Homework Types in the Rural Classroom

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Abstract

This study was conducted to find the effects of different types of homework in the rural classroom. Homework has been considered an integral part of math classes for many years. The increased use of online homework has prompted studies on the benefits of this format for homework. However, few studies of these studies have been conducted in rural classrooms. Which type of homework produces better student results and do students prefer one type over the other? When completing their homework, what resources do they use?

The study was conducted over a period of three weeks. In order to gather data about students’ perceptions of the two homework types studied, students were given a survey after they had completed each type of homework. Data was also collected from pre-tests and post-tests.

The students showed greater gains after completing the paper homework. They also felt that the paper homework gave them a better understanding of the topics that were covered. However, they did not rate the online homework significantly lower in most categories. When looking at the resources that students’ used to complete their homework, students primarily obtained help from their fellow classmates. When completing the online homework, they most frequently used the “View an Example” resource.

Students in rural areas may benefit from paper homework versus online homework, however, the online resources can also be helpful to them. Future studies could look at rural schools over a longer period of time.
Chapter 1: Introduction

Homework is seen by many people as an integral part of the high school experience. Parents, administrators and teachers expect that students will have some sort of homework assignment. Within the last twenty years, due to the increase in the quality of technology, as well as the number of people who have ready access to computers and the internet, the type of homework that students are assigned has changed. More online assignments, as well as online communication between teachers, students and parents, can occur. With the new availability of online homework systems, studies have been done comparing the benefits of online homework and learning, versus traditional paper and pencil homework (Edwards, Rule & Boody, 2013; Smeal, Walker, Carter, Simmons-Johnson & Balam, 2013).

**Problem**

As schools switch to more technologically advanced homework and textbook options, the question of whether these new methods of homework are as effective as people claim arises. While online homework has been used for several years, few studies have been conducted in rural school areas, which are sometimes delayed in adopting these new measures due to economic and access factors. When the schools’ implement the use of online resources, there is the difficulty of students’ access to online homework and resources when at home, as well as their comfort and familiarity with the online homework systems.

**Purpose and Research Questions**

The purpose of this study is to find which type of homework work best for students in a rural area. Does either an online format or a paper format, produce better gains in students’ scores? Do students prefer one type of homework over the other? When completing their homework, what type of resources do they use?

**Rationale**

As previously mentioned, few homework studies have been conducted in rural high school classrooms. This has caused a gap in the research. The information from this study will inform future teaching practice. Discovering what homework type works best for students in this type of school will guide homework choices in future classes. The information gathered about students opinions on each type of homework will give information
about what affect the different types of homework may have on student motivation. And finally, the information about the resources that students use when completing their homework will give insight into how students complete their homework, and what resources may need to be provided to assist them further.
Introduction

The use of homework assignments in math has generally been seen as a positive. There have been differing opinions on homework throughout the years, as written in Gill & Schlossman (2004). In their paper, Gill & Schlossman covered the history of homework in the United States. In their studies, they found evidence that the opinions on homework have cycled through the belief that homework is detrimental, to believing that homework is an integral part of increasing student’s knowledge and ensuring that students are learning. Part of the emphasis on homework that has occurred in more recent years has been due to the study on how various countries teach mathematics, the TIMMS or the Trends in International Mathematics and Science Study (Gill & Schlossman, 2004). When this study came out, the amount of homework that was assigned to students was fairly low, so it was decided that the best way to increase mathematics scores was to increase the amount of homework.

Benefits and Drawbacks of Homework

Currently, there are several opinions on whether homework is indeed beneficial to students, or if other alternatives, such as in-class assignments are better. Overall, those in favor of homework see it as one tool that helps students build their ability to self-regulate their work, manage their time and persevere to complete their work (Ramdass & Zimmerman, 2011). There are also studies which have shown that the use of homework, especially in math, has a positive effect on students’ scores on high stakes achievement tests. This effect is seen for students who are in secondary school, but it has little to no effect for students who are in elementary or middle school grades (Gill & Schlossman, 2004). Homework is also seen as beneficial to students, as it gives them the opportunity to practice applying new information in mathematics, as well as review previously learned information. As homework is done without the direct influence of the teacher, it also helps students to develop autonomy as they work to complete math problems (Cooper, 2008).

