APPENDICES

Appendix A – Canvas Announcements

Invitation to Participate in Online Collaborative Learning Study

Dear [Recipient's Name],

My name is Ashley King, and I am a senior lecturer in the Accounting and Information Management department. I am also a doctoral candidate in the Learning, Design, and Technology doctoral program. I am conducting a dissertation research study on the impacts of online learning technology on small group dynamics. As a learner in the "*BUAD 342 Information Management"* course your experience and insights are invaluable to this research. The purpose of this study is to explore how different technologies impact collaboration, communication, and learning outcomes in online settings. If you choose to participate in this research project, here is what you can expect:

- You will be asked to complete three surveys.
    1. **Demographic Survey:** You will be asked about demographic information about your prior experience with online learning and online collaborations. This survey will take approximately 15 minutes to complete.
    2. **Small Group Collaboration Survey I**: This survey will be related to the "*Kroger Data Categories and Attributes"* assignment. You will complete this survey after you complete the online collaboration activity. This survey will take approximately 20 minutes to complete.
    3. **Small Group Collaboration Survey II**: This survey will be related to the "*Building a Conceptual Model of an Entity Relationship Diagram"* assignment. You will complete this survey after you complete the online collaboration activity. This survey will take approximately 20 minutes to complete.
- By participating in the study, you are also giving your consent for us to access your assignment rubric scores for these two assignments and your midterm assessment scores

from questions related to the objectives of these two assignments. These scores will only be reported in the aggregate for this study.

- If you complete all three surveys and give us access to your assignment rubrics and mid-term assessment scores, you will be awarded extra credit as a part of your BUAD 342 course. If you choose not to complete or participate in this study, you will be offered an alternative assignment for extra credit
- Your participation in this research project is entirely voluntary.

To start participation in this research study: Click this Link

If you have any questions about the study, feel free to reach out to me at awyrick1@utk.edu. Your participation is greatly appreciated, and your responses will be kept completely confidential. Thank you for considering this opportunity to contribute to an important area of research.

Best regards,

Ashley King
Senior Lecturer
Doctoral Candidate in Learning, Design, and Technology
University of Tennessee, Knoxville
awyrick1@utk.edu
(865) 974-1725

Invitation to Participate in Online Collaborative Learning Study

Dear [Recipient's Name],

My name is Ashley King, and I am a senior lecturer in the Accounting and Information Management department. I am also a doctoral candidate in the Learning, Design, and Technology doctoral program. I am conducting a dissertation research study on the impacts of online learning technology on small group dynamics. As a learner in the "*BUAD 342 Information Management"* course your experience and insights are invaluable to this research. The purpose of this study is to explore how different technologies impact collaboration, communication, and learning outcomes in online settings. If you choose to participate in this research project, here is what you can expect:

- You already completed:
    4. **Demographic Survey:** You will be asked about demographic information about your prior experience with online learning and online collaborations. This survey will take approximately 15 minutes to complete.

- At this point in the project, you would complete:
    5. **Small Group Collaboration Survey I**: This survey will be related to the "*Kroger Data Categories and Attributes"* assignment. You will complete this survey after you complete the online collaboration activity. This survey will take approximately 20 minutes to complete.

- Your participation in this research project is entirely voluntary.

To start participation in the "Small Group Collaboration Survey I": Click this Link

If you have any questions about the study, feel free to reach out to me at awyrick1@utk.edu. Your participation is greatly appreciated, and your responses will be kept completely confidential. Thank you for considering this opportunity to contribute to an important area of research.

Best regards,

Ashley King
Senior Lecturer
Doctoral Candidate in Learning, Design, and Technology
University of Tennessee, Knoxville
awyrick1@utk.edu
(865) 974-1725

Invitation to Participate in Online Collaborative Learning Study

Dear [Recipient's Name],

My name is Ashley King, and I am a senior lecturer in the Accounting and Information Management department. I am also a doctoral candidate in the Learning, Design, and Technology doctoral program. I am conducting a dissertation research study on the impacts of online learning technology on small group dynamics. As a learner in the "*BUAD 342 Information Management"* course your experience and insights are invaluable to this research. The purpose of this study is to explore how different technologies impact collaboration, communication, and learning outcomes in online settings. If you choose to participate in this research project, here is what you can expect:

- You already completed:
    6. **Demographic Survey:** You will be asked about demographic information about your prior experience with online learning and online collaborations. This survey will take approximately 15 minutes to complete.
    7. **Small Group Collaboration Survey I**: This survey will be related to the "*Kroger Data Categories and Attributes"* assignment. You will complete this survey after you complete the online collaboration activity. This survey will take approximately 20 minutes to complete.

- At this point in the project, you would complete:
    8. **Small Group Collaboration Survey II**: This survey will be related to the "*Building a Conceptual Model of an Entity Relationship Diagram"* assignment. You will complete this survey after you complete the online collaboration activity. This survey will take approximately 20 minutes to complete.

- Your participation in this research project is entirely voluntary.

To start participation in the "Small Group Collaboration Survey II": Click this Link

If you have any questions about the study, feel free to reach out to me at awyrick1@utk.edu. Your participation is greatly appreciated, and your responses will be kept completely confidential. Thank you for considering this opportunity to contribute to an important area of research.

Best regards,

Ashley King
Senior Lecturer
Doctoral Candidate in Learning, Design, and Technology
University of Tennessee, Knoxville
awyrick1@utk.edu
(865) 974-1725

Appendix B – Informed Consent

Consent for Research Participation
Demographic Survey

Research Study Title:

Collaborative Online Learning Mediated Through Concurrent Update Technology in Asynchronous and Synchronous Course Activities

Researcher(s):

Ashley King
Doctoral Candidate
Learning, Design, and Technology Program
Theory & Practice in Teacher Education
University of Tennessee Knoxville
865-974-1725
awyrick1@utk.edu

Dr. Enilda Romero-Hall
Associate Professor
Learning, Design, and Technology Program
Theory & Practice in Teacher Education
University of Tennessee Knoxville,
eromeroh@utk.edu

Why am I being asked to be in this research study?

We are asking you to be in this research study because you are taking the course BUAD 342 Information Management this Spring 2025 semester.

What is this research study about?

The purpose of the research study is to study differences in how groups form and perform in online settings.

How long will I be in the research study and what will happen if I say "Yes, I want to be in this research study"?

If you agree to partake in the study, your participation will consist of the first 8 weeks of the Spring 2025 semester and will include the following:

- **Demographic Survey:** You will be asked about demographic information about your prior experience with online learning and online collaborations. This survey will take approximately 15 minutes to complete.
- **Small Groups Collaboration Survey I**: This survey will be related to the "*Kroger Data Categories and Attributes"* assignment. You will complete this survey after you complete the online collaboration activity. This survey will take approximately 20 minutes to complete.
- **Small Group Collaboration Survey II**: This survey will be related to the "*Building a Conceptual Model of an Entity Relationship Diagram"* assignment. You will complete this survey after you complete the online collaboration activity. This survey will take approximately 20 minutes to complete.
- **Rubric Scores:** By participating in the study, you are also giving your consent for us to access your assignment rubric scores for the "*Kroger Data Categories and Attributes"* assignment and the "*Building a Conceptual Model of an Entity Relationship Diagram" assignment*, which will only be reported in the aggregate for this study.
- **Mid-term Assessment Scores**: By participating in the study, you are also giving us your consent for us to access your mid-term assessment scores. We will access both your aggregate mid-term assessment score and your scores from particular questions related to the two collaborative assignments described above. These scores will only be reported in the aggregate for this study.

What happens if I say "No, I do not want to be in this research study"?

Being in this study is completely voluntary. Your decision will not affect your grades, your relationship with your instructors, or standing with the Haslam College of Business or University of Tennessee, Knoxville. In your course syllabus, your course instructor has provided details about alternative methods of obtaining the extra credit offered by this study, should you choose not to participate.

What happens if I say "Yes" but change my mind later?

Even if you decide to be in the study now, you can change your mind and stop at any time. If you decide to stop before the study is completed, please note the following:

- Please contact Ashley King directly at **awyrick1@utk.edu** or by calling 865-974-1725 to have your information removed from the list of people participating in the study.

- If you leave the study after you have completed one or more of the surveys, your data related to those surveys will be used as part of the aggregate anonymized data analysis, but your assignment and test scores will not be gathered for analysis.
- You can withdraw from the survey any time before the end of the Spring 2025 semester. At the end of the semester, data will be gathered and anonymized and the key to the anonymization destroyed. You cannot be removed from the study at that point, but neither can you be identified in the data.

Are there any possible risks to me?

We don't anticipate any risks associated with your participation in this study.

Although we will take steps to protect your confidentiality, there is a small possibility that your information could be linked to your identity due to the nature of the study data. Your data will be stored securely and only accessible to the research team members who need it for the study. Data collected from the surveys will be stored in the Qualtrics data system. Once downloaded from the system, the data will be stored on the researcher's computers. These computers are owned by the University of Tennessee and have encryption software (BitLocker) installed on them to prevent the theft or loss of data from the machines. Assessment and assignment scores are held on Canvas. Canvas has encryption and authentication controls to protect this data.

When files are transferred via email between researchers, they will be sent via the UTK Vault. Files with identifying data will not be stored in the cloud but only on personal machines and shared via the UTK Vault which has encryption and authentication protection. Grades from the instructor will also be passed through Vault and have these same protections. After the collection of data with the three surveys and the assignment and assessment scores are gathered, they will be linked using the student's netIDs. Once all the data is combined, the netIDs will be

replaced with anonymized keys and the listing of netIDS will be removed from the data. When files are transferred via email between researchers, they will be sent via the UTK Vault. Files with identifying data will not be stored in the cloud but only on personal machines and shared via the UTK Vault which has encryption and authentication protection. Grades from the instructor will also be passed through Vault and have these same protections. Direct identifiers (netIDs) and/or the key to the codes will be destroyed upon completion of the research. The study data, once anonymized and identifiers and keys destroyed, will be retained by the investigator for future research use.

