

A Student's Perception of the use of Online Homework in a College Course

Ryan Spence

West Virginia University

Math 495

A Student's Perception of the use of Online Homework in a College Course

The use of online homework is, in no way, a new idea, but it has often taken center stage as one of the key issues educators must face, especially today. How does one reap the benefits of online homework? Will the students be able to learn through such processes? Is it even worth it in the end? Taking time to delve deep into the research surrounding online homework, I was overwhelmed by both positive findings, which raved on how amazing it is, and negative ones, that found it to be a pointless feat. In the end, I have realized that one opinion matters greatly, influencing whether online homework is a progressive tool or simply extra work, the student's. At this qualitative study's core, intentions were not only to find both literary and theoretical support for the affectivity of implementing online homework, but also to analyze and reflect upon one student's perception of how this tool was used within a college algebra course. The goal is to lay down a foundation that could help to pilot future research studies on this topic.

Review of Literature

Whether we are the students, educators, or simply various bystanders, it seems likely that regardless of being for, or against, an educational development, we are all in support of the idea that every person deserves to receive the best possible education he or she can. New proposals, and ideas, are being executed every year throughout the country, all in hopes of bettering students' understanding and maintaining of information; we specifically focused on online homework within this study. Therefore, in regards to online homework, it comes down to the foundational question of does it "improve students' understanding of the content and their overall performance in the courses" (Cox & Singer, 2011, p. 514)?

Even before beginning my research on this topic, having first-hand experience with technologies in education, from both the student and educator's perspectives, I have always held them as profitable tools to be utilized within a classroom, including online homework. Hence why, after taking the time to study multiple pieces of research, and their results, I have noticed two key themes present that support online homework's implementation: the idea that it can never be a hindrance, only a benefit, and the positive perceptions of it by students that allow it to be a successful learning tool.

Online Homework is never a hindrance

If there was a statement to ideally summarize the viewpoint of those in support of online homework's use, it would be found in Cox and Singer's (2011) work, that "students were not placed at a disadvantage when they used an online homework system" (p. 518). No matter where, when, or how it was used, this tool never resulted with destructive consequences in any of the included studies, only beneficial ones. For example, many know that practice makes perfect, and that is exactly what online homework does, it provides students with "an increase in the time spent on a task, actively engaged with the mathematics itself" (Babaali & Gonzalez, 2015, p. 696). Using this approach is not simply providing the students more busy work, but it is placing them in a position where they are becoming more familiar with the processes and strategies required to be successful in mathematics. Now, in order to provide this extra experience, Smolira (2008) pointed out that this would infer numerous more graded assignments, something that is near impossible to do when a teacher hand-grades everything. Due to the traditional approach's format, it can often take days to return homework to the students with feedback that could influence their understanding of future material. Since the teacher would have to grade each individually, it would take an increased amount of time and "the long turn-around time for

homework assignments may reduce its value as a learning tool” (Smolira, 2008, p. 91).

Conversely, with online homework, its ability to provide feedback instantly allows for students to adapt, try to understand their mistakes, and make another attempt at solving a problem. In the end, hiding behind the studies seems to be the remaining fact that there is truly “no evidence to support the use of online homework over conventional hand-graded homework” (Richards-Babb, 2011, p. 92), but the tool itself never gets in the way of students’ ability to better learn, understand, and maintain the provided material, only encourage.

Opinions on Online Homework

Although online homework’s numerous beneficial qualities provide a strong argument for its use within a classroom, Smolira (2008) dropped an important truth in the conclusion of their study, “for it to be a truly effective teaching tool, students must also accept and benefit from the technology” (p. 94). We have already focused on the advantages it provides students, but the use of the word “accept” provides a key point; nobody learns unless they are receptive and supportive of the teaching they are being provided. Which leads us to the inquiry, how do students view online homework? Strictly relying on statistically based fact, looking at the results from both Smolira’s (2008) and Richards-Babb’s (2011) studies, the surveys they provided to their students resulted with each getting over 80% describing online homework in a favorable way (84% and 80.2% respectively). What becomes more revealing though are the specific perspectives both Richards-Babb (2011) and Cox and Singer (2011) were able to discover through their surveys. Within *Online Homework, Help or Hindrance?*, Richards-Babb (2011) found a detail that could greatly influence the success of this tool, “it was essential that students be rewarded for completing the online homework” (p. 86). Students, when it comes to any form of homework, prefer to be rewarded for their efforts, so only 34.2% agreed they would have

completed the assignments for no grade while 63.0% admitted they only completed the online portion because it was incorporated in their final score (Richards-Babb, 2011). On the other hand, Cox and Singer (2011) provided insight on which characteristics of the online homework their participants enjoyed, shining a light on the ability to have multiple attempts at problems and immediate feedback, each being a positive quality we previously talked about.