In contrast to the view that homework is quite beneficial to students, Krolovac & Buell (2001) believe that the time that students must spend on homework could be better spent with their families. They point out in their paper that not every student has the resources at home to assist them in completing their homework. These
resources include parents who are familiar with math as well as computer and internet access to find tutorials. Instead of dedicating resources to homework, Krolovac & Buell suggest that schools dedicate their resources to creating smaller classes and giving more resources to teachers.

In addition to the time that is required for students to complete their homework, there is also the difficulty of student motivation in completing assignments. It is difficult to increase a student’s motivation to complete their homework assignments. In a study by Akioka & Gilmore (2013), the authors were able to increase the quality of student motivation in students who already were completing homework, but were not able to increase the motivation in students who had little to begin with. Their intervention relied on methods that had been shown to have a positive effect on students’ motivation, including giving students more control of choosing the type of homework they would complete, developing a better use of the teacher and other students as resources when completing homework and grading assignments on accuracy while providing detailed feedback to students. This study emphasized the importance of student motivation in increasing the completion rates of homework. The importance of student motivation is also seen in the article by Dettmers, Trautwein, Ludtke, Kunter, & Baumert (2010) where they point out that the quality of homework has a great deal of influence on students perceptions of homework, and in turn their motivation to complete it. Dettmers et al. found that assignments that had fewer, well selected, relevant problems were seen as being of higher quality than assignments with many problems. They also found that the difficulty level of the problems was important. If students viewed the problems as too easy, or if they believed that the problems were beyond their abilities, their motivation to complete the assignments decreased (Dettmers et al., 2010).

**Online Homework**

Online homework, like other forms, also has difficulties with motivation. In a study by Burke, Mac an Bhaird & O’Shea (2012) they found that in an introductory math class at a college, having a person monitor online homework completion helped students when the monitor contacted those who had completed few of the homework assignments. For others, online homework is seen as being motivation in itself, as some students enjoy using computers, even if it is to complete mathematics homework (Butler & Zerr, 2005). In general, as
previously mentioned, homework which is viewed by students as being relevant to the lessons and “Well selected” tends to increase students’ motivation, whether it is online or not (Dettmers, Trautwein, Ludtke, Kunter & Baumert, 2010).

In addition to student motivation and the allocation of time that is needed for students to complete homework, there is also the problem of students copying homework. In a study by Arora, Rho & Masson (2013), one of the primary reasons that the courses they were studying switched to online homework was to reduce the amount of copying in their engineering classes at the college level. The professors of these classes found that students were scoring poorly on tests, which they attributed to students not completing homework assignments themselves. Instead, students were copying each other’s work, or in some cases, using the publisher’s solution manual to find answers. A possible solution that was investigated by Arora, Rho & Masson was implementing online homework. They found an online program that was able to provide randomized numbers to students, in order to reduce the amount of copying that was occurring. It had the additional benefit of providing feedback to students immediately, instead of waiting for assignments to be graded by a teacher or assistant. After the switch to online homework, there was an improvement in the scores on tests, when compared to previous years classes of a similar demographic (Arora, Rho & Masson, 2013).

As mentioned above, the instant feedback that online homework platforms often provide is listed as a benefit of online homework in several articles (Heppen, 2012; Butler, Pyzdrowski, Goodykoontz & Walker, 2008; Arora, Rho & Masson, 2013). One article mentioned the “Attempt-feedback-reattempt” model of interaction between the students and the teacher that is found with homework assignments. The model describes the behavior that is seen when the student attempts the homework and turns it in to the teacher. The teacher then gives feedback, whether it is simply labeling problems as correct or incorrect, or more in depth feedback, then gives the student the chance to reattempt the work. This model is sped up significantly through the use of online homework (Butler & Zerr, 2005; Peng, 2009). In many cases, students can complete multiple attempts right away (Butler, Pyzdrowski, Goodykoontz & Walker, 2008). If a student answers a question incorrectly, many online homework systems also include scaffolding features to assist students in solving problems. (Arora, Rho,
& Masson, 2013; Mendicino, Razzaq & Hefferman, 2009). This helps students work through mathematics problems that they may be unable to solve without assistance. The level of assistance provided varies according to the online homework platform.