Are there any benefits to being in this research study?

Your participation may help us to learn more about group collaboration in online course environments and the use of technology in these groups. We hope the knowledge gained from this study will benefit you and others in the future.

Will I be paid for being in this research study?

You will receive 40 extra credit points in the course for your participation in this research study. The instructor will be told at the end of the semester which students completed the requirements for extra credit. To receive extra credit, students must complete all three surveys that are part of the study and participate in the same modality for each of the two collaborative assignments.

An alternative assignment of equal duration and difficulty is available for students to complete for the extra credit, if they do not wish to participate in this research study. The researcher will verify the names of students completing this alternative assignment to ensure the anonymity of the students who participated in the study.

Who can see or use the information collected for this research study?

We will protect the confidentiality of your information by keeping the data in the Qualtrics system. The survey data will be coded with unique identifiers and then identifying data will be deleted from the system. Qualtrics uses Transport Layer Security (TLS) encryption for its transmitted data. The results of the survey are protected by a password known only to the lead researcher.

If information from this study is published or presented at scientific meetings, your name and other personal information will not be used. Although it is unlikely, there are times when others may need to see the information we collect about you. These include:

- People at the University of Tennessee, Knoxville oversee research to make sure it is conducted properly.
- Government agencies (such as the Office for Human Research Protections in the U.S. Department of Health and Human Services), and others responsible for watching over the safety, effectiveness, and conduct of the research.
- If a law or court requires us to share the information, we would have to follow that law or final court ruling.
- Your course instructor will know that you completed the research surveys but the data and answers you provide will not be shared with the instructor. Your instructor is only informed so that they can award the extra credit.

What will happen to my information after this study is over?

Your name and other information that can directly identify you will be deleted from the research data collected as part of the study. We will not share your research data with other researchers.

What else do I need to know?

We may need to stop your participation in the study without your consent if you drop the class or don't complete the associated assignments.

Who can answer my questions about this research study?

If you have questions or concerns about this study, or have experienced a research related problem or injury, contact the researchers: Ashley King (awyrick1@utk.edu) or Dr. Enilda Romero-Hall (eromeroh@utk.edu).

For questions or concerns about your rights or to speak with someone other than the research team about the study, please contact:

Institutional Review Board: Phone: 865-974-7697 Email: utkirb@utk.edu

STATEMENT OF CONSENT

I have read this form, and the research study has been explained to me. I have been given the chance to ask questions, and my questions have been answered. If I have more questions, I have been told who to contact. By signing this document, I am agreeing to be in this study. I will receive a copy of this document after I sign it.

Name of Adult Participant

Date

Signature of Adult Participant

Appendix C – Small Group Collaboration Assignment I

Week 4 Lab Activity

Kroger Data Categories and Attributes

Please read all the details of the assignment carefully and ask questions if you have them before the assignment is due. Please, remember that late work is not accepted in BUAD 342. Students may not do this assignment on their own and are required to participate in groups. Students will be assigned to groups based on chosen modality.

Instructions:

For this week's lab assignment, you must prepare a google sheet (Excel File) by collaborating with your group members. All group members should have editor rights to your Google Sheet (Excel File), be listed as editors in the share pane, and participate in editing this document. Group members must use UTK credentials when participating in this assignment. Please ensure that you are using the correct account! Please be aware that your level of participation will directly impact your grade and that all members of your group are required to meaningfully contribute to the assignment.

Assignment Details:

Businesses complete the Order to Cash and Procure to Pay cycle in the everyday course of business, while interacting with their customers and suppliers. In addition to tracking the data to complete these transactions, businesses also keep track of customer and vendor data in

systems like Customer Relationship Management Systems and Supply Chain Management Systems. Some companies, like Kroger, even use loyalty programs to specifically tie transactional data to their customers. Your task for this assignment is to think about the data that companies like Kroger track in their database management system. For each identified category of data, please list at least ten attributes that a company might collect related to that category. When we move forward with this assignment, these attributes will become fields in our tables that make up our database.

In addition to the six categories of data listed in the template, your group should create *at least one* additional category with ten attributes. Work together to come up with any other category of data that Kroger might want to keep track of. There are many right answers here. Feel free to be creative but, use sound business logic to create your category. If you struggle to come up with what Kroger might keep data about, review theses source documents related to Kroger or watch this video:

- Week 4 Lab Help- Source Documents.pptx
- Download Week 4 Lab Help- Source Documents.pptx

Use the google sheet (Excel File) linked below as a template to set up your group's assignment. You should be sure to include all items that are bold on the worksheet, as they are mandatory to receive credit. You should also include pertinent information in the yellow cells (not copy what is in the template). For rows 12 – 21, this indicates the minimum number of attributes for each category that your group should come up with. Additional attributes are welcome and encouraged. Use this template to get started [link].

Appendix D – Small Group Collaboration Assignment I Rubric

Small Group Collaboration Assignment I

Kroger Data Categories and Attributes

Criteria	Excellent (5 Points)	Proficient (3 Points)	Needs Improvement (1 Point)	Total Points
Following Directions (15 Points)				
Clear and Complete Setup	File is set up accurately with all mandatory items	Most mandatory items included minor omissions	Setup incomplete, lacks several required items	/5
Accurate Data Categories & Attributes	10 attributes per category; additional category w/ sound business logic	Most categories have attributes, minor inaccuracies	Multiple categories lack required attributes, weak logic	/10
Group Learning Dynamics (15 Points)				
Collaboration and Participation	All members listed as editors and contributed meaningfully	Most members contribute, some gaps in participation	Limited participation, editor rights not correctly established	/10
Effective Communication & Role Distribution	Roles distributed equitably, regular communication	Some coordination evident, room for improvement	Minimal communication or role distribution among members	/5
Content Quality & Creativity (10 Points)				
Relevance of Additional Category	Thoughtful, relevant category with logical attributes	Relevant, but lacks some logical attributes	Minimally relevant, limited/nonsensical attributes	/5
Accuracy and Attention to Detail	Careful attention to detail, accurate information	Some errors/inconsistencies, meets requirements	Frequent inaccuracies/oversights	/5
Total Score:				/40

Appendix E – Small Group Collaboration Assignment II

Building a Conceptual Model of an Entity Relationship Diagram

For this assignment, you will add to and continue using the Kroger data schema that you began creating in Week 4. You will be completing this assignment in a group. Please coordinate with your group member(s) and schedule a time to work on this assignment. If you did not complete the Week 4 group assignment, you must complete that assignment prior to beginning this one as it is the basis for understanding the concepts in this assignment.

Using the database schema you created in Google Sheets to work in LucidChart (or Visio) to create an ERD of your Kroger database. Your ERD must include the following characteristics.

1. Color must be changed for one or all elements in your ERD design.Colla
2. All tables on your ERD MUST have a Primary Key. This primary key must be CAPITALIZED FULLY AND BOLD.
3. All tables in your database schema (ERD) must be RELATED TO (connected with) at least one other table. *Most of the tables should relate to more than one other table. *
4. All tables must contain AT LEAST 12 attributes (you should each have at least 5 these from your week 4 activity which you should now combine to have increased number of fields). You must have AT LEAST 7 tables. If you can come up with more, you should.
5. Any foreign keys used to link tables together must be *ITALICIZED*. (They may be capitalized or not at your discretion).
6. Must fit all on a single page.
7. Please make sure all student names appear in the top left corner on the pdf document that you export and submit.

Other elements that will impact grading include professional presentation of your ERD on the final PDF output. Logical thought processes about connectivity of data to enable businesses to perform their order to cash and procure to pay processes. Here is a link to a LucidChart or Visio template to get you started. Duplicate it or start from scratch on your own.

Appendix F – Small Group Collaboration Assignment II Rubric

Small Group Collaboration Assignment II

Building a Conceptual Model

Criteria	Excellent (5 Points)	Proficient (3 Points)	Needs Improvement (1 Point)	Total Points
Following Directions (15 Points)				
Primary and Foreign Keys Setup	All tables have primary keys (capitalized and bold), foreign keys italicized and correctly set up	Most tables have primary keys and foreign keys with minor issues	Primary and/or foreign keys are missing or incorrectly formatted	/5
Table Relationships and Connectivity	All tables connected logically with at least one other table; most tables connected to multiple tables	Most tables connected logically, with minor gaps in relationships	Few or no logical connections between tables, relationships missing	/5
Attributes and Table Count	At least 7 tables with 12+ attributes each, demonstrating thoughtfulness in design	Most tables meet the minimum attributes and table count, with minor issues	Does not meet the required table count or attributes per table	/5
Group Learning Dynamics (15 Points)				
Collaboration and Participation	All members listed as editors, actively contributing to ERD creation	Most members contribute, with minor gaps in participation	Limited participation, or some members not added as editors	/10
Effective Communication & Coordination	Group members coordinate well, distribute tasks equitably, and communicate regularly	Some coordination evident, but room for improvement	Minimal communication or role distribution among group members	/5
Content Quality & Presentation (10 Points)				
ERD Presentation and Layout	Professional, visually clear ERD, fitting on a single page	Mostly clear ERD, minor layout or visual issues	ERD is cluttered, unclear, or does not fit on a single page	/5
Logical Structure and Data Flow	Thoughtful, logical data connectivity, supporting business processes	General structure is logical, minor areas lack clear flow	Poor structure, lacking logical connectivity between data elements	/5
Total Score:				/40

Appendix G – Demographics Survey

Demographic Survey

Introduction

The purpose of the research study is to study differences in how groups form and perform in online settings. Your participation may help us to learn more about group collaboration in online course environments and the use of technology in these groups. We hope the knowledge gained from this study will benefit you and others in the future. Additionally, you will receive extra credit in the course for your participation in this research study. The instructor will be told at the end of the semester which students completed the requirements for extra credit. The survey will take approximately 15 minutes to complete.

