EDTC 809: Assessments and Evaluation

Project 4

Mixed Method Proposal Research:

The Effect of Implementing Adaptive Learning Assessments in Higher Education Mathematics

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Brief Overview of Study

This mixed method research study purpose is to examine the importance and benefits of using adaptive learning assessments such as MyMathLab or WebAssign in a Mathematics classroom located at a New Jersey University X. Waters (2014) defined adaptive learning as an innovative technology device that allowed individuals to learn, practice, and work at their own pace (Waters, 2014). With the evolution of technology in the new era of education, schools and instructors are finding new ways to incorporate the electronic device into the classroom to enhance the traditional learning method. The process of using technology in the classroom allows students to be more interactive and engaging in their education; especially with the subject of mathematics or other Sciences fields in which some students' are scared or have anxiety (Tobias, 1993). In this report study, the researcher will administer research involving higher education students from age 18 years and older and some faculties. The data collection instruments will be qualtrics surveys, interviews, and classroom observation. These instruments will be a mixture of open-ended and likert scale questions. The study will take approximately four to six weeks to be completed after Institutional Review Board (IRB) approval. The surveys will take approximately 10 to 15 minutes to complete by individual participant, once they approved to participate in the research. In addition, teachers will be interviewed after their classroom observation so that the researcher can understand their perspective on the assessments.

The research will conduct the theoretical framework based on pragmatic worldview. Johnson, Onwuegbuzie, & Turner (2007) defined mixed method research as, "the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative approaches for the purpose of breadth and depth of understanding and corroboration" (Johnson *et al*, 2007). Additionally, Creswell (2018) also added that mixed

method designs' procedures were to accumulate, gather, analyze, and integrate both quantitative and qualitative methods in a study or series of studies to interpret the research problem (s) (Creswell, 2018). This researcher study will mainly focus on qualitative research than quantitative study, as specified by the exploratory mixed method research. According to Plano Clark and Ivankova (2016), exploratory mixed methods give priority to qualitative, the researcher believes it is essential for this study because students' perspectives for the study will answer most of the research questions. Furthermore, one of the benefits of an exploratory is that a researcher can focus on independent method; the issues might be that there might not be enough time for additional follow-up for this research and the development of the instrument could be complicated due to the psychometric procedure.

Statement of Problem

As the twenty-first century is progressing into an era of innovative technology, schools are also trying to strengthen or enhancing their curriculum with such devices. Scholars are learning to be more independent when using the technology in their daily lives. Therefore, many teachers are integrating their traditional face-to-face learning method with technology assessments to enhance their classroom activities and improve students' learning outcome. The problems schools are facing are when students are not attending school and dropped or withdrawal due to different circumstances; one of the circumstances is being unable to pass their mathematics courses. Moreover, the issue creates a drop-failure-withdrawal (DFW) of 22% to 45%; these students take a while to restart schools; in which they must successfully exit remedial math in order to graduate (Baugher, 2012). Tobias (1993) and Baugher (2012) states that remedial mathematics courses are mainly taken by students who already struggle in the Science,

Technology, Engineer, and Mathematics (STEM) courses because of their math anxiety (Tobias, 1993, Baugher, 2012). García-Santillán *et al.* (2017) state students have this anxiety due to upcoming exams, assignments, or homework which allow them to give up early in the course (García-Santillán et al, 2017). The adaptive learning assessments might not solve all the issues for students, however, it could be a minimum repair to face that mathematics anxiety and fear. Students are able to work at their own pace to boost their learning outcomes (Griff & Matter, 2013).

A mixed method research study can also develop some issues; such as having all participants in a single place or area that can create some stereotypes, not honoring different cultures, revealing private information, misunderstanding, and not having enough time to complete both qualitative and quantitative research (Creswell, 2015). Implementing technology in the classroom can also be time-consuming for instructors (Sandholtz, Ringstaff, & Dwyer, 1997). These problems can affect both educators and students if something is not properly accomplished or established.

Purpose

The aim of this exploratory mixed methods research is to determine the effect of implementing adaptive learning assessments in a mathematics classroom setting. In addition, the main intention of this study is to understand students and instructors' attitudes toward using adaptive learning assessments.

Relevant Literature Review

In the new era, technology in the classroom is becoming more relevant and useful to schools, administrators, scholars, and educators. These devices can be favorable if teachers

understand and are well trained to implement them to guide their students. The various researchers and literature will also give a better understanding of adaptive learning assessments.