Ultimately, a review of literature paints a detailed picture of the multitude of factors that influence the success of online homework as a tool. Although there are numerous reasons why its inclusion would be a positive addition to any classroom, there is a continuous need to research the students' perspectives, and holding them as constant references on how to affectively use online homework. Hoping to investigate this need, we completed our study by inspecting student perspectives of online homework used specifically within a college algebra classroom, using feedback to draw conclusions on its affectivity and potential changes.

Educational Theories Supporting Online Homework

Although there are numerous data based reasons that support the implementation of online homework, an educational tool must also hold validity based upon the grounds formed by one or more learning theories. Online homework adopts the categorization of active learning, an approach that researchers including Huang (2002) and Michael (2006) both adamantly support due to its foundation upon Constructivism. Yet, looking at online homework from different perspectives, like researchers Semple (2000) and Salemi (2002), online homework also finds support from other theories, specifically the Behaviorist and Cognitivist approaches. Although different from one another, not one takes away the legitimacy of the other two philosophies but instead provides another way to examine online homework. While most of the aforementioned researchers looked at the theories individually, Ally (2008) adopted a different approach by

providing an explanation of how the ideals of Behaviorists, Cognitivists, and Constructivists are interconnected and support online homework/learning's success. As Ally (2008) explained it, "behaviorists' strategies can be used to teach the *what* (facts); cognitive strategies can be used to teach the *how* (processes and principles); and constructivist strategies can be used to teach the *why* (higher level thinking)" (p. 20).

Behaviorist Theory: The What of Mathematics

Heavily influenced by the research of B.F. Skinner and Ivan Pavlov, the Behaviorist Theory sees learners as blank slates where learning is portrayed by visible progress and/or changes that can be observed. Using Skinner's research as a foundation, Semple (2000) focused on the importance of feedback, specifically how positive or negative responses, and the speed at which they are provided, influence the progress of student learning. As mentioned previously, regardless of whether the feedback is beneficial or not, if it takes multiple days to be received and reviewed students could fall behind in future material due to the misconceptions they still hold. But online homework is able to provide feedback instantly through positive and negative reinforcement, directing the students towards success. Echoes of feedback can also be heard in the work of Salemi (2002) and Ally (2008), each call upon online homework's active style and explain how the negative responses allow for students to see their mistakes and adapt to solving the problem. From the Behaviorist's point of view, the ability to decide if set goals have been met or not is another key sign of whether learning has occurred (Ally, 2008). Due to online homework programs' nature, they often consist of tables or charts that are slowly completed as students prove competent in a section's topic, providing observable proof that the users are learning what the material is and meeting the goals that are assigned to them.

Cognitivist Theory: The How of Mathematics

Progressing into the “how” of mathematics, cognitive theorists focus their research on understanding how mental processes, such as memory, reflection, and analysis, influence students’ learning. In order to guarantee students have an understanding of the material that surpasses surface level knowledge, online homework must evoke cognitive processes. Salemi (2002) provides a foundational layer to support online homework’s relevance to cognitive theories through referencing the demand for the higher levels of Bloom’s Taxonomy: application and analysis. “Bloom’s Taxonomy uses a multi-tiered scale to express the level of expertise required to achieve each measurable student outcome” (*Bloom’s Taxonomy of Educational Objectives*). This system provides educators an outline that helps recognize indicators of students’ development in higher-level thinking. Online homework is designed to be a tool for applying and analyzing whatever material students have been studying and Semple (2000) argues that one “cannot use them without thinking deeply about the content that they are learning” (p. 21). Students are provided the opportunity to gain a stronger understanding of the material through the multitude of problems they are assigned to complete.