Data collected will be used for research purposes. Your responses are confidential and are not shared with other researchers. Participation is on voluntary basis.

If you have questions or concerns about this study, or have experienced a research related problem or injury, contact the researchers:

Ashley King, awyrick1@utk.edu, (865) 974-1725
Doctoral Candidate in the Learning, Design, and Technology Ph.D. Program
Department of Theory & Practice in Teacher Education, University of Tennessee Knoxville

Dr. Enilda Romero-Hall, eromeroh@utk.edu
Associate Professor in the Learning, Design, and Technology Ph.D.
Program Department of Theory & Practice in Teacher Education, University of Tennessee Knoxville

Informed Consent

Consent Form: Click Here to Read the Full Consent Form

I have read the above information and my questions and concerns, if any, have been responded to satisfactorily. I believe I understand the purpose, benefits, and risks of the study, and give my informed and free consent to be a participant.

Do you consent to participate in this investigation?

- ○ Yes
- ○ No

Please sign below to provide consent to participate:



Demographics

Are you 18 years of age or older?

- ○ Yes
- ○ No

What is your current student classification?

- ○ Freshman
- ○ Sophomore
- ○ Junior
- ○ Senior
- ○ Graduate Student
- ○ Other

In what year were you born? (Please enter four digit year.)

Please select your major. (If you are double majoring, please select "Double Major" as your selection. You will then be prompted to select multiple options.)

- ○ Accounting
- ○ Business Analytics
- ○ Economics
- ○ Finance
- ○ Human Resource Management
- ○ International Business
- ○ Management & Entrepreneurship
- ○ Marketing
- ○ Supply Chain Management
- ○ Double Major
- ○ My major is outside the College of Business

You indicated you are double majoring, please select all your declared majors. If one or more of your majors is outside the College of Business, you may select that option as well as an in college major (if applicable).

- [ ] Accounting
- [ ] Business Analytics
- [ ] Economics
- [ ] Finance
- [ ] Human Resource Management
- [ ] International Business
- [ ] Management & Entrepreneurship
- [ ] Marketing
- [ ] Supply Chain Management
- [ ] My major is outside the College of Business

Are you of Hispanic, Latino, or Spanish origin?

- ○ Yes
- ○ No

How would you describe yourself? Please select all that apply.

- [ ] White
- [ ] Black or African American
- [ ] American Indian or Alaska Native
- [ ] Asian
- [ ] Native Hawaiian or Pacific Islander
- [ ] Other

To which gender identity do you most identify

- [ ] Male
- [ ] Female
- [ ] Transgender Female
- [ ] Transgender Male
- [ ] Gender Variant/Non-Conforming
- [ ] Other
- [ ] Prefer not to answer

Are you a first generation college student? (The first of your family to go to college)

- ○ Yes
- ○ No

What is your current employment status?

- ○ Not employed
- ○ Part-time
- ○ Full-time
- ○ Self-employed
- ○ Currently seeking employment
- ○ Prefer not to answer
- ○ Other

How would you rate your overall proficiency with digital tools and technology?

- ○ Beginner

- ○ Intermediate
- ○ Advanced

What is the primary device that you use for online learning.

- ○ Desktop Computer
- ○ Laptop Computer
- ○ Tablet
- ○ Smartphone
- ○ Other

How satisfied are you with the performance of your primary device during online learning?

Very unsatisfied	Unsatisfied	Neutral	Satisfied	Very satisfied
○	○	○	○	○

Prior to enrolling in this course, have you ever participated in a college level online course before? (Please do not include any dual-enrollment classes you may have taken.)

- ○ Yes
- ○ No

How many online courses have you taken at the college level? Please include if the course was taught more than half online. (Please do not include any dual-enrollment classes you may have taken.)

- ○ 1
- ○ 2
- ○ 3
- ○ 4

- ○ 5
- ○ 6
- ○ More than 6

Did you participate in online learning while in high school? (Please include any dual-enrollment courses you may have taken.)

- ○ Yes
- ○ No

How many online classes did you have in high school? (Please include any dual-enrollment courses you may have taken.)

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ More than 6

Likert Scale Questions

How frequently have you worked on group projects in online courses?

- ○ Never
- ○ Rarely
- ○ Sometimes

- ○ Often
- ○ Always

The following statements will allow you to evaluate and reflect upon your teamwork experiences. For each statement, please select the response that best represents you.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
In my past experience, learning in teams helps me succeed in a course.	○	○	○	○	○
Group work can be effective in an online course.	○	○	○	○	○
The technology that is used impacts (either in a positive or negative way) the outcome of group work in an online course.	○	○	○	○	○
Collaborative learning (group work) is more effective in synchronous environments rather than asynchronous environments.	○	○	○	○	○
I am comfortable working in groups for online projects.	○	○	○	○	○
I am comfortable using online collaboration technologies (e.g. video conferencing, shared documents, etc.).	○	○	○	○	○

My internet connection is reliable when I work in online courses.	○	○	○	○	○
I do well to balance my school, work, and life responsibilities.	○	○	○	○	○

How often do you experience regular Internet interruptions (e.g., disconnections, slow speed) during online sessions?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Often
- ○ Always

Powered by Qualtrics

Small Group Collaboration Survey

Introduction

The purpose of the research study is to study differences in how groups form and perform in online settings. Your participation may help us to learn more about group collaboration in online course environments and the use of technology in these groups. We hope the knowledge gained from this study will benefit you and others in the future. Additionally, you will receive extra credit in the course for your participation in this research study. The instructor will be told at the end of the semester which students completed the requirements for extra credit.

The survey will take approximately 20 minutes to complete. Data collected will be used for research purposes. Your responses are confidential and are not shared with other researchers. Participation is on voluntary basis.

If you have questions or concerns about this study, or have experienced a research related problem or injury, contact the researchers:

Ashley King, awyrick1@utk.edu, (865) 974-1725
Doctoral Candidate in the Learning, Design, and Technology Ph.D. Program
Department of Theory & Practice in Teacher Education, University of Tennessee Knoxville

Dr. Enilda Romero-Hall, eromeroh@utk.edu
Associate Professor in the Learning, Design, and Technology Ph.D. Program
Department of Theory & Practice in Teacher Education, University of Tennessee Knoxville

Demographics

Q1: Are you 18 years of age or older?

- ◯ Yes
- ◯ No

Q2: Your assigned modality for lab in this course is:

- ◯ In person (face-to-face)
- ◯ Online synchronous (participates via zoom at scheduled time)
- ◯ Online asynchronous (meets on own time)

Q3: For this assignment, I participated in a group that met

- ◯ In person (face-to-face)
- ◯ Online synchronous (at scheduled class time)
- ◯ Online asynchronous (but met at a time of our choosing either face-to-face or online)
- ◯ Online asynchronous (never met in a live environment either online or face-to-face)

Q4: Which software package did your group use to complete this assignment?

- ◯ Google Sheets

- ◯ Excel

Did you know any of the other members of your group prior to working together on this assignment? If yes, please choose the answer that most closely describes the way you know the other members of your group.

- ◯ No, I did not know any of my other group members before this assignment
- ◯ Yes, I knew ONE of my group members from social interactions.
- ◯ Yes, I knew ONE of my group members from working together in another group assignment.
- ◯ Yes, I knew MORE THAN ONE of my group members either socially or from other group assignments.

Did you know any of the other members of your group prior to working together on this assignment? If yes, please choose the answer that most closely describes the way you know the other members of your group.

- ◯ No, I did not know any of my other group members before this assignment
- ◯ Yes, I knew ONE of my group members from social interactions.
- ◯ Yes, I knew ONE of my group members from working together in another group assignment.
- ◯ Yes, I knew MORE THAN ONE of my group members either socially or from other group assignments.

Business Data Collection - Google Sheets

In this assignment, you participated in an asynchronous group that used Google Sheets, please answer the following questions related to your experience with **Google Sheets and its impact on your group assignment.**

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Using Google Sheets improved my ability to collaborate with peers for this assignment.	◯	◯	◯	◯	◯
Using Google Sheets for this assignment allowed me to establish personal connections with the members of my team.	◯	◯	◯	◯	◯
Using Google Sheets for this group assignment would have allowed me to collaborate effectively with my group even in a different modality from mine (asynchronous, synchronous or in person).	◯	◯	◯	◯	◯
Google Sheets was well-suited to supporting asynchronous collaboration, where team members work independently at different times and/or places.	◯	◯	◯	◯	◯
Using Google Sheets made an impact on my learning because I was able to see others contributions in real time and respond with my thoughts and contributions efficiently.	◯	◯	◯	◯	◯

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Even though Google Sheets allowed us to contribute at the same time to the assignment, my group still did most of the assignment without direct interaction or communication.	○	○	○	○	○
Using Google Sheets improved our overall performance on the assignment.	○	○	○	○	○
Using Google Sheets made a difference in the group participation and interactivity.	○	○	○	○	○
Using Google Sheets helped me to learn more from this assignment than if I had used another software that did not have live updating.	○	○	○	○	○

Q14: The main communication tool that my group used to talk to each other outside of class for this assignment was

- ○ Cell phones (texting)
- ○ Cell phones (calling)
- ○ Messaging app (GroupMe, WhatsApp, etc.)
- ○ Video Conferencing Technology (Zoom, Teams, etc.)
- ○ Email
- ○ Canvas messaging
- ○ Canvas Group Homepage
- ○ Google Sheets
- ○ Other
- ○ My group did not communicate outside of class

Please answer the following questions related to your **experiences with other technologies, that were not Google Sheets, with your group for this particular assignment.**

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The communication tools we used help build trust and cohesion within our group.	○	○	○	○	○
The communication tools we chose are well-suited to supporting our collaboration, even when team members work independently at different times and/or places.	○	○	○	○	○