Baugher's (2012) mixed-method research study was based on elderly students in remedial mathematics at the university level as they also use MyMathLab (MML) and their online tutorial assessments. MyMathLab (MML) is a Pearson/Addison-Wesley tool that guides scholars to accomplished their classroom work, include interactive tutorials, practice, and computational exams and study plan; instructors use the device to develop new assignments and observe students' growth and grade (Baugher, 2012). These assessments positively impacted the students' accomplishment and perspective towards mathematics compared to traditional learning (Baugher, 2012). As a result for the study, Baugher (2012) found that the traditional learning method also does improve adult students' perspective when accomplishing their mathematics assignments; therefore, there was no significant change for the online tutorial assessment. Furthermore, adults scholars did value their online tutorial assessment because it helped them get extra help and practice.

In his report, Smith's (2017) qualitative and quantitative study aim were to comprehend the attitudes of preservice teachers and understand their experiences and plans to blend adaptive learning into k-8 mathematics classroom. As a result, the participants thought that adaptive learning tools were beneficial for students.   Smith (2017) instruments were a survey on Google forms (https://goo.gl/IBxzJL), observations, and interviews for seventeen participants (n = 17). Although the study was for K-12 education, some of the research study questions were related to my study. For instance, question 9 states, "What is your comfort level with technology?", and question 10, "What is your comfort level with K-8 mathematics adaptive learning programs?". The Likert scale responses were, "(1) very uncomfortable (2) Uncomfortable (3) Unsure (4)

Comfortable (5) Very comfortable" (Smith, 2017). Interview questions 7, "(1) Tell me about a time you used an adaptive learning program as a K-12 student. Follow up questions: (a) Why do you think it was used? (b) How did you feel about using it? (c) What were your positive or negative perceptions?" (Smith, 2017). Smith (2017) study was base. Similarly, this researcher will send some survey questionnaires created on qualtrics for the students and instructors to fill out via email or after the classroom observation (see surveys on Appendix A and B). The surveys consist of a mixture of Likert scale and open-ended questionnaires.

Many researchers think that adaptive learning can close the achievement gap and improve on scholars' learning outcome (Chen et al, 2018; Zhang & Chang, 2016; Walkington, 2013; and Stoyanov & Kirschner, 2017). Callaghan et al (2018) study was also a mixed method research study about teachers using professional development (PD) to support the adaptive learning games to improve scholars achievement; which resulted as a necessity as well for the student's body. Adaptive learning enables learners to work on their own speed at different environment and time (Chen et al, 2018; Zhang & Chang, 2016). Walkington (2013) reports that adaptive learning is increasing in school to engage students and enhance the classroom curriculum (Walkington, 2013). Stoyanov & Kirschner (2017) define adaptive e-learning as innovative educational assessments that fulfill the needs of educators and students (Stoyanov & Kirschner (2017).

Stuve (2015) did a mixed method research study on scholars' perspective on adaptive learning for a mathematics class in a college environment. The aim of the study was to distinguish students' attitudes on the assessments and compare the final test results grade to other students. With 73 participants, the Rasch Model was the instrument that was analyzed to create a survey questionnaire with seventeen items. The adaptive learning assessment can also be used in

both the traditional and flipped classroom model so that students can practice at their own pace in their preferred environment. Smallhorn (2017) reports the flipped classroom model to compare to a traditional learning model at a university second-year biology class (Genetics, Evolution, and Biodiversity) which examine the impact of this model on student engagement, attitude, and achievement and success. The traditional lectures were replaced in 2016 by a flipped class in that topic. There were 110 students who attended one or two flipped classes (called tutorials) but attendance was not mandatory. The pre-class preparation resources were the Moodle platform Flinders Learning Online (FLO). Students watched short online videos such as the adaptive learning videos and completed a reading to get prepared for the weekly flipped class; which was then followed by a summative quiz.