In both its structure and use, online homework can also be used to grow the metacognitive abilities of the learners. Metacognition can be defined as one’s awareness of their own knowledge; being able to recognize what they were previously or are currently learning and call upon it for understanding future material (Mcdaniel, 1970). Ally’s (2008) emphasis was on that of students’ ability to recall and utilize past knowledge they have gained in order to solve problems they face. The typical setup of online homework programs permits the students to see and review past assignments that in turn allow them to “retrieve existing information from long-term memory to help make sense of the new information” (Ally, 2008, p. 24). Within Michael’s (2006) research we are reminded that students collaborating with one another is another affective

way to invest in their metacognitive abilities and success with learning through online homework. In moments of cooperation, the learners are able to explain their understanding of the problem, apply it, and analyze the accuracy of their knowledge allowing them to find and correct any faults in logic. Therefore, with both Ally's (2008) and Michael's (2006) suggestions, online homework is allowing students to become more aware of their learning and arming them to be able to use it to assist in future educational experiences.

Constructivist Theory: The Why of Mathematics

When it comes to online homework or any other form of active learning, it is speculated that no theoretical approach has a stronger correlation than Constructivism. Based on the research of both Jean Piaget and Lev Vygotsky, the core ideal of this educational belief is that “the learner is the center of the learning with the instructor playing an advising and facilitating

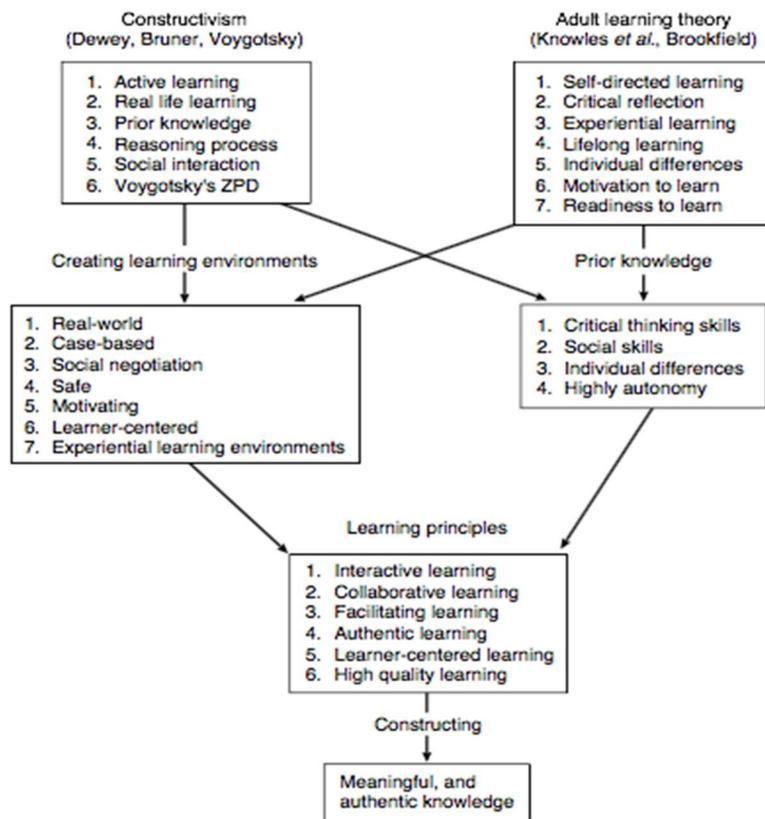


Figure 1. Constructivism and Learning

role” (Ally, 2008, p. 30). In order for understanding to occur, the students must be at the helm of constructing new knowledge through processes that demand involvement, not just passive absorption. Within Huang’s (2002) research, we are provided Figure 1 that summarizes the interconnectedness between constructivism and the ability for learners to develop meaningful and authentic knowledge. Echoes of ideas from the Behaviorist and Cognitivist approaches ring throughout Huang’s (2002) summarization, how the constructivist approach calls upon the use of social interaction, reasoning (the higher levels of Bloom’s Taxonomy), and prior knowledge, approaches that we claim online homework fulfills based upon the research of our various references. In order to combat doubting the importance of a subject, Huang (2002), Semple (2000), and Ally (2008) each stressed the creation of material as relevant to the individual student. That online homework questions should not take on the form of copy and paste assignments that have the same repetitive steps, but instead include thought-provoking situations that allow them to see the subject’s application.

