teamwork, I am organized and efficient in my answers. I try to look for what exactly the question is trying to ask and make sure to answer that portion of the question instead of beating around the bush. I appreciate a concise, efficient way of communication that doesn't leave a lot of room for interpretation. Effective communication is not only important in an open-ended test, but also in everyday life. When working with clients or other colleagues it is essential to have these qualities to avoid confusion, mistakes, and conflicts that are often tied to miscommunication. (Student ID #6, Week 12, Learning Reflection 6)

### **Trust and Comfort**

Students reflected on how they felt class was a safe space. They felt it was okay to ask questions and were no longer burdened with the idea that they should know everything as they felt as an undergraduate student. They were not afraid or intimidated in class even though they felt the material was complex. They reflected on how they felt it was okay to be wrong in class without worrying what others or the instructor would think of them. This was attributed to the social support of the learning teams and the instructors' acceptance of questions. This was especially valuable to them because sometimes they would come to class not completely understanding the reading, but they did not feel like they were at risk of embarrassing themselves or disappointing the instructor. For example, one student reflected on the comfort of the entire class in asking questions:

If I were to work on each activity independently, I would get quickly discouraged at the accuracy of my answers. This would make me less likely to share my answers when going over

them in class, discourage me from asking questions for fear of looking foolish, and would ultimately hinder my learning in this way. I didn't realize this until right now, but I think it has probably boosted the confidence of the entire class, which is part of the reason why we are not afraid to share in class. Last class period almost everyone had a question, and none of us were afraid to share. We are more inquisitive because we have support from our peers and instructors. (Student ID #6, Week 12, Learning Reflection 6)

### Guided Reading Questions

Students viewed the GRQs as instructor support. Specifically, they felt like it was the instructor telling them what they should get from the reading and what types of questions the instructor may ask in class or on an exam. Early in the semester, students had mixed feelings about the questions being phased out. There was some discomfort with this idea and concern about whether or not they would be able to succeed without them, even though they understood why they were being phased out. Even though they were unsure about their ability to succeed without them, students discussed how they would attempt to adapt without them. For example:

The guided reading questions level of detail is bittersweet to me. On one hand, I can't have my hand held throughout the entire process, but in the short-term I've been feeling busier and keeping up with class readings has become more difficult. A way to mediate this could be reviewing past reading questions and using the example to make current questions more detailed before working on them. (Student ID #8, Week 6, Learning Reflection 3)

As the GRQs were being phased out, students reflected on how those questions helped them develop reading comprehension and note taking skills as well as discriminating important information from readings. Students reflected on how the textbook readings were overwhelming at first with all of the details and they could get distracted by those, but the GRQs helped them develop skills in understanding the bigger picture and how concepts connect. By the end of the semester, students did not feel like they needed them. For example:

At first I was very intimidated and I didn't even know where to start with the information in the textbook being so broad. As I continued to read, highlight, and study, I think I have built good habits from using the guided reading questions in the beginning of the course. It's triggered my brain to ask myself similar questions and practice studying what would be important as if I had to explain the material to another class. (Student ID #9, Week 10, Learning Reflection 5)

I think it [guided reading questions] was definitely helpful in the beginning. The book was more advanced and technical than I was used to so the first couple chapters it was helpful to have the questions to fall back on to help me grasp what I needed to be understanding. I also liked having them because it helped me learn how you [the instructor] asked questions and how you pulled topics from chapters. Throughout the semester I felt like I didn't need them as much because I learned how to understand the book and I learned what to expect from you. (Student ID #7, Week 16, Learning Reflection 8)

Although minor, some students found the GRQs to be distracting or hindered their learning because they would go through the chapter to look for answers instead of reading the chapter as a whole to try to learn.

## Discussion

In this study, a flipped class that has been previously studied implemented GRQs that were phased out during the semester to provide instructor support when reading the textbook (Vollmer & Drake, 2020). Approximately half of students entering college are ill-equipped to understand and make meaning out of discipline-specific texts and there is minimal evidence on how students progress after their first year of college, especially with increasingly difficult, and discipline-specific texts (Fang & Coatoam, 2013; Paulson & Armstrong, 2010; Porter, 2018). This is concerning because instructors expect that college students are able to read various texts and understand them, but students may not be able to (Culver & Morse, 2008).