Smallhorn (2017) study used surveys, attendance records, learning analytics, and exam data before and after the implementation of the flipped classroom. Students were weekly surveyed on their perspective to learning and preparing for the flipped class model. The study compared results from final exam multiple choice answers from the previous year. The study did a qualitative open-ended analysis of the weekly reflection responses; in which students were able to respond to the flipped classroom throughout the week. For instance, on the first two weeks of the semester, 328 students responded and were neutral about preparing for the flipped class; by week three the attitude of students (n = 422) changed from not being prepared enough to not having enough time to skimming through online content. Finally, only 5% of student discussed the learning experience in the flipped classroom negative. A quantitative report was also determined to analyze students engagement as highly engaged, moderately engaged, or poorly engaged, based on the number of flipped classes attended over the semester. As a result, 88% of students who achieved a high distinction grade were highly engaged, compared to only 33% of

students who achieved a passing grade; Students who failed the topic had 57% of poorly engaged, while 20% were moderately engaged. Therefore, there was a high level of students satisfaction. This research of using the flipped classroom model is part of the blended learning assessment that can also relate to the adaptive learning process. The study's open-ended response from some students was the following: "My approach to preparing for my first tutorial is to work through all information provided on a floor, such as all video links and the topic manual. I will also submit my first quiz which will help affirm what I've been looking at before the tutorial"; "...it difficult to find time to watch the videos for a tutorial quiz and fully understand the content before doing the quiz."; "...Previously, watching all of the videos and skimming through online content was sufficient but for this tutorial, I am taking more time to re-read and note down the concepts in preparation for the questions asked during class time"; and "They have allowed me to not just have knowledge passed on in a passive manner, like most other topics, but instead apply what we are learning in a practical sense, in an environment where there is help available. They have also made me feel better prepared for the exam". These responses also give ideas of how participants in the adaptive learning assessment would respond when they have to use the tool in their classroom.

As for the mathematics anxiety, García-Santillán *et al* (2017) and Tobias (1993) report that scholars' math fear is based on nervousness, anxiety, worrying too much, fright of upcoming exams, and instructors' behavior and face-to-face learning process in the classroom (García-Santillán *et al*, 2017; and Tobias, 1993). Moreover, these anxieties can develop an achievement gap in which students can drop out of school or changed their major (Baugher, 2012). *Mathematics Anxiety* was defined as a feeling of pressure, apprehensiveness, nervousness, and concern that entail arithmetics and mathematics' achievement (García-Santillán *et al*, 2017). The

purpose of García-Santillán *et al* (2017) study was based on two variables (The

Pentadimentional Model of anxiety and the Alexander Martray (1989) model) that defined

mathematics anxiety in college. The *Pentadimentional Model of anxiety* stated that anxiety

occurs during or before a test and during mathematics assignments or activities (García-Santillán

et al, 2017). Alexander Martray (1989) reports seven source of anxiety, such as assigning hard

questions that is due the next day or a pop quiz, having the knowledge that an exam is coming,

receiving a final exam report through the email or a letter, studying for math or opening its

book, observing the board full of math assignments, registering for a math class, and entering the

classroom (García-Santillán *et al*, 2017; Alexander & Martray, 1989).

Theoretical Framework

The theoretical framework is a pragmatic worldview; which is best used to answer the research

questions. The framework seeks to issue the researcher with the chance to observe and

comprehend the world through the participants' lens while having some connections toward

specific items and collecting data to measure attitudes. According to Creswell, "Theories in

mixed methods research provide an orienting lens that shapes the types of questions asked, who

participates in the study, how data are collected and the implications made from the study"

(Creswell, 2018). As for this study, the researcher seeks to understand the importance of using

adaptive learning assessment through the students' and teachers' perspective so that the readers

may have a better knowledge of the assessments. Participants' attitudes toward the assessments

can be useful in the study when the qualitative data and interviews information are collected,

coded, and analyzed.

Research Questions

The following shows the research questions:

<u>Quantitative question</u>: Do students and faculties believe using adaptive learning assessments enhance the learning outcome in mathematics courses?

<u>Qualitative question</u>: What are students' and teachers' attitudes toward using adaptive learning assessments? (a) What are the benefits and concerns of using the assessment?

<u>Mixed method question</u>: How does adaptive learning assessment improve students' engagement?