Student motivation and cheating are important considerations, as they directly influence how much homework the student completes under their own power. There are links between higher rates of homework completion and higher grades on homework sections, and an increase in scores for tests and quizzes in mathematics (Butler & Zerr, 2005; Cox & Singer, 2011, Arora, Rho & Masson, 2013). This is attributed to the benefits that homework, and especially online homework, have in increasing the amount of knowledge that students retain, which in turn increases the test scores that they will have. This effect remains, even after the student has gone on to later, more advanced classes (Arora, Rho & Masson, 2013). The use of online homework has also been shown to correlate to an increase in the likelihood that students will go on to complete more challenging courses in the future (Heppen, 2012). Again, this is attributed to the increase in the understanding of mathematical concepts that is associated with online homework.

When interviewed, students have mentioned that one benefit that they perceive of having online homework assignments is the ability to complete work at their own speed. In some cases, the due date of an online assignment may be the end of the grading period. Students who need to spend more time on a section would be able to do so, and students who are able to move faster can do so as well. (Valtonen, Kukkonen, Dillon & Caisanen, 2009; Edwards & Rule, 2013) If students can complete assignments at their own rate, there is the problem of the self-discipline that is required in order to avoid postponing the assignment until the due date (Valtonen, Kukkonen, Dillon & Caisanen, 2009).

Online homework, for all its benefits, is not without problems. Students who are completing their homework online need to be comfortable using computers and the internet (Valtonen, Kukkonen, Dillon & Caisanen, 2009; Peng, 2009). If they are not, they will be less likely to complete homework, and the ease of use that is often touted as a positive aspect of online homework would be negated. Students also need to have access to computers and the internet in order to complete their homework. For some students, the technical problems
that can arise or unreliability of internet connections are negative features of online homework systems (Valtonen, Kukkonen, Dillon & Caisanen, 2009).

Although online homework does decrease the amount of cheating that occurs by giving students different problems to solve, there is still the difficulty of knowing if it is indeed the student who is completing the work, or if others are completing the homework for the student (Valtonen, Kukkonen, Dillon & Vaisanen, 2009).

Some people also believe that the use of online homework will reduce the amount of social interaction that students are engaged in, either during in-class homework or as part of student and teacher interactions when students ask for assistance (Edwards, Rule & Boody, 2013; Valtonen, Kukkonen, Dillon & Caisanen, 2009; Edwards & Rule, 2013). The social aspect of teaching is listed as being an important part of learning, and a concern that students have about the use of online homework and learning.

Conclusion

The homework system is seemingly here to stay, and studies have looked at the benefits of each type of homework, however, few studies have been focused on the effects that different types of homework would have in a high-needs rural high school classroom. Factors that may especially affect the use of online homework are the availability of computers, and the availability of internet when students are in their homes. For pen and paper homework, as previously mentioned, not all parents are comfortable helping students with mathematics, as may be the case in more affluent areas.
Chapter 3 : Methods

Setting and Participants

The study was completed at a rural high school located in southern Ohio. The students who participated in this study were from two class periods of Advanced Algebra 2. All the students in these two classes were in tenth grade. The students in these classes were in what is considered the College Preparatory track at this school, and as such is slightly more rigorous than the general education classes. The students’ abilities vary from those that are able to easily complete assignments, to students that require more assistance. While the classes are advanced, the student grades vary across the normal A-F range. There has been a slight difference between the average performances of the students between the two class periods, with the earlier class period tending to score slightly better than the later class period. Though the average scores of the first class are higher, this class also has the greater range of students when compared to the later class period.