Ultimately through an analysis of various educational theories, online homework finds grounds upon three core ideals, yet what matters is not which is most prevalent, but how each can be referenced for affective use of this tool; how online homework can guarantee students’ gaining of a deeper understanding of the material.

Design of Study

Progressing into this study, we held onto the goal of gaining insight on how students perceive online homework within a college classroom. We implemented the online program called *MyLabsPlus* within the college algebra course we were studying, allowing the students an extended amount of time to form opinions through their experiences. In order to gain data, numerous students were randomly selected for interviews at the end of the semester. We aimed

to learn about their thoughts on topics, including the program's affectivity, its use versus more traditional styles, and what changes they would make, if any, along with why. Due to the circumstances, though, we ultimately interviewed one student who, for privacy purposes, will be addressed as he or him for the remainder of the paper. We specifically hoped that we would be able to see how student's opinions may reflect, or contradict, the various literature and theories that support online homework along with how they may influence the program's ability to assist in gaining a better understanding of mathematics.

The Classroom, Online Homework Program, and Students

The data collected for this study was obtained from a summer college algebra course which ran from June 26th through August 4th of 2017. The students met for lecture every Monday, Wednesday, and Friday from 8:30 to 10:20 AM, and then split the time every Tuesday and Thursday with lab taking 9:30 to 10:20 AM after lecture. During the lecture section, the teacher would progress through the material with numerous examples of how the topic is accurately utilized while answering any questions that arose. Then, during the labs, students would be split into groups of two to three to complete assignments that provided practice on what had been previously taught while the teacher and lab mentors were present to offer assistance.

As previously mentioned, the college algebra course utilized an online homework program by the name of *MyLabsPlus*. Students would be assigned homework that consisted between 10 and 15 questions that had to be completed by 8:00 AM on the given due-dates. In total, the students would be given three opportunities to submit each section, with three attempts at each question, and if any of the included problems were incorrect, the program would provide feedback that aimed to guide them towards the right answer. After the third attempt, the grade

would be officially calculated and the solutions made available for viewing. Overall, the homework assignments accounted for only 8% of the students' entire grade. Practice homework sections were also included within *MyLabsPlus* that allowed students infinite attempts to answer ungraded problems similar to what they would see on graded homework, quizzes, or even tests.

The class consisted of 28 students varying in class status, specifically 15 Freshman, 8 Sophomores, 3 Juniors, and 2 Seniors. Among these students was a wide range of majors, spanning from Engineering to multiple branches of Psychology. Rather than focusing on the accuracy of students' answers on homework, we hoped to investigate the opinions of students who varied in the percentage of assignments they had completed. In order to maintain unbiased research, we used a random number generator to pick 13 students from the College Algebra course and invited them to partake in our study. Within this group of students, there were five who had done more than 80% of the homework, three between 70% and 80%, four ending in the 60% range, and one who completed less than 50%. Although we had intentions of interviewing at least five of the invited students, only one responded causing our adaptation of completing a qualitative study. Our participant for the study was a non-degree sophomore who was the one completing less than 50% and received a 70.1% grade for the entire semester.

The Interview Process and Beyond

Before inviting any students to join the study, we created two separate lists of about 10 to 13 questions each that would help guide the interviews and pull valuable insight from the participants. One list was created with questions for those who completed at least 60% of the problems and the other being for anyone of less percentage. Each contained similar questions but also some unique ones due to the differing amounts of experience they had with the program. For those who completed most of the assignments, we hoped to understand what was most

beneficial about the online homework, what were the pros and cons, what would they change. While on the other side, we aimed to see why certain students neglected to do the *MyLabsPlus* assignments, and their reasoning behind it.

The interview was guided by the previously mentioned questions but also open-ended as it allowed the student to express his thoughts and answer any questions that may have arisen from the interviewer. Since we only had one willing participant, and he had completed a small percentage of the assignments, we were able to have a look at the struggles or issues he and other students possibly had with the online homework. The full list of questions can be seen in Appendix A but a few examples are “What prevented you from completing the online *MyLabsPlus* homework assignments?” and “Do you think online homework should be a requirement or be optional and why?” In order for future analysis, the interview’s audio was recorded and later deleted once it had been transcribed to a document.