Methodology

The research study will be an exploratory mixed method study. The aim of this mixed methods research is to determine the magnitude, effect, and importance of using mathematics adaptive learning assessments. Furthermore, the researcher wants to understand students' and instructors' attitudes toward the assessment; therefore, an exploratory method will be best for the project. An exploratory mixed method for this study will mainly focus on the qualitative data collection and less on the quantitative data analysis. A mixed method research is defined as the kind of research that has a mixture of qualitative and quantitative data collection and approaches for the purpose of broadness and depth of comprehension (Johnson *et al*, 2007). The mixed method is essential for this study because the researcher wants to have a better understanding and perspectives of the adaptive learning assessments. Using qualitative data allows participants to freely express themselves; the researcher will be able to code the collected information for the research. The quantitative data will give a quick apprehension and appreciation of why scholars and teachers use the assessments.

According to Patton (2015) and Creswell (2015, 2018), an exploratory mixed method is described as, "the researcher first begins with a qualitative research phase and explores the views of participants" (Patton, 2015; Creswell, 2015 & 2018). This design will allow the researcher to decode the collected data and analyze the information to have a better perspective from both students and teachers. Some problems might be that participants might not have enough time to complete the survey; therefore, the researcher will do create a survey that includes both quantitative and qualitative questions (see Appendix A and B). In appendix A, the students have five Likert scale quantitative questions (e.g. always, most of the time, about half of the time, sometimes, and never); five open-ended qualitative questions. In appendix B, the teachers have six Likert scale questions and three open-ended questions. Interviews and classroom observation will also be conducted to complete the qualitative data collection (see Appendix C and Appendix D).

Sampling

The researcher's study population will take place at University X, New Jersey. The sampling size is twenty students from age 18 years and older; also approximately ten instructors to complete the survey on Appendix B in which two will be interviewed. Etikan, Musa, & Alkassim (2015) report two types of sampling that can also be useful for this study; purposeful sampling and convenience sampling. The purposeful sampling for the study will be based on the complete target population and time location sample. Patton (2015) defines complete target population as, "Interview and/or observe everyone within a unique group of interest", and time location sample as, "Interview everyone present at a particular location during a particular time period" (Patton, 2015). The researcher is a mathematics adjunct teacher at the University X.

Therefore, some of the participants filling out the survey might come from the researcher's mathematics classroom and the mathematics department.

The convenient sampling also called the accidental sampling is a nonrandom sampling in which participants of the target population can be easily accessible, are affordable, and are available at any given time because of the huge population in the university (Etikan, Musa, & Alkassim, 2015). The issues of convenience sampling are that it can be biased and with outliers problem, which is considered as not belonging to the data (Etikan, Musa, & Alkassim, 2015).

The researcher's interest is in mathematics because as an instructor, most students are struggling and disliking the course at the beginning of the semester. For this study, the assumptions might be that the participants from the researcher's classroom might easily be willing to complete the qualtrics survey; this issue might delay or minimize the number of participants if they do not consent to the survey. Another issue, the participants might not have enough time for the interview, classroom observation, or complete the survey. The next issue is Institutional Review Board (IRB) taking a long time to respond to the study; waiting for a long time for the IRB approval (See IRB application on Appendix F) after the Citi Program application has been submitted (see Citi Program Certification on Appendix E). The researcher will send emails and letters in the school mailbox to participants to inform them about the research after IRB approval from New Jersey City University (NJCU) and also permission by the chairperson of the mathematics department. The participants will have to be notified about their right to participate in the research study.

Procedure

In this report study, the researcher will manage the study involving university participants; including students from the age of 18 years and older and mathematics faculties.

The instruments will comprise of survey questionnaires created in Qualtrics, interviews, and classroom observations. After IRB approval, the researcher will converse with teachers during the department professional development meetings. In appendix A, the students have five Likert scale quantitative questions (e.g. always, most of the time, about half of the time, sometimes, and never); five open-ended qualitative questions. In appendix B, the teachers have six Likert scale questions and three open-ended questions.

For the instructors who consent for the interview and classroom observation (see Appendix D), the researcher will take the opportunity to also interview their students. In addition, emails and letters will be sent to all participants. The study will take approximately four to six weeks to be completed. The interview will comprise of five main questions for the participants; as the interview continues there might be additional questions that will be jotted down. The researcher aims to have at least five scholars and two instructors for the interview and observation. An interviewer must be able to properly communicate with the interviewee beforehand so that he/she can be prepared and ready for the research questions.