The students have used mainly the online homework MathXL system throughout the school year, which gives the students different numbers for the same type of problems to encourage students to work independently from each other. Occasionally, assignments are given that are paper based, such as a worksheet or assignment from the book. As such, the students are familiar both types of homework systems that were used during this study.

Methods

This study will use both qualitative and quantitative methods to collect data. The methods will include pre-test and post-test scores, and student surveys.

The data for this study was gathered during a three week period near the end of the school year. The sections that were covered during this time were related to counting principles and probability.

Before the students were taught any new material, they were given a pre-test that covered the new material (See Appendix B for pre-tests). Then, the material was taught to the students and a homework assignment was given. The first section covered counting principles, and a paper homework assignment was given to the students. The second section covered probability and had an online homework assignment.
Student scores from the homework were not used in this study, due to the way that the homework systems were set up. The online homework allowed students to attempt a problem multiple times, and as such would not give an accurate picture of students’ abilities.

After the homework assignment was completed, students were given a survey that included questions covering students’ opinions and perceptions of the homework assignment (See Appendix A for surveys used). The survey for the paper homework included questions where the students were given a statement, and were asked to choose a response that was closest to how they felt about the statement. The responses to these would be given a 0-4 on a Likert Scale. The statements in this portion of the survey included “I understand the content better after the assignment,” “The problems in the homework were too difficult,” “The problems in the homework were too easy,” and “The problems assigned were closely related to examples and work in class.”

Another section of the survey had students rate from a 1-10 scale how well they thought they knew the content, and how much they liked the format of the homework assignment. These would be scored using the 1-10 scale.

Also, students were asked what other resources they used while completing the homework. They were given some suggestions to clarify what was meant by “resources.” These examples were help from parents, siblings, friends, viewing videos online, as well as programs or websites that assist or solve problems for students.

Space was given at the end of the survey for students to add any additional comments about the homework.

The survey for the online homework was similar, with the addition of questions that were specifically geared towards the online format. Students were asked if they had internet access at home. They were also asked where they accessed the internet other than at home.

The online homework format included scaffolding resources for students to use. Students were asked to select which of the resources they used when completing their homework. These resources were “Help Me Solve This” which guides the student through the problem step-by-step, “View an Example” which gives the
students a step-by-step explanation of a similar problem, “Video” which has a recording of a person walking through a problem or giving examples related to the section the homework covered, “Textbook” which brought the student to the relevant portion of the text, “Glossary”, “Math Tools” which included computer version of factor squares as well as other relevant math manipulatives, “Calculator”, “Ask My Instructor” which allowed students to send an email to their teacher, and “Print” which allowed students to print a paper copy of the problem that they were working on.

After the homework and survey were completed, the students took a post-test over the material covered (See Appendix C for post-tests). The questions on the pre-test and post-test, while not identical, were related by the topic covered. The students’ scores were then compared to the pre-test scores, both using actual test scores, and using student gains.
Chapter 4: Results

Quiz Scores

The quiz scores that were recorded were analyzed to see if there was a greater gain between the pre-test and post-test scores for one type of homework. The pre-test included 6 questions, for both the paper homework, and the online homework. The post-test also had six questions, but care was given to ensure that while they tested the same skills, they did not include repeated problems from the pre-test. These questions were chosen so that students wouldn’t not have seen the problems in the past, in order to reduce the likelihood of this affecting their scores.

After each homework type was completed, students were also given a survey to complete, to learn their opinions about the two types of homework used, as well as to learn what resources the students used when completing each type of homework.

In Period 1, none of the students correctly answered any questions on the pre-test for the paper homework. The students in Period 2 were able to correctly answer some of the questions. The class had an average score of 3.556 points from the 24 point test. The students in these two classes, after they had completed the homework, were able to correctly answer most of the problems on the post-test. The students in Period 1 scored an average of 22.875 points on their test, and the students in Period 2 scored an average of 18.222 points out of a total of 24 points available. (Figure 4-1)

![Paper Homework](image)

*Figure 4-1 Graph showing the averages of student scores from the pre-test and post-test for the paper homework.*
For the online homework, student once again completed a pre-test with 6 questions and 24 points available. For this pre-test, the students in Period 1 had an average of 5.5 points, and the students in Period 2 had an average of 8.444 points. After the completion of the homework, the students were given a post-test over the new material, and scored an average of 18.625 points in Period 1, and an average of 17.778 points in Period 2.

