NJCU Institutional Review Board
Email: IRB@njcu.edu

Investigator's Checklist for IRB Submission

Please make sure that your application is complete prior to submitting it to the NJCU IRB. Please save the entire application and all supporting documents in one file using a file format such as DoeJ_ddmmyy_ver_1.pdf. Please make sure that your file name includes your full name and please do not use "final" in the file name, as there may be revisions of the original application. Please be certain that your consent form (or procedure), if applicable, includes all of the information provided below.

All applications must be submitted by the NJCU faculty or staff member listed as the Principal Investigator (PI). Neither students nor external researchers may submit an application. (For all students, a faculty/staff member must serve as the PI. All external researchers must have an NJCU faculty/staff member as a sponsor.)

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

Application

- ☐ Completed and signed Proposal Submission Form
- ☐ Protocol Summary (5-page limit) that identifies the research question and describes methods
- ☐ Copies of data collection instruments that coincide with the study described in the Protocol Summary
- ☐ Recruitment materials (as applicable)
- ☐ Consent document(s) or the rationale for deviation from written consent
- ☐ Certificate of training in protection of human subjects from the Collaborative Institutional Training Initiative (CITI Program) (https://about.citiprogram.org/) for **all** researchers involved in the project. A separate guidance is available on CITI certification programs.

Please ensure that **all consent forms** are written for a general audience; are specific to subjects (and/or their parents/guardians); identify the researcher, the researcher's position, and his/her institution; and:

- ☐ Describe the study and the procedures (activities, duration, and/or audio, photographic, or videotaping*) in lay terms
- ☐ Clearly state that there are no benefits or known risks or clearly explain the precautions that will be taken if there are risks (Monetary payment does not constitute a benefit.)
- ☐ Include a statement that participation is voluntary and that all subjects have the right to skip any questions or activities and to opt out at any time without penalty
- ☐ Provide the names of all contact persons for the study, including the Principal Investigator and, for external researchers, the NJCU sponsor
- ☐ Include this statement: "If you have questions about your rights as a participant in this study, please contact Dr. Ashok Vaseashta, chair of the NJCU IRB, at (201) 200-2453 or avaseashta@njcu.edu.
- ☐ Include a statement of confidentiality**
- ☐ Have places for signatures and the date.

* Furthermore, for any study using audio, photographic, or video recordings, the researcher must also completely explain the use of these recordings, the plan for their storage, and also, if and how this information will be protected and disseminated.

** If the research project is planned to deviate from complete anonymity, the researcher may include a waiver to use the names of respondents, but the researcher must specify how all data will be used and disseminated.

Please expect acknowledgement of your submission within 5 working days. If there is no acknowledgement, please email kresch@njcu.edu and avaseashta@njcu.edu.

NJCU Institutional Review Board Application for Review of Research Project

Email all materials in one file to: IRB@njcu.edu
and kresch@njcu.edu.

FOR OFFICE USE ONLY – Please do not provide any information in this box			
Date Complete Application Submitted			
Review Type	☐ Expedited	☐ Full	☐ Exempt
Principal Investigator*			

* **For all student research, the faculty advisor is the Principal Investigator.**

Date of Submission: 12/8/2024

Name (PI)/Sponsor Submitting Application: Himani Nigam

Application Type: ☐ Original ☐ Previously Approved

Proposal Title	Exploring Teachers' Perspectives on the Use and Effectiveness of Virtual Labs in Science Classrooms: A Qualitative Study
Proposed Start Date	9/1/2025
Anticipated Duration of Research	3-4 Months
CITI Certification by all researchers (Certificates must be attached.)	No

Type of Research

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

NJCU Investigators (Please list additional investigators as necessary)

Name: Dr. Dana Mason
Department: Department Educational Technology
Telephone number: 201-200-3078
Email address: dmason@njcu.edu

Co-Investigator (including student researchers)
Name: Himani Nigam
Department: Department of Educational Technology
Telephone number: 201 – 200-3078
Email address: hnigam@njcu.edu

Co-Investigator (including student researchers)
Name: Click here to enter Name.
Department: Click here to enter Department.
Telephone number: Click here to enter Telephone number.
Email address: Click here to enter Email address.

Co-Investigator (including student researchers)
Name: Click here to enter Name.
Department: Click here to enter Department.
Telephone number: Click here to enter Telephone number.
Email address: Click here to enter Email address.

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

External Investigators

Name: Click here to enter Name.
Department: Click here to enter Department.
Telephone number: Click here to enter Telephone number.
Email address: Click here to enter Email address.