In addition, the interviewer has to make sure that the environment or place is a quiet area. Gibbs (Jan. 18, 2013) states twelve points for research interview that are very useful and necessary: (1) the interviewee has to be knowledgeable about the topic before the interview process so that he/she can practice and have a quality answer; (2) the interview has to be structure and well organized and see if the interviewee has any questions or anything to add; (3) interviewer must be clear and precise so that the questions are simple and easy; (4) interview must be gentle so that the interviewee is comfortable and allow the interviewee to finish the statement before moving on to the next questions; (5) interviewer must be sensitive and listen attentively to the interviewee and take down important note; (6) interviewer must be open and

flexible; (7) interviewer must steer and bring up questions that are necessary for the research; (8) interviewer must be critical and prepare to challenge; (9) interviewer must remember important point and details and early conversation to relate back to the present discussion; (10) interviewer must interpret by summarizing for the interviewee; (11) interviewer should be balanced by not talking too much or be too quiet; (12) interviewer must be ethically sensitive to be more appreciative and recognize the importance of doing the interview with the interviewee.

During the observation process, the researcher will use that period after the class to interview the instructor and students who agreed to do the interview for 40-60 minutes. For the survey, according to Salkind (2013), the multiple choices (e.g. Likert scale) can be used to measure learning outcomes, easy to understand, minimize guessing, easy to score, and easy to analyze. The open-ended portion will allow the participants to be flexible and to reflect on the research questions. For the coding process, the researcher will collect, analyze, and decode data collection and accumulate similar themes to present a final report for this study.

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Appendix A

Student's Adaptive Learning Survey (Qualtrics):

https://njcu.co1.qualtrics.com/jfe/form/SV_2nlol1dqjnwnmWF

Q1

State your age:

[   ]

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Q2

Select the Gender:

○ Male

○ Female

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Q3

Do you have any mathematics anxiety?

○ Yes

○ No

— — — — — — — — — — — — Page Break — — — — — — — — — — — —

Q4

Does the adaptive learning assessment help the student learn and understand mathematics better?

○ Always

○ Most of the time

○ About half of the time

○ Sometimes

○ Never

○ Explain: [   ]

Q5

Does the adaptive learning assessment (MyMathLab or WebAssign) help improve student grade?

○ Always

○ Most of the time

○ About half of the time

○ Sometimes

○ Never

○ Explain: [   ]

Q6

Do you have extra help outside of class? (e.g Tutor, Khan Academy, or Educational Mathematics help)

- ○ Yes
- ○ No

Q7

Hours per week studying outside of class

- ○ 0-1 hr/wk
- ○ 2-3 hrs/wk
- ○ 4-5 hrs/wk
- ○ 6-7 hrs/wk
- ○ 8 or more hrs/wk

Q8

Amount of information expected to learn mathematics and complete assignments using adaptive learning assessment:

- ○ Too much
- ○ Just Right
- ○ Not Enough
- ○ Explain: [   ]

Q9

What does the student **think** about adaptive learning for the mathematics class?

[   ]

Q10

Do the class lectures/activities **ONLY** help improve the student's grade? **Or** does the Adaptive learning assessment **ONLY** help improve the student's grade? **Explain**.

[   ]

Q11

Does **BOTH** the class lectures/activities and adaptive learning assessments help improve student's grade? **Explain**.

[   ]

Q9 What does the student **think** about adaptive learning for the mathematics class?

Q10 Do the class lectures/activities **ONLY** help improve the student's grade? **Or** does the Adaptive learning assessment **ONLY** help improve the student's grade? **Explain**.

Q11 Does **BOTH** the class lectures/activities and adaptive learning assessments help improve student's grade? **Explain**.

Q12 What are the biggest **benefits** (**advantages**) of using adaptive learning assessment? If possible, give more than one advantage.

Q13 What are the **disadvantages** of using adaptive learning assessment? If possible, give more than one disadvantage.

Q14 Thank you so much for your time!
Your responses have been recorded and you may now exit the survey.

Teacher's Adaptive Learning Survey (Qualtrics)

https://njcu.co1.qualtrics.com/jfe/form/SV_1S06qYlBL6uMZk9

Teachers' Survey on Adaptive Learning Assessment

▼ Default Question Block   Block Options ∨

☐ Q0

Dear Instructor,

I am doing research on how students and educators use adaptive learning assessments in the classrooms. Adaptive learning, also known as adaptive teaching, is an educational method which uses computers as interactive teaching devices, and to orchestrate the allocation of human and mediated resources according to the unique needs of each learner.