Once the interview process was complete and it had been transcribed, all those involved in the study individually reviewed the answers the student provided. Each member was searching for key thematic ideas surrounding online homework, and phrases and/or words that supported such a claim. After separately completing this task, all involved came together to discuss the conclusions they found and the proof that reinforced each. With few differences in findings and after some discussion and reflection, it was agreed upon that there were three core thematic ideas within the completed interview.

Analysis of Results

The three core themes discovered were: the influence of working alone or with assistance had on the learning and understanding of Mathematics, the restructuring of various class aspects

surrounding homework could lead to more successful results in students' learning/understanding, and *MyLabsPlus*' requirement to complete/solve problems led to true learning.

Working Alone or With Assistance

One of the stark differences the student pointed out in his interview was feedback type and its presence while working. The student began by explaining that feedback was more beneficial in class because whenever a problem arose the students could have "a direct answer when you ask the question." Instead of waiting to see if it was wrong as with *MyLabsPlus*, the teacher was able to help guide the students through the process, there was no delay in answer or waiting until after submitting a problem. More often than not, he felt that the problems' lack of hints or guidance when asking the question meant "a lot of people would get frustrated and aggravated because we're just like trying to learn it on our own almost."

It was not only the absence of the teacher's feedback that influenced the online homework's nature, but also the lack of any physical presence overall. In the student's mind, the nature of having someone as a type of support seemed to lead to more successful learning. This idea was reflected in his response of "the lecture time" being the piece of the course that was most helpful. He noted how he enjoyed the direct nature of the *MyLabsPlus* assignments, but found them more beneficial in his previous Quantitative Skills Reasoning course where "whenever we would do those [problems], and the teacher was with us, that was a whole lot more helpful." Not only was the teacher's presence beneficial to the student, but also that of his classmates made learning more enjoyable. With the presence of his classmates, he did not feel as alone and he explained "I like the fact we got to work together with people," noting that it often led to brainstorming and eventual completion of the problem they were facing.

As a whole, throughout the interview, he was emphasizing the importance of having a beneficial presence in whatever form that may be. Whether it is the teacher's direct feedback or the teamwork of fellow classmates, assistance could lead to a more beneficial use of online homework as a learning tool.

Restructuring of Class Aspects Pertaining to Homework

Analyzing the interview, it felt as if one key issue the student had with *MyLabsPlus* was the fact that he had a limited number of attempts before the problem would be counted as incorrect permanently. The student felt as if his grade was being hindered through the learning process where we can assume mistakes will occur, explaining that "by the time I went back through the problem, or redone the problem, or saw my mistake, it already sent me to the next problem and I'd miss points." Rather than allowing them to test their hypotheses and try to find the correct answer on their own, "it's like you're done after three times and you skip the problem."

This led to his support of the idea that if online homework must be graded, it should take on a different form, specifically mentioning a participation-based style. He explained that the grades would be grounded upon the completion of assignments alone. In order to gain full credit, the students must successfully answer every question, regardless of accuracy. This would cause them to observe the process of every problem type rather than submitting a few, receiving most points, and missing out on learning opportunities. Yet, when focusing on if *MyLabsPlus* stayed the way it currently was, he continued reasoning that "you should have an unlimited amount of chances and if somebody wants to continue to do every problem to get all ten points, they can do that."

Moving forward, the student began to explain that often it was not that he did not know the material, but the actual layout and phrasing of questions seemingly acted as a hindering factor for the students. He explained his claim, saying, “they were just so confusing and laid out so bad that we were having to ask questions on the simplest problems.” Then, following the teacher’s clarification, the students would be frustrated, agreeing on how “we didn’t know what that even meant” because of the lack of clear terminology.

Sometimes, students struggle with material not because of the difficulty but because of the way it is presented to them. Our interviewee summed up his opinion on the restructuring of the online homework program with “we don’t mind math, we don’t mind doing the problems, we just don’t like what we’re doing them through” and that “the bugs have to get fixed in this process.”