![Online Homework Results](image)

*Figure 4-2 Graph showing the averages of student scores from the pre-test and post-test for the online homework.*

The data from the pre and post tests show that when looking at gains, or the difference in points between the pretest, and the post-test, that the students in Period 1 had gains of 22.875 points for the paper homework, and that Period 2 had gains of 14.667 points. This is an average of 18.771 points between the two class periods.

The online homework showed gains of 13.125 points for Period 1, and 9.333 points for Period 2, for an average of 11.222 points of gains. (Figure 4-3)
Survey Results

For the student perceptions portion of the research, both classes were combined into one group.

The first section of the surveys, on the students perceptions of each type of homework, included a Likert scale, with 0 being strongly disagreeing with the statement given, 1 slightly disagreeing, 2 neither agreeing nor disagreeing, three slightly agreeing and four being strongly agreeing. The student opinion questions were worded the same for both the paper and the online homework.

The first question asked students to rate how much they agreed with the statement “I understand the content better.” The next two questions were used to gauge students’ perception of the difficulty of the problems included in the homework, with one question asking students to rate how much they agreed with the statement, “the Problems were too difficult” and also asking them to rate how much they agreed with “the problems were too easy.” The final question on the 0-4 Likert scale asked students to rate how much they agreed with the statement, “the homework related well to the examples.”

For the paper homework, the average of the students’ responses to the first statement, “I understand the content better” was a value of 2.533, a value that falls between neither agreeing nor disagreeing and slightly agreeing with the statement. The average of the responses to the second and third questions were .933 and 1.733
respectively, or slightly disagreeing and neither agreeing nor disagreeing. And the final statement, “the content related well to the examples” was a value of 3.2 or between slightly and strongly agreeing with the statement. (Figure 4-4)

Students were also asked to rate on a 1-10 scale the following: How well did they know the content, and how well they liked the format of the homework. The average of the students’ response to how well they knew the content after completing the paper homework, was 7.22. For the second question, asking students to rate the format of the homework, the average of the students’ responses was 5.667. In addition to the number values, some students added commentary to clarify their response. One of the complaints that several students had with the paper homework was the method of assigning the homework. For these classes, the homework was given from the book. Students have online access when at home, but no physical copy of the book. Several students stated that having the assignment from the book was one part of the format of this homework assignment that they did not like, several stated that they would have preferred a worksheet instead, due to the limited number of physical textbooks available. (Figure 4-5)
Student Perceptions of the Online Homework

The student responses for the online homework were collected in the same manner, through a survey given after the homework was completed. When asked to choose how much they agreed with the statement “I understood the content better” the average of the students responses was 3.5 or between slightly agreeing with the statement and strongly agreeing. When asked to choose how much they agree with the statements “the problems were too difficult” and “the problems were too easy” the average of the students’ responses were 2.938 and 2.438 respectively. These values fall at slightly less than the slightly agreeing mark for “The problems were too difficult” and in between neither agreeing nor disagreeing and the slightly agreeing mark for the problems were too easy. (Figure 4-6)
The students were also asked to rate, from 1-10 how well they felt they knew the content, and how well they liked the format of the homework. The average rating students gave the online homework for how well they felt they knew the content was 5.981. The average rating for how well they liked the format was 5.813. (Figure 4-7)
In addition to asking students perceptions, the surveys also gathered data about any additional assistance the students received, other than that provided through the homework system, the book or their notes.