The purpose of this research study is to understand and determine the importance of using Adaptive Learning Assessments in Higher Education Mathematics classroom. You will be introduced with information about adaptive learning assessments (e.g. MyMathLab and/or WebAssign) and asked to complete some questions. Your responses will be kept completely confidential.

The survey could take approximately 10 minutes to complete. Your participation is voluntary for this research. You have the right to withdraw at any time during the study, without any judgment.

By clicking the button below, you acknowledge that your participation is completely voluntary and you may choose to terminate your participation in the study at any time.

Please be advised, this survey will be best displayed on a laptop or desktop computer; some mobile devices features might not be compatible. Thank you in advance!

Do you consent to the survey?

◯ I consent. Please, Begin the study—>

◯ I do not consent. I do not wish to participate

– – – – – – – – – – – – – Page Break – – – – – – – – – – – – –

Q1

⚙

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Are you an Adjunct or a Full-time faculty in your present institution?

○ Adjunct faculty

○ Full time faculty

○ None

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Q2

⚙

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Which Mathematics do you teach in the institution?

○ Academic Foundation Math (e.g. Basic Math, Basic Algebra, Intermediate Algebra Lower Level..)

○ College Level Math (e.g College Algebra, Intermediate Algebra Higher level, Pre-Calculus, Calculus...

○ Both Academic Foundation and College Level Mathematics

○ K-12 Level Mathematics and College Mathematics

--------- Page Break ---------

Q3

⚙

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How long have you been teaching mathematics?

○ 0 - 2 years

○ 3 - 5 years

○ 5 - 8 years

○ 8 or more years

--------- Page Break ---------

Q4

⚙

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What type of mathematics anxiety or problems do you mostly encounter in the classroom? (Select all possible answer)

| 0 Items |

Q5

⚙

＊

How helpful are the adaptive learning tools (e.g. ebook, videos, homework, grading, test, quizzes assignments, PowerPoint...)?

○ Extremely helpful

○ Very helpful

○ Somewhat helpful

○ Not so helpful

Q5 How helpful are the adaptive learning tools (e.g. ebook, videos, homework, grading, test, quizzes assignments, PowerPoint...)?

○ Extremely helpful
○ Very helpful
○ Somewhat helpful
○ Not so helpful

Q6 How satisfied are you with the adaptive learning assessment(s) in your classroom (s)?

○ Very satisfied
○ Satisfied
○ Neither satisfied nor dissatisfied
○ Dissatisfied
○ Very Dissatisfied

Q7 What are the biggest **benefits (advantages)** of using adaptive learning assessment? (Select all that apply)

0 Items	...

Q8 On average, how often do you integrate the adaptive learning assessment in your classroom?

○ Once a week
○ At least twice a week
○ Three times a week
○ Everyday
○ Rarely

Q9 Does the adaptive learning assessment (s) help students see their strengths or weaknesses in math? Explain.

Q10 Do the solution supports (e.g. View an example or Help me solve it) and tips in the assessment affect students' learning? Explain.

Q7 What are the biggest **benefits (advantages)** of using adaptive learning assessment? (Select all that apply)

[0 Items ...]

Q8 On average, how often do you integrate the adaptive learning assessment in your classroom?

- ◯ Once a week
- ◯ At least twice a week
- ◯ Three times a week
- ◯ Everyday
- ◯ Rarely

Q9 Does the adaptive learning assessment (s) help students see their strengths or weaknesses in math? Explain.

[   ]

Q10 Do the solution supports (e.g. View an example or Help me solve it) and tips in the assessment affect students' learning? Explain.

[   ]

Q11 What are some disadvantages of using adaptive learning assessment?

[   ]

Q12 Thank you so much for your time!
Your responses have been recorded and you may now exit the survey.

Appendix C

Interview Questions

.**Interview Questions for Students:**
1. Describe your experience in a mathematics classroom?
2. Is the adaptive learning assessment (e.g. MyMathLab) gives you a better understanding of the mathematics lessons?
3. Do you see any improvement in your grade when using the assessment?
4. What are some advantages of using the assessment for your assignments?
5. What are some disadvantages you encounter when using the assessment?