Requirement of Completing Problems

Even with the issues he had with *MyLabsPlus*, the student applauded the fact that the program required the students to actually complete problems, explaining how “that’s how you learn math, it’s not something you can study, you don’t necessarily memorize it, you just kinda have to know it.” The program would not let one slide by if he or she had a small grasp of it but instead “we have to do something and understand concepts and learn it” if the students wanted to gain those points for the question. This is also reflected within his strategy to be successful in the course, repetition, explaining that he was often “doing things over and back-tracking my steps.” It allowed the student opportunities to see where mistakes did, or could, happen, fix them, and finally find the correct answer. Even due to *MyLabsPlus*’ limit of three attempts, he recognized an affective approach to learning the material, so he would analyze the problem for

mistakes then redo it, even if he was frustrated that the system already moved on and marked it incorrect.

When it comes to a student's perspective on online homework, there are a multitude of factors that must be taken into account before drawing any final conclusions. One must look at how the results reflect research from the past along with educational theories, do they line up or are they contradicting? Yet, at this moment, an analysis of the collected results seemingly points towards the idea that online homework can be an affective learning tool, as long as it is implemented in ways that do not hinder the students.

Discussion of Results

Our foundational goal for this study was to gain insight on students' opinions of online homework and its integration into a college classroom; and in turn, using this data to reflect on what changes should be made in order for this tool to help develop students' understanding of mathematics. As one analyzes the student's interview and reflects upon his responses, it becomes apparent that his statements reveal both similarities and differences in his opinions and the various resources used in this study. The student's own individual experiences with online homework during the course helped shape his opinion that may agree, differ slightly, or be the complete opposite of the main ideas expressed within the literature and educational theories.

Perceptions Compared to the Literature

The idea that learning comes from doing is emphasized through multiple studies especially in Babaali and Gonzalez (2015). Engagement and involvement are strategies implemented within online homework that do not allow students to simply glide through the problems, but instead help them to gain deeper insight. The student we interviewed expressed a view similar to this. He saw a benefit of online homework being that the assigned problems

required the students to be involved with and understand the material in order to complete them accurately. Both the researchers and the interviewee agree on the idea that online homework's high demand of time on task is what leads to learning math, not simply through memorization.

While the benefit for completing problems was well known, Richards-Babb (2011) and the student both expressed the fact that a reward is necessary. If a teacher was to integrate online homework in his or her course, compensation would be a requirement if the students were to complete any problems assigned. Whether the points are rewarded for participation or accuracy is unimportant, since something would be needed to influence completion of the homework.

Although agreeing on multiple points, it is interesting to analyze the contradicting ideas that exist between completed studies and the interviewed student. Both agree on the basic idea of using feedback and numerous attempts, but disagree on the specifics of each feature. On one side, the researchers found that many online homework program's use of open-ended and quick feedback was beneficial in challenging the students to learn through discovering and fixing their own mistakes. Yet the student we interviewed felt that whenever he was working on the assignments, the feedback he received was useless compared to what he got from his teacher. Typically, it would end up making him feel as if he had no help or guidance when he got a question incorrect, leaving him more confused. The student preferred having the teacher there, since the teacher would be able to provide personalized feedback rather than what was coded into a program. As for numerous attempts, Cox and Singer (2011) and the student each agree that it should be implemented, yet our interviewee was passionate about the idea that those doing the homework should be allowed an infinite number of chances to answer. Due to the limited chances, the student felt pressured that if he made too many errors in his thinking, his grade would be suffering as he was trying to learn. Instead, he implored that the students have infinite

attempts so that the pressure of being incorrect on each attempt would not act as a distraction from learning and understanding the material. Yet what he did not realize was there were numerous practice assignments on *MyLabsPlus*. Within each, he would have an infinite number of attempts to solve these problems and then, when he understood the questions, he could have completed the graded homework with ease and less pressure about losing points.

Perceptions Compared to the Educational Theories

Emphasis on the importance of being involved in learning is not only found in previous studies, but also in the theories supporting online homework. Salemi (2002) and Semple (2000) reflected similar ideas on student involvement in their individual works. Salemi (2002) focused on Bloom's Taxonomy and how online homework demands application and analysis, while Semple (2000) argued how while completing problems, the students are somewhat forced into thinking deeply about the material. Although the student we interviewed felt overwhelmed at times by the numerous problems he had to complete, he found that his strategy for improving learning was through repetition. He would complete as many problems as possible since that is what helped him gain insight and understanding of the material. Relative to repetition, the student expressed his wish that he could go back to previous assignments after an exam in order to refresh what he already learned, but, due to miscommunications, thought he could not. Yet, this hope reflects similarities to Ally's (2008) studies on Metacognition and its highlight on how online homework should have a setup that allows students to be aware of what they have already learned. Both the student and Ally (2008) understood the importance of online homework programs providing users the opportunity to review past materials so that it can then, in turn, help simplify the learning process of future topics.