With the addition of the GRQs, some differences from previous cohorts of students who took the same class were discovered. In previous cohorts and other studies utilizing the flipped format, students reported that they wanted more instructor guidance, especially during class preparation periods, and needed time to adjust to this style of learning (Akçayır & Akçayır, 2018; Vollmer & Drake, 2020; Brewer & Movahedazarhoulign, 2018; Burkhart et al., 2020; Gilboy et al., 2015). In fact, in previous cohorts, students did not buy into the flipped process until about week 6 of the semester even though it is important to get student buy-in as early as possible (Vollmer & Drake, 2020; Gilboy et al., 2015). In this study, although students needed some reassurance and were nervous about their first exam, they were accepting of the flipped process from the beginning of the semester. The GRQs may have provided the instructor support that previous cohorts were missing and may have allowed them to improve their reading skills and thus, their confidence in learning on their own (Van Camp & Van Camp, 2012). Therefore, relating back to the SSDL model, students in this cohort did not revert back to stage 1 at any time point in the semester. Instead, they progressed from stage 2 to stage 4 by the end of the semester (Grow, 1994).

For flipped learning to work as designed, students must take responsibility for their own learning by engaging in preparatory class work and attempting to understand the concepts prior to coming to class (Roehl et al., 2013). There is a risk that students will not read or do the preparatory work before coming to class because they may not have been held responsible for their own learning before, they lack the skills to understand or ascertain key ideas from the readings, or they lack the time (Cevikbas & Kaiser, 2020; Lei et al., 2010; Tan, 2018). In traditional lecture, teachers typically cover the material from the reading, which removes the incentive for students to read before coming to class (Fink, n.d.). In previous cohorts, perceived responsibility for learning increased throughout the semester with some resistance in the beginning; however, in this study, students recognized their responsibility in learning in the first reflection, and this remained steady throughout the semester (Vollmer & Drake, 2020). In this study, students even explicitly discussed what adjustments they needed to make to succeed in the course, and specifically to anticipate the GRQs being phased out. By using the GRQs as a scaffolding technique, it may have allowed students to gradually take ownership of reading with a lot of initial instructor support and guided practice (Clark & Graves, 2004). Without the GRQs, students may have struggled to accept responsibility for their own learning because they did not have adequate reading comprehension or note taking skills.

One of the biggest differences with the addition of the GRQs was the theme of trust/comfort in which students felt the class was a safe space to ask questions and be wrong. This was not a theme in the previous study (Vollmer & Drake, 2020). While the authors do not know exactly why this cohort experienced comfort, the only instructional difference in this class was the addition of the GRQs. Because the GRQs may have allowed them to develop skills in reading comprehension, and thus improved confidence in their ability to learn independently, they may have felt more comfortable.

This study is limited by the small sample size. Participants were also in one class at a single university, so it is unknown how undergraduate or students at other universities may differ. While

comparisons were made to previous cohorts, no quantitative measures of reading comprehension were collected, thus this study relies on student perception of his/her ability. Additionally, even though the only instructional difference were the GRQs, other factors could have impacted some of the differences in themes. Because students knew the instructor would be reading these learning reflections, they may have felt the need to please the instructor; however, the instructions and rubric explicitly focused on students deeply reflecting. To combat this limitation, a focus group was held to conduct a member check of the themes and the students confirmed that it reflected their experience in the class, although using a focus group may have been an impediment for someone who disagreed with the themes but did not want to speak up. This study would have been strengthened with three investigators to aid in the analysis. The instructor was an investigator for this study, but did not participate in the focus group and a second investigator who had no instructional interaction with the students was also involved in the analysis. The second investigator was a faculty member in the same department.

### **Implications for Practice and Research**

Instructors would benefit from incorporating active learning techniques into their classes and/or curriculum. Students in flipped classes recognize that active learning is helpful in providing them with skills to solve problems on their own after graduation because they will not have an instructor to guide them (Santos et al., 2020). Traditional lectures may not motivate students to gain knowledge beyond what the instructor provided in his/her lecture. This could be detrimental for desired characteristics such as initiative, problem solving, independence, and proactivity and students do not feel like lectures prepare them for the real world (Santos et al., 2020).

Active learning requires that students come prepared to class often by completing readings. Instructors likely need to provide reading support when assigning texts, especially if they are complex (Hattan & Alexander, 2018). When instructors expect students to be responsible for learning from a reading prior to coming to class, a reading guide can help reduce the cognitive overload students feel and may help them develop skills in reading comprehension (Dubas & Toledo, 2015; Hattan & Alexander, 2018). Students appreciate when instructors provide material to help them read course materials critically (Narendran et al., 2018). By providing skills in reading, it will allow students to learn any new material better later on in their professional lives when they do not have guidance from instructors. Reading guides can also provide an incentive because it serves as a resource to complete a task. Because students have reported that textbook readings are not engaging in a flipped class, an interactive guide can help them engage with the text (Burkhart et al., 2020). Furthermore, visual guides may be preferred by students (Bigger & Luo, 2020).