Name: Click here to enter Name.
Department: Click here to enter Department.
Telephone number: Click here to enter Telephone number.
Email address: Click here to enter Email address.

Name: Click here to enter Name.
Department: Click here to enter Department.
Telephone number: Click here to enter Telephone number.
Email address: Click here to enter Email address.

Name: Click here to enter Name.
Department: Click here to enter Department.
Telephone number: Click here to enter Telephone number.
Email address: Click here to enter Email address.

NJCU Sponsor (if the researcher is not affiliated with NJCU)
Name: Click here to enter Name.
Department: Click here to enter Department.
Telephone number: Click here to enter Telephone number.
Email address: Click here to enter Email address.

X_____

NJCU Sponsor

1. Number of participants: 15-20

2. How was this number determined (e.g., power analysis)? Purposive Sampling

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

3A. If yes, how will participants be selected or recruited (<4-5 sentences)?

The participant are selected through purposive sampling of science teachers who have experience with virtual labs or are familiar with their use in the classroom. Teachers from different grade levels, geographic locations, school settings, and teaching experiences will be recruited to ensure varied viewpoints. By gathering a representative and meaningful sample will provide rich qualitative insights into the use and effectiveness of virtual labs in science classrooms.

3B. Will subjects participate on a fully voluntary basis? ☐ Yes ☐ No

3C. Will subjects be compensated for their participation? ☐ Yes ☐ No

3D. If yes, please briefly describe the compensation:

Click here to enter text.

4. Does this project make use of human tissue or cell lines: ☐ Yes ☐ No

5. Briefly describe the research methodology(ies) to be used in this study (e.g., focus group, participant observation, survey, experiment). (<4-5 sentences)

Click here to enter text.

6. Does this project use data that have already been collected for a non-research purpose or by another researcher? ☐ Yes ☐ No

6A. If yes, what is the source of the data? (3-4 sentences)

Click here to enter text.

6B. Are the data accessible in the public domain? ☐ Yes ☐ No

6C. If no, does the data include information that would allow identification of individuals, either directly or indirectly? ☐ Yes ☐ No

6D. If yes, please explain briefly how participant confidentiality will be safeguarded. (3-4 sentences)

To safeguard the confidentiality of teachers in a qualitative study, it is essential to anonymize all participants by using pseudonyms or codes instead of real names. Any identifiable details such as school names or locations will be avoided. Informed consent must be obtained, clearly explaining how information will be used. Findings will be reported in an aggregated manner to prevent identification. Compliance with ethical standards, such as obtaining IRB approval and using secure communication channels, ensures that participant privacy is maintained throughout the research process.

Participant Risks

7. 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

7A. 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. (4-5 sentences).

Click here to enter text.

8. 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. (<3-5 sentences)

Click here to enter text.

Potentially Vulnerable

9. Human Research Subject Populations – Please check if your research involves vulnerable populations:

Physically/Mentally Challenged Individuals:	☐ Yes	☐ No
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

9A. If anything in Question #9 is checked **yes**, please briefly explain how the rights of this (these) population(s) will be protected. (<4-5 sentences)

Click here to enter text.

Informed Consent (Please attach your consent form(s).)

10. Consent form must contain the following in lay terms:

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 discomfort:	☐ Yes	☐ No
Any benefits to them or to others from the research:	☐ Yes	☐ No
The extent to which confidentiality will be maintained:	☐ Yes	☐ No
Whom to contact for information about the research participants' rights and any research-related injury:	☐ Yes	☐ No

10A. If the answer to anything in Question 10 was checked no, please briefly explain why the research requires an alteration of the standard elements of informed consent.

Click here to enter text.

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

- ☐ Signature on a written consent document
- ☐ Signature on a document to be read to the participants and witnessed by another party
- ☐ E-signature on an electronic form/survey
- ☐ Written documentation of informed consent will not be obtained because one of 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 participate, including risks associated with the loss of privacy, are no greater than those ordinarily encountered in daily life and the research involves no procedure for which written consent is normally required outside of the research context.

12. Who will obtain the informed consent from the participants?

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

13. Please include your protocol summary (5-page maximum) and your recruitment materials (as applicable). You are provided space to do this at the end of this application. Please see *APPENDIX A. Protocol Summary.*

External Reviews and Funding

14. Has this protocol been reviewed by an Institutional Review Board or Human Subjects Review Committee at any other institution(s)? ☐ Yes ☐ No

If yes, at what institution(s)?