Business Data Collection - Excel

In this assignment, you participated in an asynchronous group that used Microsoft Excel, please answer the following questions related to your experience with **Microsoft Excel and**

its impact on your group assignment.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Using Excel to complete the assignment improved my ability to collaborate with peers.	○	○	○	○	○
Using Excel for this assignment allowed me to establish personal connections with the members of my team.	○	○	○	○	○
Using Excel for this group assignment would have allowed me to collaborate effectively with my group even in a different modality from mine (asynchronous, synchronous or in person).	○	○	○	○	○
Excel was well-suited to supporting asynchronous collaboration, where team members work independently at different times and/or places.	○	○	○	○	○
Using Excel made an impact on my learning because I was able to see others contributions of others and respond with my thoughts and contributions efficiently.	○	○	○	○	○
Even though the assignment focused on collaboration, my group still did most of the assignment without direct interaction or communication.	○	○	○	○	○
The features of Excel improved our overall performance on the assignment.	○	○	○	○	○
The features of Excel made a difference in the group participation and interactivity.	○	○	○	○	○
Using Google Sheets would have helped me to learn more from this assignment than using Excel that did not have live updating.	○	○	○	○	○

The main communication tool that my group used to talk to each other outside of class for this assignment was

- ○ Cell phones (texting)
- ○ Cell phones (calling)
- ○ Messaging app (GroupMe, WhatsApp, etc.)
- ○ Video Conferencing Technology (Zoom, Teams, etc.)
- ○ Email
- ○ Canvas messaging
- ○ Canvas Group Homepage
- ○ Google Sheets
- ○ Other

○ My group did not communicate outside of class

Please answer the following questions related to your **experiences with other technologies, that were not Excel, with your group for this particular assignment.**

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The communication tools we used help build trust and cohesion within our group.	○	○	○	○	○
The communication tools we chose are well-suited to supporting our collaboration, even when team members work independently at different times and/or places.	○	○	○	○	○

Course Experience

Please answer the following questions related to your overall **experience with groups in this course** (not particular to this assignment).

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Finding my role within group assignments has been easy.	○	○	○	○	○
Overall, group leaders struggle to coordinate our work using online tools and communication platforms (Group Chat, email, Canvas, etc.).	○	○	○	○	○
The course encourages group members to take responsibility for their work within the team.	○	○	○	○	○
The technologies we use for group work contributed to misunderstandings or conflicts within the group.	○	○	○	○	○
The technologies for group work used allowed me to establish personal connections with the members of my team.	○	○	○	○	○
My group members have given me support, help, and encouragement at times when it was necessary.	○	○	○	○	○
I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.	○	○	○	○	○
The design of the course and the group activity guidelines have allowed us to work as a team more effectively.	○	○	○	○	○
The use of technology in our group work ensures that communication is clear	○	○	○	○	○

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
and reduces the chance of miscommunication.					
Technology helps our group reach consensus more effectively during decision-making processes.	○	○	○	○	○
Technology helps ensure that everyone's voice is heard in group discussions and activities.	○	○	○	○	○
The technology we use in group work makes it harder to resolve conflicts or disagreements.	○	○	○	○	○
The online tools we use hinder the group's ability to reach consensus during decision-making.	○	○	○	○	○
I felt that my point of view was acknowledged by other members of my groups.	○	○	○	○	○
Participating in the group assignments was valuable in helping me appreciate different perspectives.	○	○	○	○	○
Teamwork has contributed to making me feel more involved in studying the subject.	○	○	○	○	○
I have learned more interacting with my teammates than when I work alone.	○	○	○	○	○
Interacting with my teammates, I have improved the grades I would have obtained working individually on the task.	○	○	○	○	○
The online tools (e.g., group homepages, shared documents, breakout rooms) help us clearly assign roles and responsibilities within the groups.	○	○	○	○	○
I felt that my point of view was acknowledged by other members of my groups.	○	○	○	○	○

Please answer the following questions related to your **overall experience** in BUAD 342 this semester.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The time I have spent forming groups and meeting group members has been time well spent as I have learned from the group interactions.	○	○	○	○	○

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Working in teams has benefited my learning because I am able to see various viewpoints and add my knowledge to others.	○	○	○	○	○
The Learning Management System (Canvas) setup used in this course provides clear structure and guidelines, which help reduce barriers between me and the course content.	○	○	○	○	○
The ability to communicate directly with my instructor and GTAs through the online tools (like Canvas or Zoom) makes me feel more connected to the course.	○	○	○	○	○
I feel empowered to direct my own learning process in this online course due to the technology and course structure.	○	○	○	○	○
Getting to know other course participants through collaborative assignments gave me a sense of belonging in the course.	○	○	○	○	○
I felt comfortable interacting with other course participants during group activities.	○	○	○	○	○
I felt motivated to explore content-related questions.	○	○	○	○	○
Engaging with the course content and the group assignments helped me understand fundamental concepts in this class and increase my performance on assignments.	○	○	○	○	○
The course structure makes it easy for me to stay on track and manage my learning.	○	○	○	○	○
Course activities piqued my curiosity.	○	○	○	○	○
I can apply the knowledge created in this course to my work or other non-class-related activities.	○	○	○	○	○

Open Ended Questions

How does real-time collaboration tools (e.g., shared documents, live editing) affect your group's ability to work together efficiently?

How do you feel that course activities and group assignments have impacted your ability to apply knowledge in real-world contexts?

If you could change or improve one feature of the technology used in your online group work, what would it be and why?

How does your group typically choose a leader or assign roles when using online tools? What challenges, if any, do you encounter?

What challenges, if any, have you encountered when using technology for group work? How did you overcome them?

When using the software to complete your assignment, what was the most useful feature of the technology you used (Excel or Google Sheets) to complete this group assignment?

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Small Group Collaboration Survey

Introduction

The purpose of the research study is to study differences in how groups form and perform in online settings. Your participation may help us to learn more about group collaboration in online course environments and the use of technology in these groups. We hope the knowledge gained from this study will benefit you and others in the future. Additionally, you will receive extra credit in the course for your participation in this research study. The instructor will be told at the end of the semester which students completed the requirements for extra credit.

The survey will take approximately 20 minutes to complete. Data collected will be used for research purposes. Your responses are confidential and are not shared with other researchers. Participation is on voluntary basis.

If you have questions or concerns about this study, or have experienced a research related problem or injury, contact the researchers:

Ashley King, awyrick1@utk.edu, (865) 974-1725
Doctoral Candidate in the Learning, Design, and Technology Ph.D. Program
Department of Theory & Practice in Teacher Education, University of Tennessee Knoxville

Dr. Enilda Romero-Hall, eromeroh@utk.edu
Associate Professor in the Learning, Design, and Technology Ph.D. Program
Department of Theory & Practice in Teacher Education, University of Tennessee Knoxville

Demographics

Q1: Are you 18 years of age or older?

- ◯ Yes
- ◯ No

Q2: Your assigned modality for lab in this course is:

- ◯ In person (face-to-face)
- ◯ Online synchronous (participates via zoom at scheduled time)
- ◯ Online asynchronous (meets on own time)

Q3: For this assignment, I participated in a group that met

- ◯ In person (face-to-face)
- ◯ Online synchronous (at scheduled class time)
- ◯ Online asynchronous (but met at a time of our choosing either face-to-face or online)
- ◯ Online asynchronous (never met in a live environment either online or face-to-face)

Q4: Which software package did your group use to complete this assignment?

- ◯ Lucid Chart

○ Microsoft Word

Did you know any of the other members of your group prior to working together on this assignment? If yes, please choose the answer that most closely describes the way you know the other members of your group.

○ No, I did not know any of my other group members before this assignment

○ Yes, I knew ONE of my group members from social interactions.

○ Yes, I knew ONE of my group members from working together in another group assignment.

○ Yes, I knew MORE THAN ONE of my group members either socially or from other group assignments.

ERD Assignment

In this assignment, you participated in an asynchronous group that used Lucid Chart, please answer the following questions related to your experience with **Lucid Chart and its impact on your group assignment.**

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Using Lucid Chart improved my ability to collaborate with peers for this assignment.	○	○	○	○	○
Using Lucid Chart for this assignment allowed me to establish personal connections with the members of my team.	○	○	○	○	○
Using Lucid Chart for this group assignment would have allowed me to collaborate effectively with my group even in a different modality from mine (asynchronous, synchronous or in person).	○	○	○	○	○
Lucid Chart was well-suited to supporting asynchronous collaboration, where team members work independently at different times and/or places.	○	○	○	○	○
Using Lucid Chart made an impact on my learning because I was able to see others contributions in real time and respond with my thoughts and contributions efficiently.	○	○	○	○	○
Even though Lucid Chart allowed us to contribute at the same time to the assignment, my group still did most of the assignment without direct interaction or communication.	○	○	○	○	○
Using Lucid Chart improved our overall performance on the assignment.	○	○	○	○	○

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Using Lucid Chart made a difference in the group participation and interactivity.	○	○	○	○	○
Using Lucid Chart helped me to learn more from this assignment than if I had used another software that did not have live updating.	○	○	○	○	○

Q14: The main communication tool that my group used to talk to each other outside of class for this assignment was

- ○ Cell phones (texting)
- ○ Cell phones (calling)
- ○ Messaging app (GroupMe, WhatsApp, etc.)
- ○ Video Conferencing Technology (Zoom, Teams, etc.)
- ○ Email
- ○ Canvas messaging
- ○ Canvas Group Homepage
- ○ Google Sheets
- ○ Other
- ○ My group did not communicate outside of class

Please answer the following questions related to your **experiences with other technologies, that were not Lucid Chart, with your group for this particular assignment.**

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The communication tools we used help build trust and cohesion within our group.	○	○	○	○	○
The communication tools we chose are well-suited to supporting our collaboration, even when team members work independently at different times and/or places.	○	○	○	○	○

ERD Assignment

In this assignment, you participated in an asynchronous group that used Microsoft Word, please answer the following questions related to your experience with **Microsoft Word and its impact on your group assignment.**