The right amount of guided practice is needed so that instructors do not abandon students when they need assistance or they do not have the opportunity to gain skills to take responsibility for the task (Clark & Graves, 2004). However, to build autonomy, one of the fundamental aspects of scaffolding is to gradually have students take ownership, thus, these reading guides should be designed as such (Clark & Graves, 2004). Reading guides also allow students to actively engage in the text vs. highlighting or underlining concepts, which significantly increases comprehension (Hattan & Alexander, 2018). Instructors also need to consider how feedback will be provided for these reading guides. While time constraints may not allow instructors to provide feedback on guided reading questions, having a low-stakes activity in class can provide students with a non-threatening feedback opportunity (Mulcare & Shwedel, 2017). Metacognitive reflection questions within the guide may help with learning self-regulation and recall (Reid & Morrison, 2014).

Future studies with larger and diverse participants are needed to confirm the findings of this study. It would also be beneficial for future researchers to empirically evaluate different formats of

reading guides and the effects on reading comprehension that can be adopted across universities. Additionally, understanding the long-term impacts of utilizing the flipped learning process and guided notes are needed. It is unknown if the benefits described by students in this study are maintained beyond the end of the semester or how they compare to peers who have not experienced flipped learning or the scaffolding of guided notes. Studies are needed to understand if students are able to take notes themselves in future classes or they rely on the guidance provided by the instructors with each new course.

## References

- Akçayır, G., & Akçayır, M. (2018). The flipped classroom: A review of its advantages and challenges. *Computers & Education, 126*, 334–345. <https://doi.org/10.1016/j.compedu.2018.07.021>
- Baer, J. D., Cook, A. L., Baldi, S. (2006, January). *The Literacy of America's College Students*. American Institutes for Research. <https://www.air.org/sites/default/files/The-Literacy-of-Americas-College-Students-Jan-2006.pdf>
- Biggers, B. & Luo, T. (2020). Guiding students to success: A systematic review of research on guided notes as an instructional strategy from 2009-2019. *Journal of University Teaching & Learning Practice, 17*, <https://ro.uow.edu.au/jutlp/vol17/iss3/12>.
- Brewer, R., & Movahedazarhouli, S. (2018). Successful stories and conflicts: A literature review on the effectiveness of flipped learning in higher education. *Journal of Computer Assisted Learning, 34*(4), 409–416. <https://doi.org/10.1111/jcal.12250>
- Burkhart, S. J., Taylor, J. A., Kynn, M., Craven, D. L., & Swanepoel, L. C. (2020). Undergraduate students experience of nutrition education using the flipped classroom approach: A descriptive cohort study. *Journal of Nutrition Education and Behavior, 52*(4), 394–400. <https://doi.org/10.1016/j.jneb.2019.06.002>
- Cevikbas, M., & Kaiser, G. (2020). Flipped classroom as a reform-oriented approach to teaching mathematics. *ZDM, 52*(7), 1291–1305. <https://doi.org/10.1007/s11858-020-01191-5>
- Clark, K. F., & Graves, M. F. (2004). Scaffolding students' comprehension of text. *The Reading Teacher, 58*(6), 570–580. <https://doi.org/10.1598/rt.58.6.6>
- Culver, T. F., & Morse, L. M. (2008). Helping students use their textbook more effectively. Faculty Focus. Retrieved June 1, 2021, from <https://www.sd43.bc.ca/school/gleneagle/Parents/LearningLab/Reading%20Resources/Benefits%20of%20Reading%20and%20Strategies/11-strategies-getting-students-to-read.pdf>
- Dubas, J. M., & Toledo, S. A. (2015). Active reading documents (ARDS): A tool to facilitate meaningful learning through reading. *College Teaching, 63*(1), 27–33. <https://doi.org/10.1080/87567555.2014.972319>
- Fang, Z., & Coatoam, S. (2013). Disciplinary literacy : What you want to know about it. *Journal of Adolescent & Adult Literacy, 56*(8), 627–632. <https://doi.org/10.1002/jaal.190>
- Fink, L. D. (n.d.). *Creating significant learning experiences: An integrated approach to designing college courses*. John Wiley & Sons, Inc. 2003.
- Gilboy, M. B., Heinerichs, S., & Pazzaglia, G. (2015). Enhancing student engagement using the flipped classroom. *Journal of Nutrition Education and Behavior, 47*(1), 109–114. <https://doi.org/10.1016/j.jneb.2014.08.008>
- Graves, M. F., & Graves, B. B. (2003). *Scaffolding reading experiences: Designs for student success*. Christopher-Gordon.
- Grow, G. O. (1991). Teaching learners to be self-directed. *Adult Education Quarterly, 40*(1), 1–10.