Click here to enter institution(s).

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

16. Has this protocol been submitted for federal funding? ☐ Yes ☐ No

16A. If yes, list the agency or organization:

Click here to enter agency or organization.

Submission Date: Click here to enter a date.

Funding Start Date: Click here to enter a date. ☐ Anticipated ☐ Actual

Contact Person: Click here to enter Contact Person.

Contact's Telephone Number: Click here to enter Contact's Telephone #.

17. Has this protocol been submitted for any other types of funding: ☐ Yes ☐ No

17A: If yes, list the agency or organization:

Click here to enter agency or organization.

Submission Date: Click here to enter a date.

Funding Start Date: Click here to enter a date. ☐ Anticipated ☐ Actual

Contact Person: Click here to enter Contact Person.

Contact's Telephone Number: Click here to enter Contact's Telephone #.

Proof of CITI Certification

Please provide documentation of current CITI 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/We certify that I/we 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.

X _____

Principal Investigator

X _____

Co-Principal Investigator

X _____

Co-Principal Investigator

X _____

Co-Principal Investigator

X _____

Co-Principal Investigator

***Instructions for signatures**: First, save your application file and then open it.
Sign the document by right clicking on the signature line and selecting "Sign." **DO NOT SAVE** the file, **simply CLOSE IT**. The signature will be automatically saved. If applicable, send the file as an email attachment to the next signatory. Every subsequent signatory must also follow these instructions.

Please submit the completed application, checklist, and accompanying documents as one document or PDF file to IRB@njcu.edu and kresch@njcu.edu.

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

APPENDIX A. Protocol Summary*; Surveys, including recruitment materials as applicable; and consent forms.

Please note: The protocol summary (5-page maximum) should only include the central elements of the project such as the rationale, objectives, methods, populations, and period.

Rationale:
Virtual labs are computer simulations that replicate the experience of traditional experiments in classroom settings and offer an innovative approach to teaching. The integration of virtual labs into science classrooms has become an increasingly popular method for enhancing students' learning experiences, particularly in the context of technology-driven education. However, there is limited research on how teachers perceive the use and effectiveness of virtual labs in supporting student learning. This study aims to explore teachers' perspectives, identify challenges, and assess the impact of virtual labs on teaching and learning outcomes. It seeks to gain insights into the factors influencing the adoption and implementation of virtual labs in science education.

Objectives:
The study aims to answer the following questions:

1. How do science teacher's perceive the usage and effectiveness of virtual labs in facilitating student learning in their classrooms?
2. What factors influence science teacher's decision to incorporate virtual labs into their curriculum?
3. What challenges do science teachers encounter when using virtual labs in the class and how do they address these challenges?
4. How do virtual labs support differentiated instruction and address diverse student needs.

Methods:
The study will be conducted on a sample of 15-20 science teachers from varying grades and from diverse educational backgrounds and experience who utilize virtual labs in their classrooms. The study will use an opinion survey along with open-ended questions which will aid in determining the perceptions these teachers regarding the use of and effectiveness of virtual labs in facilitating student learning. Semi – structured interviews will be conducted with each participant where they share their insights, beliefs, and experiences in their own words about the challenges they encounter when using virtual labs in the class and how do they address these challenges.

Population:
The study will focus on 15-20 science teachers from various educational levels (elementary, middle school, high school) who have used virtual labs in their classrooms. Teachers with different levels of experience using virtual labs (beginner, intermediate, and advanced users), geographic levels, school settings will be included to capture a range of perspectives and varied viewpoints. By gathering a representative and meaningful sample will provide rich qualitative insights into the use and effectiveness of virtual labs in science classrooms.

Recruitment Process:
Teachers will be recruited through:

1. Collaboration with science department heads or administrators at participating schools.
2. Online networks and professional groups focused on science education and technology integration.
3. Invitations sent via email or direct outreach, providing a clear explanation of the study's goals and the voluntary nature of participation.

Period:
The timeline for this project is between September 2025 – December 2025 during which teachers will be contacted via email and asked to participate in the study. A survey will be administered to teachers before and after the interview, focusing on their experiences with virtual labs, including questions on effectiveness, ease of use, and student engagement.

Email to be sent out to Participants

Subject: Invitation to Participate in Research Study on Virtual Labs in Science Classrooms

Dear [Participant's Name],

I hope this email finds you well. My name is Himani Nigam, and I am a doctoral candidate at Department of Educational Technology at NJCU. I am writing to invite you to participate in a research study titled **"Exploring Teachers' Perspectives on the Use and Effectiveness of Virtual Labs in Science Classrooms."** This study aims to gather insights from educators like yourself on the use of virtual labs in teaching science and their effectiveness in enhancing student learning and engagement.

