Institutional Review Board for the Protection of Human Subjects

Touro University California • Graduate School of Education

Research Proposal – DO NOT ALTER THE APPLICATION OR INSTRUCTIONS.

(TUC IRB FWA00009823: expiration 10/01/2019; IRB00004515; IORG0003813: expiration 10/31/2018)

Faculty: Email this form along with the students Human Subjects Course certificate to: tuc.gsoeirb@tu.edu

Students: Only your Advisor may forward this form for review. Forms submitted directly by students will not be processed. Please submit this completed form to your Advisor along with proof that you have passed a Human Subjects Course.

Click all checkboxes that apply. Form fields will expand as needed.

- ☐ **This proposal includes all consent forms and survey questions (if applicable) in the body of this document. Insert page/section breaks as necessary to place these on separate pages below the proposal section.**
- ☒ **This is a student proposal. NOTE: All student proposals must be emailed by the faculty advisor who, by submission, indicates that (1) s/he has reviewed the proposal and (2) it has his/her full approval.**
- ☐ **This is a faculty proposal.**

Principal Investigator: Jennifer Perkins	**Program of Study:**
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	☐ ABA ☐ Other:

Title of the Research

How Inquiry Based Instruction Will Develop a Positive Math Mindset and Increase Student Performance on *Bridges* Assessments

Provide an Abstract or Summary for the proposed study.

This study is beneficial because research has shown that a positive math mindset and inquiry are powerful tools that lead to increased student performance in mathematics. I will be doing this study with the students in my fourth grade classroom. I anticipate that my students will develop deeper inquiry skills when taught questioning strategies in mathematics. I predict that each child's math mindset will increase through teaching with positive math mindset principles, verbiage, and strategies. I anticipate that focusing on inquiry and a positive math mindset will increase student performance levels in the math curriculum *Bridges*, which is used by my school district (Napa Valley Unified). I intend to give my students a series of formal and informal assessments over a five week period. I will give three different assessments at the beginning and end of this study. I will administer a math mindset survey, an inquiry assessment on levels of questioning, and a student performance test from the *Bridges* math curriculum (see attached). I will compare the pre-tests and post-tests scores to evaluate if these methods of instruction were effective.

For exempt research only:

Check the category of exemption (definitions below): ☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6

EXCEPTIONS: Research involving vulnerable populations such as the mentally or cognitively impaired, prisoners, parolees, pregnant women, and fetuses, cannot be exempt from review even though it meets the criteria of one of the categories below.

EXEMPTION CATEGORIES (45 CFR 46.101(b)): Research activities in which the only involvement of human subjects will be in one or more of the following categories:

1. Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricular or classroom management methods.
2. Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employment or reputation. **Research using survey procedures or interview procedures upon children cannot be exempt. Research involving observation of children's behavior cannot be exempt if the investigator is a participant in the behaviors observed.**
3. Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under paragraph (b) (2) of this section if (i) the human subjects are elected or appointed public officials or candidates for public office; or (ii) federal statue(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter. Research which deals with sensitive aspects of the subject's own behavior such as illegal conduct, drug use, sexual behavior, or use of alcohol, cannot be exempt from review.

4. Research involving the collection or study of **existing** ("in existence on the day the study is approved") data, documents, records, pathological specimens or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly, or through identifiers linked to the subjects.
5. Research and demonstration projects which are conducted by or subject to the approval of **federal** department or agency heads and which are designed to study, evaluate, or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs.
6. Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the U.S. Food and Drug Administration or approved by the Environmental Protection Agency or the Food and Safety and Inspection Service of the U.S. Department of Agriculture.

Indicate the exemption category above and provide justification for exempt review here.

This study will involve thirty-four fourth graders in my classroom using pre-existing math curriculum and assessments. I will administer a pre-test and post-test for one unit of study from the district-wide math curriculum, *Bridges*. In addition, students will be surveyed based on math mindset and inquiry. The students will take these surveys at the beginning of this study, and then at the end of this study. Additionally, I will be using pre-existing data on my students from the Math Inventory they took at the beginning of this school year.

CONTINUING STUDIES:

Is this a continuation of or change to an existing TUC IRB approved study? ☐ **Yes** ☒ **No**

If yes, attach a copy of last year's approved exempt study and indicate the date of submission/approval.