- 41(3), 125–149. <https://doi.org/10.1177/0001848191041003001>
- Hattan, C., & Alexander, P. (2018). Scaffolding reading comprehension for competent readers. *Literacy Research: Theory, Method, and Practice*, 67(1), 296–309. <https://doi.org/10.1177/2381336918786885>
- Lei S.A., Bartlett K.A., Gorney S.E., & Herschbach T.R. (2010). Resistance to reading compliance among college students: Instructors’ perspectives. *College Student Journal*, 44(1), 219–229.
- McBride, A. B. (1996). Creating a critical thinking learning environment: Teaching statistics to social science undergraduates. *PS: Political Science & Politics*, 29(03), 517–521. <https://doi.org/10.1017/s1049096500045194>
- McLean, S., Attardi, S. M., Faden, L., & Goldszmidt, M. (2016). Flipped classrooms and student learning: Not just surface gains. *Advances in Physiology Education*, 40(1), 47–55. <https://doi.org/10.1152/advan.00098.2015>
- Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research: A guide to design and implementation* (4th ed.). John Wiley & Sons.
- Michaelsen, L. K., Knight, A. B., & Fink, L. D. (2004). *Team-Based Learning: A transformative use of small groups in college teaching*. Stylus Pub.
- Mulcare, D. M., & Shwedel, A. (2016). Transforming bloom’s taxonomy into classroom practice: A practical yet comprehensive approach to promote critical reading and student participation. *Journal of Political Science Education*, 13(2), 121–137. <https://doi.org/10.1080/15512169.2016.1211017>
- Narendran, R., Almeida, S., Coombes, R., Hardie, G., Quintana-Smark, E., Zaher, N., Wang, H.L., Chowdhury, A., & Stevenson, B. (2018). The role of self-determination theory in developing curriculum for flipped classroom learning: A case study of first-year business undergraduate course. *Journal of University Teaching and Learning Practice*, 15(5), 75–95. <https://doi.org/10.53761/1.15.5.6>
- Paulson, E.J., & Armstrong, S.L. (2010). Postsecondary literacy: Coherence in theory, terminology, and teacher preparation. *Journal of Developmental Education*, 33, 2–13.
- Persky, A. M., & McLaughlin, J. E. (2017). The flipped classroom – from theory to practice in Health Professional Education. *American Journal of Pharmaceutical Education*, 81(6), 118. <https://doi.org/10.5688/ajpe816118>
- Porter, H. D. (2018). Constructing an understanding of undergraduate disciplinary reading: An analysis of contemporary scholarship. *Journal of College Reading and Learning*, 48(1), 25–46. <https://doi.org/10.1080/10790195.2017.1362970>
- Reid, A. J. & Morrison, G. (2014). Generative learning strategy use and self-regulatory prompting in digital text. *Journal of Information Technology Education: Research*, 13, 49-72.
- Roehl, A., Reddy, S. L., & Shannon, G. J. (2013). The flipped classroom: An opportunity to engage millennial students through active learning strategies. *Journal of Family & Consumer Sciences*, 105(2), 44–49. <https://doi.org/10.14307/jfcs105.2.12>
- Rogoff, B. (1992). *Apprenticeship in thinking: Cognitive development in social context*. Oxford University Press.
- Santos, A. G., Fagundes, A., Barbosa, K. B., & Barreto, N. S. (2020). Students’ perspective on active learning in nutrition education. *Journal of Nutrition Education and Behavior*, 52(4), 415–420. <https://doi.org/10.1016/j.jneb.2019.09.012>
- Sharma, P. & Hannafin, M. (2005). Learner perceptions of scaffolding in supporting critical thinking. *Journal of Computing in Higher Education*, 17, 17-42.
- Tan, Y.L.L. (2018). Meaningful gamification and students’ motivation: A strategy for scaffolding reading material. *Online Learning*, 22(2), 141-155. doi:10.24059/olj.v22i2.1167

- Van Camp, D., & Van Camp, W. (2012). Using Content Reading Assignments in a Psychology Course to Teach Critical Reading Skills. *Journal of the Scholarship of Teaching and Learning*, 13(1), 86–99. Retrieved from <https://scholarworks.iu.edu/journals/index.php/josotl/article/view/2184>
- Vollmer, R., & Drake, T. (2020). Exploration of dietetics graduate students' experience in a flipped course using learning reflections. *Journal of Nutrition Education and Behavior*, 52(4), 407–414. <https://doi.org/10.1016/j.jneb.2019.11.014>
- Vygotsky, L.S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- West, J. (2018). Raising the Quality of Discussion by Scaffolding Students' Reading. *International Journal of Teaching and Learning in Higher Education*, 30(1), 146–160.