Study Overview: As part of this study, you will be asked to complete a brief online survey (approximately 15-20 minutes) and, if you are willing, to participate in a one-on-one interview (30-45 minutes). The interview will focus on your experiences with virtual labs, how they have impacted your teaching practices, and any challenges or benefits you have observed in the classroom.

Participation Details:

- **Survey:** A short questionnaire about your use of virtual labs in your classroom.
- **Interview:** A follow-up interview to discuss your perspective on the effectiveness of virtual labs.
- Participation is completely voluntary, and you may withdraw at any time without any consequences. Your responses will be kept confidential, and all data will be anonymized.

Why Participate? Your input will contribute to a deeper understanding of how virtual labs are being used in science education and may help shape future educational practices and tools.

Please find attached the **Informed Consent Form**, which provides more detailed information about the study. If you are willing to participate, kindly reply to this email, and we can arrange a time for the survey and interview at your convenience.

Thank you for considering participating in this study. Your insights would be invaluable in shaping our understanding of virtual labs in the classroom. If you have any questions or would like additional information, please don't hesitate to contact me at hnigam@njcu.edu or 706 – 254-5427.

Best regards,
Himani Nigam
Doctoral Candidate, Department of Educational Technology
New Jersey City University
hnigam@njcu.edu

Consent Form for Participation in the Study: "Exploring Teachers' Perspectives on the Use and Effectiveness of Virtual Labs in Science Classrooms."

Himani Nigam
Doctoral Candidate, Department of Educational Technology
New Jersey City University
hnigam@njcu.edu

You are being invited to participate in a research study to explore teachers' perspectives on the use and effectiveness of virtual labs in science classrooms. This study aims to gather valuable insights into how virtual labs impact teaching practices, student engagement, and learning outcomes. The findings will help improve the integration of virtual labs in educational settings.

Study Title:
Exploring Teachers' Perspectives on the Use and Effectiveness of Virtual Labs in Science Classrooms: A Qualitative Study

Purpose of the Study:
The purpose of this study is to understand your experiences and perceptions regarding the use of virtual labs in science classrooms. We will also explore the effectiveness of virtual labs in improving student learning and engagement.

Procedures:
If you decide to participate, you will be asked to:
1. Complete a brief survey about your experience with virtual labs.
2. Participate in an in-depth interview to discuss your views on the effectiveness and challenges of using virtual labs in science teaching.
The interview will be audio-recorded for accuracy and transcribed for analysis. You may also be asked to share any relevant

classroom materials (e.g., lesson plans, assessments) that incorporate virtual labs.

Duration:
The survey will take approximately 15-20 minutes to complete, and the interview will take about 30-45 minutes.

Voluntary Participation:
Your participation in this study is completely voluntary. You may choose not to participate or withdraw from the study at any time without any consequences. If you decide to withdraw, any data collected up until that point will be excluded from the study.

Confidentiality:
All information collected will be kept strictly confidential. Your responses will be anonymized by using a code or pseudonym rather than your name. Your personal information and responses will not be shared with anyone outside the research team, and findings will be reported in aggregate form to ensure anonymity. Data will be stored securely in password-protected files, and only the research team will have access to it.

Potential Risks and Discomforts:
There are no significant risks to participating in this study. However, you may find some of the questions in the interview to be reflective or challenging. You are free to skip any question that you feel uncomfortable answering.

Benefits:
While there are no direct benefits to you for participating in this study, your responses will help inform educators and researchers about the effectiveness and challenges of using virtual labs in science education. This may ultimately improve the integration of technology in science classrooms.

Compensation:
There is no financial compensation for participating in this study.

Contact Information:
If you have any questions about this study or your participation, please feel free to contact Himani Nigam at hnigam@njcu.edu or 706 - 254-5427.
If you have any concerns about your rights as a participant or wish to report a complaint, please contact Dr. Ashok Vaseashta, chair of the NJCU IRB, at 201- 200-2453 or avaseashta@njcu.edu.

Consent Statement:
By signing below, you agree to participate in this study and acknowledge that you have been informed of the study's purpose, procedures, and your rights as a participant. You understand that participation is voluntary, and you can withdraw at any time.