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Using Word to complete the assignment improved my ability to collaborate with peers.	○	○	○	○	○
Using Word for this assignment allowed me to establish personal connections with the members of my team.	○	○	○	○	○

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Using Word for this group assignment would have allowed me to collaborate effectively with my group even in a different modality from mine (asynchronous, synchronous or in person).	○	○	○	○	○
Word was well-suited to supporting asynchronous collaboration, where team members work independently at different times and/or places.	○	○	○	○	○
Using Word made an impact on my learning because I was able to see others contributions of others and respond with my thoughts and contributions efficiently.	○	○	○	○	○
Even though the assignment focused on collaboration, my group still did most of the assignment without direct interaction or communication.	○	○	○	○	○
The features of Word improved our overall performance on the assignment.	○	○	○	○	○
The features of Word made a difference in the group participation and interactivity.	○	○	○	○	○
Using Lucid Chart would have helped me to learn more from this assignment than using Word that did not have live updating.	○	○	○	○	○

The main communication tool that my group used to talk to each other outside of class for this assignment was

- ○ Cell phones (texting)
- ○ Cell phones (calling)
- ○ Messaging app (GroupMe, WhatsApp, etc.)
- ○ Video Conferencing Technology (Zoom, Teams, etc.)
- ○ Email
- ○ Canvas messaging
- ○ Canvas Group Homepage
- ○ Google Sheets
- ○ Other
- ○ My group did not communicate outside of class

Please answer the following questions related to your **experiences with other technologies, that were not Word, with your group for this particular assignment.**

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The communication tools we used help build	○	○	○	○	○

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
trust and cohesion within our group.					
The communication tools we chose are well-suited to supporting our collaboration, even when team members work independently at different times and/or places.	○	○	○	○	○

Course Experience

Please answer the following questions related to your overall **experience with groups in this course** (not particular to this assignment).

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Finding my role within group assignments has been easy.	○	○	○	○	○
Overall, group leaders struggle to coordinate our work using online tools and communication platforms (Group Chat, email, Canvas, etc.).	○	○	○	○	○
The course encourages group members to take responsibility for their work within the team.	○	○	○	○	○
The technologies we use for group work contributed to misunderstandings or conflicts within the group.	○	○	○	○	○
The technologies for group work used allowed me to establish personal connections with the members of my team.	○	○	○	○	○
My group members have given me support, help, and encouragement at times when it was necessary.	○	○	○	○	○
I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.	○	○	○	○	○
The design of the course and the group activity guidelines have allowed us to work as a team more effectively.	○	○	○	○	○
The use of technology in our group work ensures that communication is clear and reduces the chance of miscommunication.	○	○	○	○	○
Technology helps our group reach consensus more effectively during decision-making processes.	○	○	○	○	○
Technology helps ensure that everyone's	○	○	○	○	○

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
voice is heard in group discussions and activities.					
The technology we use in group work makes it harder to resolve conflicts or disagreements.	○	○	○	○	○
The online tools we use hinder the group's ability to reach consensus during decision-making.	○	○	○	○	○
I felt that my point of view was acknowledged by other members of my groups.	○	○	○	○	○
Participating in the group assignments was valuable in helping me appreciate different perspectives.	○	○	○	○	○
Teamwork has contributed to making me feel more involved in studying the subject.	○	○	○	○	○
I have learned more interacting with my teammates than when I work alone.	○	○	○	○	○
Interacting with my teammates, I have improved the grades I would have obtained working individually on the task.	○	○	○	○	○
The online tools (e.g., group homepages, shared documents, breakout rooms) help us clearly assign roles and responsibilities within the groups.	○	○	○	○	○
I felt that my point of view was acknowledged by other members of my groups.	○	○	○	○	○

Please answer the following questions related to your **overall experience** in BUAD 342 this semester.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The time I have spent forming groups and meeting group members has been time well spent as I have learned from the group interactions.	○	○	○	○	○
Working in teams has benefited my learning because I am able to see various viewpoints and add my knowledge to others.	○	○	○	○	○
The Learning Management System (Canvas) setup used in this course provides clear structure and guidelines, which help reduce barriers between me and the course content.	○	○	○	○	○

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The ability to communicate directly with my instructor and GTAs through the online tools (like Canvas or Zoom) makes me feel more connected to the course.	○	○	○	○	○
I feel empowered to direct my own learning process in this online course due to the technology and course structure.	○	○	○	○	○
Getting to know other course participants through collaborative assignments gave me a sense of belonging in the course.	○	○	○	○	○
I felt comfortable interacting with other course participants during group activities.	○	○	○	○	○
I felt motivated to explore content-related questions.	○	○	○	○	○
Engaging with the course content and the group assignments helped me understand fundamental concepts in this class and increase my performance on assignments.	○	○	○	○	○
The course structure makes it easy for me to stay on track and manage my learning.	○	○	○	○	○
Course activities piqued my curiosity.	○	○	○	○	○
I can apply the knowledge created in this course to my work or other non-class-related activities.	○	○	○	○	○

Open Ended Questions

How does real-time collaboration tools (e.g., shared documents, live editing) affect your group's ability to work together efficiently?

How do you feel that course activities and group assignments have impacted your ability to apply knowledge in real-world contexts?

If you could change or improve one feature of the technology used in your online group work, what would it be and why?

How does your group typically choose a leader or assign roles when using online tools? What challenges, if any, do you encounter?

What challenges, if any, have you encountered when using technology for group work? How did you overcome them?

When using the software to complete your assignment, what was the most useful feature of the technology you used (Microsoft Word or Lucid Chart) to complete this group assignment?

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Appendix J: Full Codebook and Construct Mapping

This appendix presents the full codebook used in the dissertation study, including all survey items, variable names, construct assignments, and theoretical frameworks. It reflects the complete mapping of items from the Demographic Survey, Small Group Collaboration Survey I, and Small Group Collaboration Survey II. Each item is listed with corresponding values, associated constructs, and whether it contributes to a composite variable. This codebook supports analyses detailed in Chapters 3, 4, and 5.

Table J1:

Full Codebook and Construct Mapping

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
D_01	Are you 18 years of age or older?	Adult	5=Yes, 4=No			
D_02	What is your current student classification?	Year_of_Study	1=Freshman, 2=Sophomore, 3=Junior, 4=Senior			
D_03	In what year were you born?	BirthYear				
D_04	Please select your major. (If you are double majoring, please select "Double Major" as your selection. You will then be prompted to select multiple options.)	Major	1=Accounting, 2=Business Analytics, 3=Economics, 4=Finance, 5=HRM, 6=IB, 7=Management&Entreprenuership, 8=Marketing, 9=SCM, 10=Double Major, 11=Outside College of Business			
D_04a	You indicated you are double majoring, please select all your declared majors. If one or more of your majors is outside the	Double_Major	1=Accounting, 2=Business Analytics, 3=Economics, 4=Finance, 5=HRM, 6=IB, 7=Management&Entreprenuership, 8=Marketing, 9=SCM,			

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
	College of Business, you may select that option as well as an in college major (if applicable).		10=Double Major, 11=Outside College of Business			
D_05	Are you of Hispanic, Latino, or Spanish origin?	Hispanic	1=Yes, 2=No			
D_06	How would you describe yourself? Please select all that apply.	Race	1=White, 2=Black or African American, 3= American Indian or Alaska Native, 4=Asian, 5=Native Hawaiian or Pacific Islander, 6=Other			
D_07	To which gender identity do you most identify?	Gender	1=Male, 2=Female, 3=Transgender Female, 4=Transgender Male, 5=Gender Variant/Non-Conforming, 6=Other, 7=Prefer not to answer			
D_08	Are you a first generation college student? (The first of your family to go to college)	FirstGen	1=Yes, 2=No			
D_09	What is your current employment status?	Employ	1=Not employed, 2=Part-time, 3=Full-time, 4=Self-employed, 5=Currently seeking employment, 6=Prefer not to answer, 7=Other			
D_10	How would you rate your overall proficiency with digital tools and technology?	TechProficiency	1=Beginner, 2=Intermediate, 3=Advanced			
D_11	What is the primary device that you use for online learning?	Device	1=Desktop Computer, 2=Laptop Computer, 3=Tablet, 4=Smartphone, 5=Other			

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
D_12	How satisfied are you with the performance of your primary device during online learning?	Satisfied_Device	1=Very unsatisfied, 2=Unsatisfied, 3=Neutral, 4=Satisfied, 5=Very satisfied	Technology Access and Functionality (Contextual)	No specific theory. Contextual to this study.	No
D_13	Prior to enrolling in this course, have you ever participated in a college level online course before? (Please do not include any dual-enrollment classes you may have taken.)	Prior_Online_Class_College	1=Yes, 2=No			
D_14	How many online courses have you taken at the college level? Please include if the course was taught more than half online. (Please do not include any dual-enrollment classes you may have taken.)	Num_of_Prior_Online_Courses_College	1=1, 2=2, 3=3, 4=4, 5=5, 6=6, 7=More than 6			
D_15	Did you participate in online learning while in high school? (Please include any dual-enrollment courses you may have taken.)	Online_Course_HS	1=Yes, 2=No			
D_16	How many online classes did you have in high school? (Please include any dual-enrollment courses	Num_Online_Courses_HS	1=1, 2=2, 3=3, 4=4, 5=5, 6=6, 7=More than 6			