JUSTIFICATION AND PROJECT DESCRIPTION:

Type your answers in the boxes provided which will expand as needed. Describe your research study. If you are applying for exemption, you must justify how your study qualifies for exemption by addressing the **critical elements** of the exemption category you choose in item 7. To be sure you answer the issues typically examined by the reviewers, please review the "IRB Review Form" available at: http://cehs.tu.edu/gsoe/research/irb.html

1. Is this a thesis or project? (check one) ☐ **Thesis** ☒ **Project**

a. **Describe the specific aims/purpose of your project.**

The purpose of this study is to learn how to best cultivate a positive math mindset in students, how to implement successful assessment and feedback tools based on student performance, and how to use inquiry instruction in a meaningful way in the area of mathematics. Learning from other educators, and researching the most effective techniques will enhance my teaching methods and strategies in mathematics. This will make me a more effective teacher, and my students more successful in the classroom.

b. **State your research question, or hypothesis and research questions, or project goals and objectives.**

How can I use inquiry based instruction to develop a positive math mindset and increase student performance on *Bridges* assessments in the area of mathematics?

2. Describe background information and rationale for conducting the study and the importance of the knowledge to be gained. Provide citations and references to support your description. Be sure to list references for any citations used in the description.

Having a positive math mindset not only helps student become more confident in math, it also allows them to prime their brains to think more effectively (Sparks, Sarah D., 2015). Increasing each child's math mindset will make my entire unit of study more effective. Inquiry will lead to greater student understanding, and prepare students to successfully engage in the "4 Cs": Creativity, Collaboration, Communication, and Critical Thinking. When students have a deeper level of discussion, they can make discoveries while talking about their thought process in solving problems which increases their understanding for how to solve problems (James, Lorie, 2016). Teaching through inquiry will lead to students developing a positive math mindset, and will increase student performance.

Sparks, Sarah D. "In Math, Positive Mindset May Prime Students' Brains." Education Week, vol. 35, Issue 14, December 2015

James, Laurie (2016, September). Mathematics Awareness through Technology, Teamwork, Engagement, and Rigor. Retrieved from https://files.eric.ed.gov/fulltext/EJ1157580.pdf

3. Describe the research methods and procedures.

a. **How do you plan to do it?** What kind of study is it? How will it answer your research question? **Be specific**. Will any remuneration be provided?

I am using a pre-test/post-test design. This study will be done through a naturalistic approach, because this kind of research is field-focused and will take place in my classroom. I will be relying on qualitative methods of research, especially for the math mindset/inquiry portions. This will be derived from observations, open-ended questions, student surveys, and document collection. Multiple methods of assessment will help me gain a holistic understanding of how my students are progressing in relation to my essential question.

Data for the academic portion will be analyzed through looking at percentages on the pre-test and post-test on the standards based test for this unit of study in mathematics. The first unit of study I will be assessing is: "Multi-Digit Multiplication and Early Division" in my "Bridges" math program. For the inquiry portion, I will be comparing the Inquiry Survey from the beginning of this study to the end of this study. Finally, I will be comparing the Math Mindset Survey from the beginning of this study to the end of this study. Various math discussions centered around inquiry will be recorded and compared from the beginning to the end of this study.

Remuneration will not be provided.

b. ***Describe your sample:*** Who/what will be included/excluded and why? (What are recruitment/exclusion criteria? Be sure to include women, minorities, other groups if appropriate, and how they will be recruited). Randomization and/or controls? How will you obtain consent? Provide for translation, reading for illiterate participants; whatever else may be necessary? Address confidentiality.

This study will take place in a fourth grade classroom at a Title 1 elementary school. There will be 34 students included in this study. This will include five English Learners, students requiring intervention support, students on grade level, above grade-level students who need enrichment, three students with IEPs and two students with 504s. Consent will be provided through a signed parent permission document. Confidentiality will be maintained through ensuring that all student names will be kept confidential throughout the duration of this study. Additionally, all physical data will stay in a locked cabinet, and all digital data will stay on my password protected computer.

c. **What are the potential risks and benefits to your human subjects?** Be sure to be as specific as possible; include loss of time or other inconveniences to participants. Don't overstate benefits; if they are hypothetical benefits this must be clearly stated.

The potential risks to my human subjects will include students not receiving the same traditional instruction time during this period. I will be spending academic math time focused on inquiry and questioning, along with increasing students' math mindsets. This means that students will receive less direct instruction, and more inquiry based teaching which could affect their learning.

d. **Data Collection:** What data/artifacts will you collect? Is this the best, safest way to collect it? Who will perform the collections/analyze the data? Will any tests be involved? (List data collection instruments in question 3f below.)

I must gather evidence to effectively measure how I can meet all of my student's individual needs. I must have a baseline assessment to start. After clearly identifying where I want my students to achieve after completing a unit of study, I will administer a baseline assessment.