Numerous times during the interview the student compared things done in his current class to what happened in his previous Quantitative Skills Reasoning course. Specifically, he expressed how he wished the *MyLabsPlus* assignments could have been completed during class time, where students could work together with the teacher present. This reflects ideas in Michael's (2006) study, which argued that grouped students could brainstorm, make and test hypotheses, and then fix what mistakes may occur, bettering their learning of material.

As mentioned previously, both the student and researchers agree on the importance of having feedback present regardless of what form it may take. But the differences begin to show as Semple (2000) argued that the speed of feedback is what influences its effectiveness while the student we interviewed believed it to be the quality of it. Semple (2000) stood by the fact that online homework's quick responses are what help to guide students towards attaining the right answer, while also maintaining the importance/relevance of the material. If a teacher was to grade everything, it could potentially take a few days for the students to get any feedback, hindering their learning. On the other side of things, the student felt as if all the feedback *MyLabsPlus* gave him was hollow, causing him to have to learn alone. Instead, he preferred having the teacher's input, regardless of how long it took, as it was more individualized and detailed about his mistakes.

Another disagreement arose over the use of goals as motivational factors. Ally (2008) found that having visible marks showing completion of a lesson or assignment helped to motivate the students as they were able to see how far they have come and wanted to earn said check. In the course, *MyLabsPlus* would do this through percentage of questions correct, which the student found to actually add stress to the situation. He would be working through a problem and, due to limited attempts, felt that with every mistake, he was losing points for going through

the typical learning process. Too often he would be so worried about his grade that he could not focus on the material in front of him.

Lastly, both the research of Huang (2002) and Semple (2000) argued that in order to make learning relevant and true, material must be related to real-world situations the students may face. The students should be given challenging problems that demand the use of application and analysis to be successful. Yet, the interviewed student felt the *MyLabsPlus* questions would often throw students into the deep end with problems that were not instantly recognizable. Instead, he wanted to have assignment problems that reflected what was completed in lecture, since that is what he was used to and had notes on.

There is no perfect way to implement online homework, or any other strategy within an educational classroom. At every point, one will face both support and opposition with every decision made. What must be remembered is that online homework programs should continuously adapt and change so that we can guarantee students are comfortable and able to best use these tools for learning the material presented to them.

Conclusions

As stated previously, the goal for this study was to analyze students' opinions on online homework's use within a college algebra classroom and use these responses as guidance for what changes could, or should, be made to ensure better understanding of mathematics. Although the interviewed student had completed less than 50% of the *MyLabsPlus* assignments, it is important to not undermine the value of the responses provided by him. From analysis and discussion of the transcript, conclusions could be drawn on what changes were seen as possible, those that could potentially occur if circumstances were right, and those that could not be accepted.

The first idea that was drawn from the interview was that of unlimited attempts. The issue here was perspective of what role the *MyLabsPlus* assignments' were taking on. The educators saw it as an assessment tool, testing students' understanding of the material, while our interviewee believed it to be a learning tool. Although the assignments could definitely adapt both roles, allowing the students an unlimited number of attempts is a bit cumbersome as students could potentially randomly guess answers until the right one was discovered, preventing meaningful learning. Yet, it was agreed upon that an increase in attempts from nine to an agreed upon number was a possibility as long as the students would be made aware of these increased chances and use them to make educated attempts at the problem.

The next point of discussion was that of the idea of changing the grading type from focusing on accuracy to one based upon participation/completion. Reflecting on this, there were multiple issues that came to arise with this idea, beginning with the fact that, as mentioned before, the educators wanted *MyLabsPlus* to act as an assessment tool. If it were to grade based solely on participation, students could potentially fill in every answer with random numbers thus completing every problem incorrectly and still gain full credit for attempting the assignment. The teacher would no longer be able to check grades on the *MyLabsPlus* assignments to see if students truly understood the topics. This led to the idea of splitting the points between accuracy and participation, perhaps two-thirds for correct answer and one-third for completion. Whether this idea is used, and how the points are separated, would depend upon the personal preference of individual course educators.