When completing the paper homework, the majority of the students indicated that they did not receive any additional assistance. Out of the 15 students who completed the paper homework survey, 12 did not have any additional help. Four students indicated that they had received help from a classmate, and one student said that they had received help from a family member. (Figure 4-8)

![Additional Assistance for Paper Homework](image)

*Figure 4-8 Graph shows the number of students in each category who used additional assistance on the paper homework.*

For the online homework, the numbers were similar. The majority of the students, 11 of the 16 that completed the online homework survey, said that they did not receive any additional help. Three had received assistance from a classmate and one had received help from a family member. Unlike the paper homework, one student had used other online resources when completing their work. (Figure 4-9)
The survey also gathered information about the features of the online homework that the students utilized. Students were able to choose more than one of the options given on the survey in this section.

Six students in the classes used the “Help me Solve this” function when completing the online homework. Fourteen of the students used “View an Example” which walks them through a similar problem. One student used the “Video” function, which shows students a person walking through a similar problem. None of the students used the linked textbook chapter or the Glossary. Three students used the “M.T.” feature. Ten students used the online calculator function of the homework. No students used “Ask My Instructor” or printed the homework. (Figure 4-10)
When comparing the averages of the students’ responses, the students indicated that they understood the content better when completing the online homework. Students rated the online homework as being both more difficult and easier than the paper homework. They rated the online homework as slightly better related to the examples that were covered in class. (Figure 4-11)

When asked how well they felt they knew the content, the average of the students’ responses showed that they felt they knew the content better after completing the paper homework. The students rated the paper homework and the online homework very similarly when asked how much they liked the format. (Figure 4-12)
Figure 4-12 Graph showing comparison of student perception of the paper and the online homework.
Chapter 5: Discussion, Conclusions, Recommendations and Implications for Practice

Discussion

The data from the students’ quizzes showed that the students had greater gains from their pre-test to the post-test when using the paper homework. The students also had higher average scores on the test after the paper homework. This is contrary to what much of the research has said about the use of online homework. This may be in part related to the content that was covered during each section. As the data from the quiz results shows, the paper homework had lower pre-test scores. The material covered during this section was material that hadn’t been covered in previous grades, unlike the material covered by the online homework. Because the students were more familiar with the material on the online homework, they had higher pre-test scores, and thus lower gains.

Despite the students having little experience with the material covered during the paper homework, they were able to show higher overall scores when compared to the online homework. Other factors which may have affected the paper homework versus the online homework was the timing of the material being covered. While both were covered late in the school year, the online homework was very close to the end of school, and as such, students were more likely to exhibit motivational problems.

The students’ opinions on the different types of homework in some ways supported what I had hypothesized. The paper homework seemed to be at a level of difficulty that was correct for the students in these classes. When asked their opinion on the format of the homework, students seemed ambivalent, in most cases rating it neither very high nor low. The online homework had a much higher rating when asked if students thought the content was too difficult, but it also had a higher rating when the students were asked if they thought the questions were too easy. This indicated that the students felt it was at a good level for them, as the middle value was a neither agree nor disagree option. Students rated the online homework at 5.98125 out of ten points, indicating that they felt they understood the content with the online homework, although this was not necessarily supported by the scores on the post-test.

With both the online and the paper homework, the students felt that the content of the homework was related well to the examples that were covered during class.
The students’ opinions of the online homework was somewhat unexpected. The students did not rate the online homework format significantly higher than the paper homework format. They did however feel that the online homework did not help them understand the content as well as the paper homework, based on the average scores that the students gave these two types of homework.

The students’ responses concerning what resources they used while completing the homework aligned well with what the research had indicated. Most students did not use additional help, and having help from family was unusual for these students. Students were more likely to request help from a classmate.

The online homework had additional resources for students to use. For the most part, the more passive assistance options, such as the book or video, were not used. Students used the “show an example” resource very frequently, most students in the classes indicated that was the resource they used. Students also used the “Help Me Solve This” option. These two options are ones that step students through a similar math problem, thus giving them an easier way to complete their homework. These types of resources are ones that are commonly cited as reasons to use online homework, the ability to get instant feedback on a problem, and receive assistance in solving the problem if needed was listed in several other studies as a benefit of using the online homework versus paper homework. However, the features in the online homework don’t require that the problem is attempted before they are used. Students are able to use either the “Show an Example” or the “Help Me Solve This” resources at any time during their homework problem. This undermines some of the benefits that are associated with homework assignments, such as students independently attempting problems.