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
	you may have taken.) - 7 = More than 6					
D_17	How frequently have you worked on group projects in online courses?	Freq_Group_Work_Online	1=Never, 2=Rarely, 3=Sometimes, 4=Often, 5=Always			
D_18	In my past experience, learning in teams helps me succeed in a course.	Success_Team	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Prior Team Experience (Contextual)	No specific theory. Contextual to this study.	No
D_19	Group work can be effective in an online course.	Group_Work_Effective_Online	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Group Work Perception (Contextual)	No specific theory. Contextual to this study.	No
D_20	The technology that is used impacts (either in a positive or negative way) the outcome of group work in an online course.	Tech_Impact_Group_Work	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Perceived Technology Impact (Contextual)	No specific theory. Contextual to this study.	No
D_21	Collaborative learning (group work) is more effective in synchronous environments rather than asynchronous environments.	Modality_Comparison	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Modality Beliefs (Contextual)	No specific theory. Contextual to this study.	No
D_22	I am comfortable working in groups for online projects.	Comfort_Online_Groups	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Social Presence - Affective and Relational Connection	Social Presence Theory	No

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
D_23	I am comfortable using online collaboration technologies (e.g. video conferencing, shared documents, etc.).	Comfort_Online_Tools	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Technology Comfort	No specific theory. Contextual to this study.	No
D_24	My internet connection is reliable when I work in online courses.	Reliable_Internet	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Technology Access (Contextual)	No specific theory. Contextual to this study.	No
D_25	I do well to balance my school, work, and life responsibilities.	Balance	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Learner Autonomy	No specific theory. Contextual to this study.	No
D_26	How often do you experience regular Internet interruptions (e.g., disconnections, slow speed) during online sessions?	Num_Internet_Disruptions	1=Never, 2=Rarely, 3=Sometimes, 4=Often, 5=Always			
S1_01	Are you 18 years of age or older?	Adult	1=Yes, 2=No			
S1_02	Your assigned modality for lab in this course is:	Modality_Assigned	2=Synchronous, 3=Asynchronous			
S1_03	For this assignment, I participated in a group that met	Group_Modality_Reality	1=In person (face-to-face), 2= Online Synchronous (at scheduled class time), 3=Online asynchronous (but met at a time of our choosing either face-to-face or online), 4=Online asynchronous (never met in a live environment either online or face-to-face)			

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
S1_04	Which software package did your group use to complete this assignment?	Software	1=Google Sheets, 2=Excel			
S1_05	Did you know any of the other members of your group prior to working together on this assignment? If yes, please choose the answer that most closely describes the way you know the other members of your group.	Prior_Acquaintance	1=No, I did not know any of my other group members before the assignment, 2=Yes, I knew ONE of my group members from social interactions, 3=Yes, I knew ONE of my group members from working together in another group assignment, 4=Yes, I knew MORE THAN ONE of my group members either socially or from other group assignments.			
S1_06	Using Google Sheets improved my ability to collaborate with peers for this assignment.	Improved_Collaboration_GS	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Concurrent Update; Cognitive Presence - Tool Enabled Collaboration and Learning - Concurrent Update	Contextual; Community of Inquiry	Yes
S1_07	Using Google Sheets for this assignment allowed me to establish personal connections with the members of my team.	Personal_Connection_GS	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Concurrent Update	Contextual	Yes

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
S1_08	Using Google Sheets for this group assignment would have allowed me to collaborate effectively with my group even in a different modality from mine (asynchronous, synchronous or in person).	Effective_Collab_All_Modalities_GS	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Tool Enabled Collaboration and Learning - Concurrent Update	Community of Inquiry	Yes
S1_09	Google Sheets was well-suited to supporting asynchronous collaboration, where team members work independently at different times and/or places.	Suited_Asynchronous_GS	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Structure - Concurrent Update Tools	Theory of Transactional Distance	Yes
S1_10	Using Google Sheets made an impact on my learning because I was able to see others contributions in real time and respond with my thoughts and contributions efficiently.	Concurrent_Update_Learning_Impact_GS	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Concurrent Update	Contextual	Yes
S1_11	Even though Google Sheets allowed us to contribute at the same time to the assignment, my group still did most of the assignment without direct interaction or communication.	No_Interaction_GS	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Concurrent Update	Theory of Transactional Distance	No
S1_12	Using Google Sheets improved our overall	Improved_Performance_GS	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools	Contextual; Community of Inquiry	Yes

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
	performance on the assignment.			Concurrent Update; Cognitive Presence - Tool Enabled Collaboration and Learning - Concurrent Update		
S1_13	Using Google Sheets made a difference in the group participation and interactivity.	Group_Participation_GS	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Concurrent Update	Contextual	Yes
S1_14	Using Google Sheets helped me to learn more from this assignment than if I had used another software that did not have live updating.	Enhanced_Learning_Comparison_of_Tools_GS	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Tool Enabled Collaboration and Learning - Concurrent Update	Theory of Transactional Distance	No
S1_15	The main communication tool that my group used to talk to each other outside of class for this assignment was - (Selected Choice)	Communication_Tool_GS	1=Cell phones (texting), 2=Cell phones (calling), 3=Messaging app (GroupMe, WhatsApp, etc.), 6=Canvase Group Homepage, 7=Other, 8=My group did not communicate outside of class, 10=Google Sheets, 11=Video Conferencing Technology (Zoom,			

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
			Teams, etc.), 4=Email, 5=Canvas Messaging			
S1_16	The communication tools we used help build trust and cohesion within our group.	Other_Communication_Tools_Trust_GS	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Concurrent Update	Contextual	Yes
S1_17	The communication tools we chose are well-suited to supporting our collaboration, even when team members work independently at different times and/or places.	Other_Communication_Supports_Asynchronous_GS	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Structure - Concurrent Update Tools	Theory of Transactional Distance	Yes
S1_18	Using Excel to complete the assignment improved my ability to collaborate with peers.	Improved_Collaboration_EX	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Standard; Cognitive Presence - Tool Enabled Collaboration and Learning - Standard	Contextual; Community of Inquiry	Yes
S1_19	Using Excel for this assignment allowed me to establish personal connections with the members of my team.	Personal_Connection_EX	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Standard	Contextual	Yes

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
S1_20	Using Excel for this group assignment would have allowed me to collaborate effectively with my group even in a different modality from mine (asynchronous, synchronous or in person).	Effective_Collab_All_Modalities_EX	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Tool Enabled Collaboration and Learning - Standard	Community of Inquiry	Yes
S1_21	Excel was well-suited to supporting asynchronous collaboration, where team members work independently at different times and/or places.	Suited_Asynchronous_EX	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Structure - Standard Tools	Theory of Transactional Distance	Yes
S1_22	Using Excel made an impact on my learning because I was able to see others contributions of others and respond with my thoughts and contributions efficiently.	Concurrent_Update_Learning_Impact_EX	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Standard	Contextual	Yes
S1_23	Even though the assignment focused on collaboration, my group still did most of the assignment without direct interaction or communication.	No_Interaction_EX	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Standard	Theory of Transactional Distance	No
S1_24	The features of Excel improved our overall performance on the assignment.	Improved_Performance_EX	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Standard; Cognitive	Contextual; Community of Inquiry	Yes

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
				Presence - Tool Enabled Collaboration and Learning - Standard		
S1_25	The features of Excel made a difference in the group participation and interactivity.	Group_Participation_EX	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Standard	Contextual	Yes
S1_26	Using Google Sheets would have helped me to learn more from this assignment than using Excel that did not have live updating.	Enhanced_Learning_Comparison_of_Tools_EX	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Tool Enabled Learning Perception	Theory of Transactional Distance	No
S1_27	The main communication tool that my group used to talk to each other outside of class for this assignment was - Selected Choice	Communication_Tool_EX	1=Cell phones (texting), 2=Cell phones (calling), 3=Messaging app (GroupMe, WhatsApp, etc.), 6=Canvase Group Homepage, 7=Other, 8=My group did not communicate outside of class, 10=Google Sheets, 11=Video Conferencing Technology (Zoom, Teams, etc.), 4=Email, 5=Canvas Messaging	Real Time Collaboration Tools	Contextual	
S1_28	The communication tools we used help build trust and cohesion within our group.	Other_Communication_Tools_Trust_EX	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Standard	Contextual	Yes
S1_29	The communication tools we chose are well-suited to supporting our	Other_Communication_Supports	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Structure - Standard Tools	Theory of Transactional Distance	Yes

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
	collaboration, even when team members work independently at different times and/or places.	_Asynchronous_EX				
S1_30	Finding my role within group assignments has been easy.	Overall_Course_Groups_Role	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Structure - overall	Theory of Transactional Distance	Yes
S1_31	Overall, group leaders struggle to coordinate our work using online tools and communication platforms (Group Chat, email, Canvas, etc.).	Overall_Course_Groups_Leader_Struggle_Reverse_Coded	1=Strongly Agree (reversed), 2=Agree, 3=Neutral, 4=Disagree, 5=Stongly Disagree	Cognitive Presence - Group Functioning and Conflict Resolution	Community of Inquiry	Yes
S1_32	The course encourages group members to take responsibility for their work within the team.	Overall_Course_Groups_Responsibility	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence; Structure - overall	Community of Inquiry: Theory of Transactional Distance	Yes
S1_33	The technologies we use for group work contributed to misunderstandings or conflicts within the group.	Overall_Course_Groups_Tech_Conflict_Reverse	1=Strongly Agree (reversed), 2=Agree, 3=Neutral, 4=Disagree, 5=Stongly Disagree	Cognitive Presence - Group Functioning and Conflict Resolution	Community of Inquiry	Yes
S1_34	The technologies for group work used allowed me to establish personal connections with the members of my team.	Overall_Course_Groups_Tech_Connection	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Social Presence - Affective and Relational Connection	Social Presence Theory	Yes