The final piece discussed was the student's emphasis on how he constantly wanted assistance with the homework assignments, wanting to not learn alone. Although there are already multiple opportunities for out-of-class help including tutors, office hours, and a math-

learning center, the issue may be that students are unaware of these resources. This led to the idea of, if the resources were available, requiring students to be in the math-learning center for one hour weekly, allowing them to utilize this resource for asking questions, studying, or homework. The students would check in and ultimately their attendance would count as a percentage of their final grade in the college algebra course.

The research done within this study was done with the intention of gaining insight to what students' opinions are of online homework used within a college algebra classroom and whether they align with previously completed studies. No final conclusions can be drawn about the affectivity of online homework, and whether students perceive it as a positive resource. This study leads to recognition that future research must be done through interviewing more students of various performances to gain more conclusive data about this topic.

Acknowledgements

Throughout this entire study, I have gratefully received guidance from both Laura Pyzdrowski and Matthew Schraeder. Each have supplied advice on numerous occasions along with being the other two researchers who analyzed the interview process, helped finalize what themes seemingly existed in the student's responses, and what conclusions were drawn.

References

- Ally, M. (2008). Foundations of Educational Theory for Online Learning. In *The Theory and Practice of Online Learning (Second Edition)* (pp. 15-39). Athabasca University: AU Press.
- Babaali, P., & Gonzalez, L. (2015). A quantitative analysis of the relationship between an online homework system and student achievement in pre-calculus. *International Journal of Mathematical Education in Science and Technology*, 46(5), 687-699.

- Bloom's Taxonomy of Educational Objectives. (n.d.) Retrieved November 19, 2017, from <https://teaching.uncc.edu/services-programs/teaching-guides/course-design/blooms-educational-objectives>
- Cox, T. B., & Singer, S. L. (2011). Taking the WORK out of HOMEWORK. *The Mathematics Teacher*, 104(7).
- Huang, H. (2002). Toward constructivism for adult learners in online learning environments. *British Journal of Educational Technology*, 33(1), 27.
- Mcdaniel, R. (1970, February 09). Metacognition. Retrieved November 19, 2017, from <https://cft.vanderbilt.edu/guides-sub-pages/metacognition/>
- Michael, J. (2006). Where's the evidence that active learning works? *The American Physiological Society*, 159-167.
- Richards-Babb, M., Drelick, J., Henry, Z., & Robertson-Honecker, J. (2011). Online Homework, help or Hindrance? What Students Think and How They Perform. *Journal of College Science Teaching*, 40.
- Salemi, M. K. (2002). An Illustrated Case for Active Learning. *Southern Economic Journal*, 68(3), 721-731
- Semple, A. (2000). Learning Theories and Their Influence on the Development and Use of Educational Technologies. *Australian Science Teachers Journal*, 46, 21.
- Smolira, J. C. (2008). Student Perceptions of Online Homework in Introductory Finance Courses. *Journal of Education for Business*, 84(2), 90-95.

Appendix A
Interview Questions

- What strategies did you use in order to help improve your learning and understanding of mathematics in this course?
- When comparing the *MyLabsPlus* homework assignments to other pieces of the course, like textbook homework, labs, quizzes, and lectures, did you find it to be helpful in your learning? Why?
- Which piece of the course, i.e. the *MyLabsPlus* homework, videos, or labs, did you find most helpful to your learning and why?
- Are there any strategies, or components, you can think of that you would recommend adding to the course to help future students be more successful with their learning and application of mathematics?
- Would you have done the *MyLabsPlus* homework if it were presented in a different format? (i.e. pen and paper) Why or why not?
- What prevented you from completing the online *MyLabsPlus* homework assignments? (Explain more, by giving examples of what may have stopped them, in case students need clarification)
- What changes would you make to the *MyLabsPlus* program and its use in the course in order to help you better learn and understand mathematics? Why?
- Do you think online homework should be a requirement or be optional? Why?
- What pros and cons do you see with the use of the *MyLabsPlus* online homework in a classroom setting?
- Do you think students would complete homework assignments if they were not graded? Do you think they should? Why?