Participant's Signature:_____
Date:_____

Researcher's Signature: _____
Date:_____

Survey to be used for the study on Exploring Teachers' Perspectives on the Use and Effectiveness of Virtual Labs in Science Classrooms

Thank you for participating in this survey. The purpose of this survey is to understand your experiences with using virtual labs in your science classroom, specifically focusing on the perceived effectiveness and challenges. Your feedback will be valuable in helping to assess how virtual labs can enhance teaching and learning.

1. What is your current role?
   a. Elementary School Teacher
   b. Middle School Teacher
   c. High School Teacher

2. How many years have you been teaching science?

a. 0-2 years
b. 3-5 years
c. 6-10 years
d. 10+ years

3. What is your experience level with virtual labs?
   a. Beginner
   b. Intermediate
   c. Advanced

4. How often do you use virtual labs in your science lessons?
   a. Never
   b. Occasionally
   c. Frequently
   d. Always

5. Which types of virtual labs do you primarily use in your classroom? (Select all that apply)

a. Physics simulations
b. Chemistry experiments
c. Biology virtual dissections
d. Earth Science simulations
e. General science simulations
f. Other (Please specify): _____

6. What features of virtual labs do you find most useful for teaching science? (Select up to 3 features)
   a. Realistic simulations of experiments
   b. Interactive tools for student engagement
   c. Ability to visualize complex scientific concepts
   d. Access to a wide range of experiments and activities
   e. Instant feedback on student performance
   f. Collaboration opportunities with other educators
   g. Other (Please specify): _____

7. How effective do you think virtual labs are in helping students understand scientific concepts?
   a. Not effective at all
   b. Somewhat effective
   c. Effective
   d. Very effective

8. How do virtual labs impact student engagement and interest in science?
   a. No impact
   b. Slightly improves engagement
   c. Significantly improves engagement
   d. Drastically improves engagement

9. In your experience, how do students respond to using virtual labs in comparison to traditional hands-on labs?
   a. They prefer traditional labs
   b. They prefer virtual labs
   c. They enjoy both equally
   d. They are indifferent

10. What challenges have you faced in integrating virtual labs into your teaching? (Select all that apply)
    a. Lack of time to prepare or implement virtual labs
    b. Insufficient technological resources (e.g., computers, internet access)
    c. Limited teacher training or support
    d. Difficulty in aligning virtual labs with curriculum goals
    e. Students' lack of familiarity with the technology
    f. Other (Please specify): _____

11. Do you feel that virtual labs are accessible for all students, including those with diverse learning needs (e.g., disabilities, language barriers)?
    a. Not accessible
    b. Somewhat accessible
    c. Mostly accessible
    d. Fully accessible

12. What improvements would you like to see in virtual lab platforms? (Select up to 3 improvements)
    a. More diverse and varied experiments
    b. Better user interface and ease of navigation
    c. Improved teacher training and support
    d. Enhanced accessibility for students with learning needs
    e. Better integration with classroom management tools
    f. Other (Please specify): _____
13. Do you plan to continue using virtual labs in your teaching in the future?
    a. Yes, definitely
    b. Yes, with modifications
    c. No, I do not plan to
    d. I am unsure

Thank you for completing the survey. Your responses will greatly contribute to the success of this study.

Interview Questions to be used for the study on Exploring Teachers' Perspectives on the Use and Effectiveness of Virtual Labs in Science Classrooms

Perceptions of Usage and Effectiveness

1. What do you think are the primary benefits of using virtual labs for student learning?
2. How do virtual labs compare to traditional hands-on experiments in terms of effectiveness?
3. Can you share any specific instances where you felt virtual labs significantly enhanced student understanding or engagement?

Factors Influencing Incorporation

4. What motivated you to start using virtual labs in your curriculum?
5. How do institutional policies or resources influence your decision to use virtual labs?
6. What role do professional development opportunities play in your ability to incorporate virtual labs effectively?
7. How does the availability of technology and resources impact your choice to integrate virtual labs into your teaching?

Challenges and Solutions

8. How do students generally respond to virtual labs, and what challenges have you observed from their perspective?
9. How do you address technical or logistical issues that arise during the implementation of virtual labs?
10. Are there any specific strategies or supports that have helped you overcome these challenges?

Support for Differentiated Instruction

11. In what ways do virtual labs allow you to customize learning experiences for individual students or groups?
12. How do virtual labs help you address the needs of students with varying abilities and learning styles?
13. Can you provide examples of how virtual labs have supported students who typically struggle with science concepts?

14. How do you use virtual labs to challenge advanced learners and keep them engaged?