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
S1_35	My group members have given me support, help, and encouragement at times when it was necessary.	Overall_Course_Groups_Support	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Social Presence - Affective and Relational Connection	Community of Inquiry	Yes
S1_36	I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.	Overall_Course_Groups_Trust	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Social Presence - Group Interaction and Participation	Community of Inquiry	Yes
S1_37	The design of the course and the group activity guidelines have allowed us to work as a team more effectively.	Overall_Course_Guidelines_Team_Effectiveness	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Structure - overall	Theory of Transactional Distance	Yes
S1_38	The use of technology in our group work ensures that communication is clear and reduces the chance of miscommunication.	Overall_Course_Groups_Tech_Communication	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Structure - overall	Theory of Transactional Distance	Yes
S1_39	Technology helps our group reach consensus more effectively during decision-making processes.	Overall_Course_Groups_Consensus	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Group Functioning and Conflict Resolution	Community of Inquiry	Yes
S1_40	Technology helps ensure that everyone's voice is	Overall_Course_Groups_Tech_Discussion	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Social Presence - Group	Social Presence Theory	Yes

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
	heard in group discussions and activities.			Interaction and Participation		
S1_41	The technology we use in group work makes it harder to resolve conflicts or disagreements.	Overall_Course_Groups_Tech_Resolve_Conflict_Reverse_Coded	1=Strongly Agree (reversed), 2=Agree, 3=Neutral, 4=Disagree, 5=Stongly Disagree	Cognitive Presence - Group Functioning and Conflict Resolution	Community of Inquiry	Yes
S1_42	The online tools we use hinder the group's ability to reach consensus during decision-making.	Overall_Course_Groups_Consensus_Reverse_Coded	1=Strongly Agree (reversed), 2=Agree, 3=Neutral, 4=Disagree, 5=Stongly Disagree	Cognitive Presence - Group Functioning and Conflict Resolution	Community of Inquiry	Yes
S1_43	I felt that my point of view was acknowledged by other members of my groups.	Overall_Course_Groups_POV	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Social Presence - Group Interaction and Participation	Social Presence Theory	Yes
S1_44	Participating in the group assignments was valuable in helping me appreciate different perspectives.	Overall_Course_Groups_Perspective	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Social Cognitive Learning with Peers	Community of Inquiry	Yes

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
S1_45	Teamwork has contributed to making me feel more involved in studying the subject.	Overall_Course_Groups_Involvement	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Social Presence - Group Interaction and Participation	Community of Inquiry	Yes
S1_46	I have learned more interacting with my teammates than when I work alone.	Overall_Course_Groups_Interaction	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Social Cognitive Learning with Peers	Community of Inquiry	Yes
S1_47	Interacting with my teammates, I have improved the grades I would have obtained working individually on the task.	Overall_Course_Groups_Improved_Grades	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Academic Performance (Self-report)	Social Presence Theory	No
S1_48	The online tools (e.g., group homepages, shared documents, breakout rooms) help us clearly assign roles and responsibilities within the groups.	Overall_Course_Groups_Tools_Roles	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Structure - overall	Theory of Transactional Distance	Yes
S1_49	The time I have spent forming groups and meeting group members has been time well spent as I have learned from the group interactions.	Overall_Course_Forming_Groups	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Social Presence - Group Interaction and Participation	Community of Inquiry	Yes

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
S1_50	Working in teams has benefited my learning because I am able to see various viewpoints and add my knowledge to others.	Overall_Course_Viewpoints	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Social Cognitive Learning with Peers	Community of Inquiry	Yes
S1_51	The Learning Management System (Canvas) setup used in this course provides clear structure and guidelines, which help reduce barriers between me and the course content.	Overall_Course_LMS_Structure	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Learning Engagement and Transfer	Community of Inquiry	Yes
S1_52	The ability to communicate directly with my instructor and GTAs through the online tools (like Canvas or Zoom) makes me feel more connected to the course.	Overall_Course_Connection_to_Instructor	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Learning Engagement and Transfer	Community of Inquiry	Yes
S1_53	I feel empowered to direct my own learning process in this online course due to the technology and course structure.	Overall_Course_Empowerment	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Learner Autonomy	Community of Inquiry	Yes
S1_54	Getting to know other course participants through collaborative assignments gave me a sense of belonging in the course.	Overall_Course_SOB	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Social Presence - Affective and Relational Connection	Community of Inquiry	Yes
S1_55	I felt comfortable interacting with other	Overall_Course_Group_Comfort	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Social Presence - Affective	Community of Inquiry	Yes

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
	course participants during group activities.			and Relational Connection		
S1_56	I felt motivated to explore content-related questions.	Overall_Course_Motivation	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Social Cognitive Learning with Peers	Community of Inquiry	Yes
S1_57	Engaging with the course content and the group assignments helped me understand fundamental concepts in this class and increase my performance on assignments.	Overall_Course_Groups_Performance	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Academic Performance (Self-report)	Community of Inquiry	No
S1_58	The course structure makes it easy for me to stay on track and manage my learning.	Overall_Course_Structure_Managing_Learning	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Academic Performance (Self-report)	Theory of Transactional Distance	No
S1_59	Course activities piqued my curiosity.	Overall_Course_Curiosity	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Learning Engagement and Transfer	Community of Inquiry	Yes
S1_60	I can apply the knowledge created in this course to my work or other non-class-related activities.	Overall_Course_Knowledge_Transfer	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Learning Engagement and Transfer	Community of Inquiry	Yes

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
S1_61	How does real-time collaboration tools (e.g., shared documents, live editing) affect your group's ability to work together efficiently?	Concurrent_Update_Tools_Collaboration				
S1_62	How do you feel that course activities and group assignments have impacted your ability to apply knowledge in real-world contexts?	Knowledge_Real_World_Context				
S1_63	If you could change or improve one feature of the technology used in your online group work, what would it be and why?	Technology_Improvement				
S1_64	How does your group typically choose a leader or assign roles when using online tools? What challenges, if any, do you encounter?	Group_Roles_Challenges				
S1_65	What challenges, if any, have you encountered when using technology for group work? How did you overcome them?	Technology_Challenges				
S1_66	When using the software to complete your assignment, what was the most useful feature of the technology you used (Excel or Google	Technology_Features				

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
	Sheets) to complete this group assignment?					
S2_01	Are you 18 years of age or older?	Adult	1=Yes, 2=No			
S2_02	Your assigned modality for lab in this course is:	Modality_Assigned	2=Synchronous, 3=Asynchronous			
S2_03	For this assignment, I participated in a group that met	Group_Modality_Reality	1=In person (face-to-face), 2= Online Synchronous (at scheduled class time), 3=Online asynchronous (but met at a time of our choosing either face-to-face or online), 4=Online asynchronous (never met in a live environment either online or face-to-face)			
S2_04	Which software package did your group use to complete this assignment?	Software	1=Google Sheets, 2=Excel			
S2_05	Did you know any of the other members of your group prior to working together on this assignment? If yes, please choose the answer that most closely describes the way you know the other members of your group	Prior_Acquaintance	1=No, I did not know any of my other group members before the assignment, 2=Yes, I knew ONE of my group members from social interactions, 3=Yes, I knew ONE of my group members from working together in another group assignment, 4=Yes, I knew MORE THAN ONE of my group members either socially or from other group assignments.			
S2_06	Using Lucid Chart improved my ability to collaborate with peers for this assignment.	Improved_Collaboration_LC	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Concurrent	Contextual; Community of Inquiry	Yes

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
				Update; Cognitive Presence - Tool Enabled Collaboration and Learning - Concurrent Update		
S2_07	Using Lucid Chart for this assignment allowed me to establish personal connections with the members of my team.	Personal_Connection_LC	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Concurrent Update	Contextual	Yes
S2_08	Using Lucid Chart for this group assignment would have allowed me to collaborate effectively with my group even in a different modality from mine (asynchronous, synchronous or in person).	Effective_Collab_All_Modalities_LC	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Tool Enabled Collaboration and Learning - Concurrent Update	Community of Inquiry	Yes
S2_09	Lucid Chart was well-suited to supporting asynchronous collaboration, where team members work independently at different times and/or places.	Suited_Asynchronous_LC	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Structure - Concurrent Update Tools	Theory of Transactional Distance	Yes

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
S2_10	Using Lucid Chart made an impact on my learning because I was able to see others contributions in real time and respond with my thoughts and contributions efficiently.	Concurrent_Update_Learning_Impact_LC	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Concurrent Update	Contextual	Yes
S2_11	Even though Lucid Chart allowed us to contribute at the same time to the assignment, my group still did most of the assignment without direct interaction or communication.	No_Interaction_LC	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Concurrent Update	Theory of Transactional Distance	No
S2_12	Using Lucid Chart improved our overall performance on the assignment.	Improved_Performance_LC	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Concurrent Update; Cognitive Presence - Tool Enabled Collaboration and Learning - Concurrent Update	Contextual; Community of Inquiry	Yes
S2_13	Using Lucid Chart made a difference in the group participation and interactivity.	Group_Participation_LC	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Concurrent Update	Contextual	Yes

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
S2_14	Using Lucid Chart helped me to learn more from this assignment than if I had used another software that did not have live updating.	Enhanced_Learning_Comparison_of_Tools_LC	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Tool Enabled Collaboration and Learning - Concurrent Update	Theory of Transactional Distance	No
S2_15	The main communication tool that my group used to talk to each other outside of class for this assignment was	Communication_Tool_LC	1=Cell phones (texting), 2=Cell phones (calling), 3=Messaging app (GroupMe, WhatsApp, etc.), 6=Canvase Group Homepage, 7=Other, 8=My group did not communicate outside of class, 10=Google Sheets, 11=Video Conferencing Technology (Zoom, Teams, etc.), 4=Email, 5=Canvas Messaging			
S2_16	The communication tools we used help build trust and cohesion within our group.	Other_Communication_Tools_Trust_LC	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Concurrent Update	Contextual	Yes
S2_17	The communication tools we chose are well-suited to supporting our collaboration, even when team members work independently at different times and/or places.	Other_Communication_Supports_Asynchronous_LC	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Structure - Concurrent Update Tools	Theory of Transactional Distance	Yes