I will use a standards based pre-test and post-test. I will administer a pre-test and post-test survey on Inquiry where students will identify what level a math question is based on Costa's Levels of Questioning and our district's math program, *Bridges*. I will administer a pre-test and post-test survey that will identify each child's Math Mindset. Other forms of assessment will be observation and record keeping.

I will gather data from student conversations about math individually, and with their peers. One place I will collect this information will be at our *Number Corner*, a component of our math program that focuses almost exclusively on using math academic vocabulary, questioning, and inquiry. This would also tie into measuring the math mindset principle in relation to math. Gathering data from my students verbally in this area will show where their personal mindset is with math. This will allow me to watch their growth mindset and academic progress.

These modes of assessment will be done through a naturalistic approach, because this kind of research is field-focused and will take place in my classroom. I will be relying on qualitative methods of research, especially for the growth mindset/inquiry portions. This will be derived from observations, videography to review and compare, open-ended questions, and document collection. Multiple methods of assessment will help me gain a holistic understanding of how my students are progressing in relation to my driving question. These methods will be the best, safest way to collect data.

e. **Data Analysis?** Where and how will it be stored and for how long? Who will have access to it? How will it be analyzed? Will there be follow-up?

Digital data will be stored on my password-protected computer. Paper data will be stored in a locked cabinet in my classroom. I will collect the data and analyze it throughout the duration of the 2018-2019 school year. I will not do a follow-up after the 2018-2019 school year. This data will be analyzed through grading a standards-based pre-test and post-test, and observing student growth in the Common Core State Standards that are being assessed. The data on Inquiry and Math Mindset will be analyzed by comparing data from the beginning and the end of this study.

4. List the specific location of the study (building, etc.) and describe the research setting.

Clearly explain where the interaction or intervention with subjects will occur (i.e., UNE, telephone, home setting, class setting, collaborating institution, etc.).

List any collaborating sites where research will be performed, and describe the role of these sites.

The address this study will take place at is 2315 West Park Avenue. This is the address for West Park Elementary School. This study will take place in a classroom setting.

5. Indicate the proposed project timeline and overall duration of the study. IRB approval expires one year from date of approval. Research studies extending beyond one-year requires a re-application for continued IRB approval. *Researchers earning a grade of INC (Incomplete) must monitor their IRB approval expiration date.*

This study will take place in many steps:
- Math Baseline Assessment: October 2018
-Parent Consent Letter: October 2018
- Math Mindset Survey: October 2018
- Inquiry Survey: October 2018
- Bridges Multi-Digit Multiplication and Early Division Pre-Test: October 2018
- Bridges Multi-Digit Multiplication and Early Division Post-Test: December 2018
- Math Mindset Survey Post-Data Cycle 1: December 2018
- Inquiry Survey Post-Data Cycle 2: December 2018
- Continuous math data cycles will continue from January 2019 through June 2019. I will continue the pre-test, post-test testing cycle for the following math units: “Fractions and Decimals”, “Addition, Subtraction and Measurement”, “Geometry and Measurement”, and “Multiplication & Division, Data & Fractions.”
- Math Mindset Survey: May 2019
- Inquiry Survey: May 2019
- Written Report: July 2019

6. List all attachments (Human Subjects Course Certificate and Informed Consent for School Settings are both required. Other documents might include questionnaires, focus group questions, consent forms, parental handouts. etc.) Submit listed documents with this research proposal.

NIH Certificate of Completion
https://drive.google.com/file/d/1aiBWxLMfFSVnRZppbIvCP3l3f3G7iIdy/view?usp=sharing

Parent Consent:
https://docs.google.com/document/d/1lwibKefIp0iNz_Fxkbv7jmvp4oyQShpmf6PrFyCinK8/edit?usp=sharing

Inquiry Assessment
https://docs.google.com/document/d/1xnffsbO782FBVHWgQzvY4BMuuvalpmnEX40fQo5r7wA/edit?usp=sharing

Math Mindset Assessment
https://docs.google.com/document/d/1kF2ES5hJEKjpKfjdgNHyc9rVq9kKzCaRr6MS0CsJywQ/edit?usp=sharing

Bridges Multi-Digit Multiplication and Early Division Pre-Test

Bridges Multi-Digit Multiplication and Early Division Post-Test

Student investigators only: Once your IRB proposal has been approved by your advisor, email the document and all attachments to them for submission along with proof that you completed a human subjects course. The Human Subjects course may be accessed at: http://phrp.nihtraining.com/users/login.php. Any significant changes to your study require a resubmittal and subsequent approval of the study.

Faculty PIs and Advisors: Please email original .doc file ***and all appendices*** to: **tuc.gsoeirb@tu.edu**.

GSOE IRB Administration
Wilderman Hall Room 202, Mare Island Campus