**Implications**

This study provides additional data in homework that can be used in future. The specificity of this is useful for other teachers who are in rural settings, versus the more urban or suburban settings that other studies have used in their research. The data in this study has indicated that the paper homework is more beneficial to students, as far as gains in scores is concerned. The paper homework also seems to give students a higher level of confidence that they know the material.
The surveys showed that the students in these two classes relied on their classmates or the integrated online resources. While there were several students who received help from a family member, most students did not utilize this resource. As mentioned in other studies, this is one reason that homework is not considered helpful to students. Yet, even with the paper homework, and little support available at home, the student completed the paper homework, and scored higher gains on the post-test.

Future studies could look at the effects of different types of homework over a longer period of time. Because this study was over such a short time period, there is the possibility that the results could be skewed by the small amount of data that was recorded. Additional students, or students from different class levels could be included in future studies as well. Studies could also incorporate more types of homework, such as work that is completed in class.
References


Appendix A:

Post-survey: Take-home homework
Name: ________________________________
Class Period:__________________________ Date: ________________________

For questions 1-4, circle the response that best fits the statement.

1. I understand the content better after the assignment.
   Strongly disagree    Disagree    Neither Agree or disagree    Agree    Strongly agree

2. The problems in the homework were too difficult.
   Strongly disagree    Disagree    Neither Agree or disagree    Agree    Strongly agree

3. The problems in the homework were too easy.
   Strongly disagree    Disagree    Neither Agree or disagree    Agree    Strongly agree

4. The problems related to the section’s content well.
   Strongly disagree    Disagree    Neither Agree or disagree    Agree    Strongly agree

5. On a scale of 1 to 10, how well do you think you know the content, with 1 being not at all, and 10 being very well?

6. On a scale of 1 to 10, how much did you like the format of the assignment, with 1 being not at all, and 10 being a lot?

7. Did you use additional resources while completing the homework? This would include help from parents/brothers or sisters/friends, viewing videos online to help, websites with tutorials, and programs or websites that assist or solve problems for you.
   If so, what did you use or who assisted you?

Any additional comments about the take-home assignment can be written on the back.
If so, what did you use?
Post-survey: Online homework

Name: __________________________________
Class Period:__________ Date:___________________

1. Do you have internet access at home?
   □ Yes
   □ No

2. Other than at home, where do you access the internet? (Select all that apply.)
   □ School
   □ Library
   □ Cell phone
   □ Friend’s house
   □ Family member’s house
   □ Restaurant/coffee house
   □ Other __________________________

For questions 1-5, circle the response that best fits the statement.

3. I understand the content better after the assignment.
   Strongly disagree    Disagree    Neither Agree or disagree    Agree    Strongly agree

4. The problems in the homework were too difficult.
   Strongly disagree    Disagree    Neither Agree or disagree    Agree    Strongly agree

5. The problems in the homework were too easy.
   Strongly disagree    Disagree    Neither Agree or disagree    Agree    Strongly agree

6. The problems assigned were closely related to examples and work in class.
   Strongly disagree    Disagree    Neither Agree or disagree    Agree    Strongly agree

7. On a scale of 1 to 10, how well do you think you know the content, with 1 being not at all, and 10 being very well?

8. On a scale of 1 to 10, how much did you like the format of the assignment, with 1 being not at all, and 10 being a lot?
9. Which of the following features did you use during the online homework?

☐ Help Me Solve This
☐ View an Example
☐ Video
☐ Textbook
☐ Glossary
☐ Math Tools
☐ Calculator
☐ Ask My Instructor
☐ Print

10. Did you use other resources during the online homework? (This would include help from parents/brothers or sisters/ friends, viewing other videos online to help, programs or websites that assist or solve problems for you.)