Interview Questions for Teachers:
1. Do you think combining the traditional method with adaptive learning assessment really engages students? Or help improve their knowledge?
2. Is there a significant improvement in students grade when using the adaptive learning assessment for mathematics?
3. As a diverse community of students, how have the assessments helped an individual or different group of diverse students? Give examples of classroom experience.
4. What are some advantages or benefits of using adaptive learning assessments?
5. What are some disadvantages of using the assessments?

Appendix D

Classroom Observation

Faculty Name: _____Date of Observation: _____

Start Time: _____End Time: _____

School Name: _____ Class/Section:_____

Number of Students: _____Type of Assessment:_____

Themes -- **Codes**
Student Participation/Engagement---------------------Participate/Engage
Student Understanding ------------------------------- Understand
Student's online activities------------------------------- Activity
Technology Use-- Tech
Blending Traditional and Assessment ----------------- Blend

Jottings:

_____

_____

_____

_____

_____

_____

_____

Appendix E

Citi Program Certificate

CITI PROGRAM

Completion Date 25-Oct-2018
Expiration Date 24-Oct-2021
Record ID ▓▓▓▓▓

This is to certify that:

Aminata Adewumi

Has completed the following CITI Program course:

Social & Behavioral Research - Basic/Refresher	(Curriculum Group)
Social & Behavioral Research	(Course Learner Group)
1 - Basic Course	(Stage)

Under requirements set by:

New Jersey City University

CITI
Collaborative Institutional Training Initiative

Appendix F
Institutional Review Board (IRB) Application

New Jersey City University

NJCU Institutional Review Board Application for
Review of Research Proposal

Email: IRB@njcu.edu

FOR OFFICE USE ONLY			
File Number			
Review Type	Exempt ☐	Expedited ☐	Full☐
PI			

Date of Submission

Proposal type:

☑ Original   ☐ Revised*

*If this is a revised application, there is no need to complete the remainder of this form. However, please describe in detail the changes that you have made in response to the IRB's

concerns. _____

Principal Investigator	Aminata E. Adewumi
Proposal title	Adaptive learning assessments in Higher Education Mathematics
Proposed start date	December 2018
Anticipated duration of research	4 Months

Type of Research

☑ Student/Classroom project
☑ Faculty project
☐ Staff project
☐ External researcher project (All external researchers must have an NJCU sponsor.)

NJCU Investigators (Please list additional investigators as necessary.)

Principal Investigator (For all student research, the faculty advisor is the PI.)

Name   Dr. Christopher Carnahan
Department Education Technology Leadership
Telephone   201-200-xxxx
Email   Ccarnahan@njcu.edu

Co-Investigator (including student researchers)
Name   _____
Department
            _____

Telephone _____

Email _____

Co-Investigator(including student researchers)

Name _____None_____

Department _____

Telephone _____

Email _____

Co-Investigator(including student researchers)

Name _____

Department _____

Telephone _____

Email _____

*Any NJCU investigator who plans to work on this project either with or for a Principal Investigator Investigator at another institution must identify those investigators and their institutions.

External Investigators

Name _____None_____

Title _____

Institution _____

Name _____

Title _____

Institution _____

Name _____

Title _____

Institution _____

Name _____

Title _____

Institution _____

NJCU Sponsor (if the researcher is not affiliated with NJCU)

Name _____None_____

Department _____

Telephone _____

Email _____

Data Sources

Number of participants _____30_____

How was this number determined (e.g., power analysis) _____Data Analysis_____

Does this project require the collection of new data?   ☑Yes   ☐No

    If Yes: How will participants be selected or recruited?   _School Email, Mailbox letter, phone_

    Will subjects participate on a fully voluntary basis?   ☑Yes   ☐No

    Will subjects be compensated for their participation?   ☐Yes   ☑No
        If yes: Please briefly describe the compensation.

_____

    Does this project make use of human tissue or cell lines?   ☐Yes   ☑No

Briefly describe the research methodology(ies) to be used in this study (e.g., focus group, participant observation, survey, experiment).

    Survey on qualtrics; interviews, classroom observation, students and teachers

Does this project use data that have already been collected for a non-research purpose or by another researcher?

                             ☐Yes   ☑No

    If yes: What is the source of the data?