If so, what did you use?

If you have any other comments about the online homework, write them below.
Appendix B

Section 1 Pre-test

Name:____________________________ Date:________________

1. How many unique license plates can be made using three letter spaces, and four number spaces?

2. In a class of 13 people, how many different orders can they line up in?

3. For a group of 10 people, how many ways can you form a new group of 3 people?

4. Evaluate the expression: $(2 \cdot 5)!$

5. What is the theoretical probability of rolling a 5 on a standard number die?

6. What is the probability of being dealt exactly 3 Jacks in a 5-card hand from a standard 52 card deck?

Section 2 Pre-test

Name:________________________ Date:________________________
1. A class of students flipped a coin and recorded 24 heads and 32 tails. What is the experimental probability of tails?

2. A jar full of marbles contains 7 blue, 3 red, 5 white and 1 green marble. If a marble is picked from the jar at random, what is the probability of the following:

   \[ P(\text{not blue}) \]

3. Of the 195 students in the senior class, 104 study Spanish and 86 study French, with 12 studying both Spanish and French. What is the theoretical probability that a student chosen at random is studying Spanish, but not French?
Appendix C

Advanced Algebra II: Quiz Section 11-1

Name:_________________________ Date:_________________

Directions: Identify if the problem is a Permutation, Combination, or Fundamental Counting Principle problem, and solve.

1. You need to create a new password for your computer. You decide to use three letters and five numbers in the password. How many different passwords can you make?

2. There are 12 standbys who hope to get on your flight to Hawaii, but only 6 seats are available on the plane. How many different ways can the 6 people be selected?

3. Four people walk into a fast food restaurant at the same time. How many different ways can they stand in line?

4. The volleyball team has 9 players, but only six can be on the court at one time. How many different ways can the team fill the court.

5. How many different trucks can you get from two styles and four different colors?
6. A corporation has ten members on its board of directors. In how many ways can it elect a president, vice-president, secretary and treasurer?

Advanced Algebra Quiz 11.2

Name: _______________________________ Date: ______________

7. What is the theoretical probability not rolling a 2 or a 3 on a standard number cube?

8. What is the probability of being dealt exactly 2 Aces in a 5-card hand from a standard 52 card deck?

9. A group of students has recorded the results of tossing a die, which are listed below. Given this information, what is the experimental probability of that the students will get a 4 on their next roll?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>23</td>
<td>14</td>
<td>41</td>
<td>37</td>
<td>30</td>
</tr>
</tbody>
</table>

10. A tub of crayons has 43 blue crayons, 14 green crayons, and 38 red crayons. If you randomly choose a crayon, find the following probabilities:
P(Not red and not green)
P(Green)
11. Of the 27 students in a class, 14 own a dog, 17 own a cat and 8 own both a cat and a dog. What is the theoretical probability that a student chosen at random will own a cat, but not a dog?

12. A squirrel jumps into a garden. The garden is 30 ft by 20 ft, and has a small section that is used to grow pumpkins. If the area of the section used to grow pumpkins is 5 ft by 10 ft, what is the probability that the squirrel will land in the pumpkin patch?
A determination has been made that the following research study is exempt from IRB review because it involves:

Category 1. research conducted in established or commonly accepted educational settings, involving normal educational practices

Project Title: Homework Types in the Rural Classroom

Primary Investigator: Elizabeth Jane Crook

Co-Investigator(s):

Advisor: Ralph Martin

Department: Teacher Education

Robin Stack, CIP, Human Subjects Research Coordinator
Office of Research Compliance

The approval remains in effect provided the study is conducted exactly as described in your application for review. Any additions or modifications to the project must be approved as an amendment prior to implementation.
Originality Report

Original Work

Originality: 100%

No sign of plagiarism was found. That's what we like to see!

A low originality percentage is indicative of plagiarized papers. Sometimes the score is lower due to long quotations within a document, so please make sure that you use proper citations if this is the case. For more information on our originality scoring process, click here.