_____

    Are the data accessible in the public domain?   ☑Yes   ☐No

    If no: Are fields included that would allow identification of individuals, either directly or indirectly?   ☑Yes   ☐No

    If yes: Please explain briefly how participant confidentially will be safeguarded

    Participants' name and personal information will be excluded from research

Participant Risks

Will participants be exposed to any stresses (e.g., anxiety, pain, etc.) or physical harm (e.g., injury, infection, etc.) in connection with this research?   ☐Yes   ☑No

    If yes: Please briefly explain what risks may be involved in the research, what specific steps will be taken to minimize and monitor the risk, and what will be done to compensate and/or treat participants who are harmed by the research.

_____

Does the research design require that participants be deceived?   ☐Yes   ☑No

    If yes: Please briefly explain why deception is necessary and what steps will be taken to reduce potential harm from this deception.

_____

Potentially Vulnerable

Populations Will this research involve:
Physically/Mentally Challenged Individuals

Young children (ages 0-13)	☐ Yes	☑ No
Older children (ages 14-17)	☐ Yes	☑ No
Senior Citizens (over age 65)	☐ Yes	☑ No
Pregnant Women	☐ Yes	☑ No
Prisoners	☐ Yes	☑ No

If yes to any of the above: Please briefly explain how the rights of this (these) population(s) will be protected.

_____

Informed Consent

Will participants be fully informed about:

The voluntary nature of their participation and the freedom to withdraw without penalty at any time	☑ Yes	☐ No
The purposes and procedures of the research	☑ Yes	☐ No
Any reasonably foreseeable risks or discomforts	☑ Yes	☐ No
Any benefits to them or to others from the research	☑ Yes	☐ No
The extent to which confidentiality will be maintained	☑ Yes	☐ No
The compensation and/or treatments available if injury occurs	☑ Yes	☐ No

(This question need only be answered for research that involves risks.)

Whom to contact for information about the research participants' rights and any research-related injury	☑ Yes	☐ No

If the answer to any of the above is no, please briefly explain why the research requires an alteration of the standard elements of informed consent.

_____

How will participants' informed consent be documented? Please check all that apply.

☑Signature on written consent document
☐Signature on document to be read to the participants and witnessed by another party
☐Written documentation of informed consent will not be obtained because one or more of the following criteria is satisfied (check all that apply):

    ☐ The only link between the subject and the research would be the informed consent documentation and the primary risk is loss of confidentiality.

    ☐ The risks to participants, including risks associated with the loss of privacy, are no greater than those ordinary encountered in daily life and the research involves no procedure for which written consent is normally required outside of the research context.

Who will obtain the informed consent from the participants?

☑Principal Investigator
☐ Co-Investigator
☐ Sponsor (in cases where PI is not affiliated with NJCU)
☑Other
☐ Not applicable

Please include your protocol summary (5 pages maximum) and your recruitment materials (as applicable).
Written on a separate sheet of paper

External Reviews and Funding

Has this protocol been reviewed by an Institutional Review Board or Human Subjects Review Committee at another institution(s)?   ☐Yes ☑No

  If yes: At what institutions(s)?

_____

What is its status?   ☐Approved   ☐Rejected   ☐Pending (or provisionally approved

Has this protocol been submitted for Federal Funding?   ☐Yes   ☑No

If yes: Agency or Organization:_____

              Submission Date: _____

            Funding Start Date: _____   ☐Anticipated   ☐Actual

                Contact Person: _____
           Contact's Telephone: _____

Has this protocol been submitted for any other types of funding? ☐Yes ☑No

If yes: Agency or Organization: _____

Submission Date: _____
Funding Start Date: _____ ☐Anticipated ☐Actual

Contact Person: _____
Contact's Telephone: _____

Proof of NIH or CITI Certification
Please provide documentation of current CITI and/or NIH certification in human subjects research for all researchers involved in this project.

Certificate of Agreement

The signatures of all researchers involved in this project must be provided.

I certify that I agree to comply with the requirements of both NJCU and the Office for Human Research Protection (OHRP) of the United States Department of Health and Human Services as described in 45 CFR §46.

_____ 12/1/2018
PI Signature   Date

_____ _____
Co-PI Signature   Date

_____ _____
Co-PI Signature   Date

_____ _____
Co-PI Signature   Date

_____ _____
Co-PI Signature   Date

Please submit the completed application and accompanying documents as one document or pdf to IRB@njcu.edu and kresch@njcu.edu.

All applications must be submitted by the NJCU faculty or staff member who is serving as the Principal Investigator (PI). Neither students nor external researchers may submit an application.