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
S2_18	Using Word to complete the assignment improved my ability to collaborate with peers.	Improved_Collaboration_MW	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Standard; Cognitive Presence - Tool Enabled Collaboration and Learning - Standard	Contextual; Community of Inquiry	Yes
S2_19	Using Word for this assignment allowed me to establish personal connections with the members of my team.	Personal_Connection_MW	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Standard	Contextual	Yes
S2_20	Using Word for this group assignment would have allowed me to collaborate effectively with my group even in a different modality from mine (asynchronous, synchronous or in person).	Effective_Collab_All_Modalities_MW	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Tool Enabled Collaboration and Learning - Standard	Community of Inquiry	Yes
S2_21	Word was well-suited to supporting asynchronous collaboration, where team members work independently at different times and/or places.	Suited_Asynchronous_MW	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Structure - Standard Tools	Theory of Transactional Distance	Yes

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
S2_22	Using Word made an impact on my learning because I was able to see others contributions of others and respond with my thoughts and contributions efficiently.	Concurrent_Update_Learning_Impact_MW	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Standard	Contextual	Yes
S2_23	Even though the assignment focused on collaboration, my group still did most of the assignment without direct interaction or communication.	No_Interaction_MW	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Standard	Theory of Transactional Distance	No
S2_24	The features of Word improved our overall performance on the assignment.	Improved_Performance_MW	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Standard; Cognitive Presence - Tool Enabled Collaboration and Learning - Standard	Contextual; Community of Inquiry	Yes
S2_25	The features of Word made a difference in the group participation and interactivity.	Group_Participation_MW	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Standard	Contextual	Yes
S2_26	Using Lucid Chart would have helped me to learn more from this assignment	Enhanced_Learning_Comparison_of_Tools_MW	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Tool Enabled	Theory of Transactional Distance	No

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
	than using Word that did not have live updating.			Learning Perception		
S2_27	The main communication tool that my group used to talk to each other outside of class for this assignment was	Communication_Tool_MW	1=Cell phones (texting), 2=Cell phones (calling), 3=Messaging app (GroupMe, WhatsApp, etc.), 6=Canvase Group Homepage, 7=Other, 8=My group did not communicate outside of class, 10=Google Sheets, 11=Video Conferencing Technology (Zoom, Teams, etc.), 4=Email, 5=Canvas Messaging	Real Time Collaboration Tools	Contextual	
S2_28	The communication tools we used help build trust and cohesion within our group.	Other_Communication_Tools_Trust_MW	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Real-Time Collaboration Tools Standard	Contextual	Yes
S2_29	The communication tools we chose are well-suited to supporting our collaboration, even when team members work independently at different times and/or places.	Other_Communication_Supports_Asynchronous_MW	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Structure - Standard Tools	Theory of Transactional Distance	Yes
S2_30	Finding my role within group assignments has been easy.	Overall_Course_Groups_Role	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Structure - overall	Theory of Transactional Distance	Yes
S2_31	Overall, group leaders struggle to coordinate our work using online tools and communication platforms (Group Chat, email, Canvas, etc.).	Overall_Course_Groups_Leader_Struggle_Reverse_Coded	1=Strongly Agree (reversed), 2=Agree, 3=Neutral, 4=Disagree, 5=Stongly Disagree	Cognitive Presence - Group Functioning and Conflict Resolution	Community of Inquiry	Yes

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
S2_32	The course encourages group members to take responsibility for their work within the team.	Overall_Course_Groups_Responsibility	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence; Structure - overall	Community of Inquiry: Theory of Transactional Distance	Yes
S2_33	The technologies we use for group work contributed to misunderstandings or conflicts within the group.	Overall_Course_Groups_Tech_Conflict_Reverse	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Group Functioning and Conflict Resolution	Community of Inquiry	Yes
S2_34	The technologies for group work used allowed me to establish personal connections with the members of my team.	Overall_Course_Groups_Tech_Connection	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Social Presence - Affective and Relational Connection	Social Presence Theory	Yes
S2_35	My group members have given me support, help, and encouragement at times when it was necessary.	Overall_Course_Groups_Support	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Social Presence - Affective and Relational Connection	Community of Inquiry	Yes
S2_36	I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.	Overall_Course_Groups_Trust	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Social Presence - Group Interaction and Participation	Community of Inquiry	Yes

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
S2_37	The design of the course and the group activity guidelines have allowed us to work as a team more effectively.	Overall_Course_Guidelines_Team_Effectiveness	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Structure - overall	Theory of Transactional Distance	Yes
S2_38	The use of technology in our group work ensures that communication is clear and reduces the chance of miscommunication.	Overall_Course_Groups_Tech_Communication	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Structure - overall	Theory of Transactional Distance	Yes
S2_39	Technology helps our group reach consensus more effectively during decision-making processes.	Overall_Course_Groups_Consensus	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Group Functioning and Conflict Resolution	Community of Inquiry	Yes
S2_40	Technology helps ensure that everyone's voice is heard in group discussions and activities.	Overall_Course_Groups_Tech_Discussion	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Social Presence - Group Interaction and Participation	Social Presence Theory	Yes
S2_41	The technology we use in group work makes it harder to resolve conflicts or disagreements.	Overall_Course_Groups_Tech_Resolve_Conflict_Reverse_Coded	1=Strongly Agree (reversed), 2=Agree, 3=Neutral, 4=Disagree, 5=Stongly Disagree	Cognitive Presence - Group Functioning and Conflict Resolution	Community of Inquiry	Yes

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
S2_42	The online tools we use hinder the group's ability to reach consensus during decision-making.	Overall_Course_Groups_Consensus_Reverse_Coded	1=Strongly Agree (reversed), 2=Agree, 3=Neutral, 4=Disagree, 5=Stongly Disagree	Cognitive Presence - Group Functioning and Conflict Resolution	Community of Inquiry	Yes
S2_43	I felt that my point of view was acknowledged by other members of my groups.	Overall_Course_Groups_POV	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Social Presence - Group Interaction and Participation	Social Presence Theory	Yes
S2_44	Participating in the group assignments was valuable in helping me appreciate different perspectives.	Overall_Course_Groups_Perspective	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Social Cognitive Learning with Peers	Community of Inquiry	Yes
S2_45	Teamwork has contributed to making me feel more involved in studying the subject.	Overall_Course_Groups_Involvement	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Social Presence - Group Interaction and Participation	Community of Inquiry	Yes
S2_46	I have learned more interacting with my teammates than when I work alone.	Overall_Course_Groups_Interaction	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Social Cognitive Learning with Peers	Community of Inquiry	Yes

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
S2_47	Interacting with my teammates, I have improved the grades I would have obtained working individually on the task.	Overall_Course_Groups_Improved_Grades	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Academic Performance (Self-report)	Social Presence Theory	No
S2_48	The online tools (e.g., group homepages, shared documents, breakout rooms) help us clearly assign roles and responsibilities	Overall_Course_Groups_Tools_Roles	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Structure - overall	Theory of Transactional Distance	Yes
S2_49	The time I have spent forming groups and meeting group members has been time well spent as I have learned from the group interactions.	Overall_Course_Forming_Groups	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Social Presence - Group Interaction and Participation	Community of Inquiry	Yes
S2_50	Working in teams has benefited my learning because I am able to see various viewpoints and add my knowledge to others.	Overall_Course_Viewpoints	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Social Cognitive Learning with Peers	Community of Inquiry	Yes
S2_51	The Learning Management System (Canvas) setup used in this course provides clear structure and guidelines, which help reduce barriers between me and the course content.	Overall_Course_LMS_Structure	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Learning Engagement and Transfer	Community of Inquiry	Yes

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
S2_52	The ability to communicate directly with my instructor and GTAs through the online tools (like Canvas or Zoom) makes me feel more connected to the course.	Overall_Course_Connection_to_Instructor	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Learning Engagement and Transfer	Community of Inquiry	Yes
S2_53	I feel empowered to direct my own learning process in this online course due to the technology and course structure.	Overall_Course_Empowerment	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Learner Autonomy	Community of Inquiry	Yes
S2_54	Getting to know other course participants through collaborative assignments gave me a sense of belonging in the course.	Overall_Course_SOB	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Social Presence - Affective and Relational Connection	Community of Inquiry	Yes
S2_55	I felt comfortable interacting with other course participants during group activities.	Overall_Course_Group_Comfort	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Social Presence - Affective and Relational Connection	Community of Inquiry	Yes
S2_56	I felt motivated to explore content-related questions.	Overall_Course_Motivation	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Social Cognitive Learning with Peers	Community of Inquiry	Yes
S2_57	Engaging with the course content and the group assignments helped me understand fundamental	Overall_Course_Groups_Performance	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Academic Performance (Self-report)	Community of Inquiry	No

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
	concepts in this class and increase my performance on assignments.					
S2_58	The course structure makes it easy for me to stay on track and manage my learning.	Overall_Course_Structure_Managing_Learning	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Academic Performance (Self-report)	Theory of Transactional Distance	No
S2_59	Course activities piqued my curiosity.	Overall_Course_Curiosity	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Learning Engagement and Transfer	Community of Inquiry	Yes
S2_60	I can apply the knowledge created in this course to my work or other non-class-related activities.	Overall_Course_Knowledge_Transfer	1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree	Cognitive Presence - Learning Engagement and Transfer	Community of Inquiry	Yes
S2_61	How does real-time collaboration tools (e.g., shared documents, live editing) affect your group's ability to work together efficiently?	Concurrent_Update_Tools_Collaboration				
S2_62	How do you feel that course activities and group assignments have impacted your ability to apply knowledge in real-world contexts?	Knowledge_Real_World_Context				
S2_63	If you could change or improve one feature of the	Technology_Improvement				

Q#	Question Full Text	Variable	Value Labels	Construct	Theory	Composite?
	technology used in your online group work, what would it be and why?					
S2_64	How does your group typically choose a leader or assign roles when using online tools? What challenges, if any, do you encounter?	Group_Roles_Challenges				
S2_65	What challenges, if any, have you encountered when using technology for group work? How did you overcome them?	Technology_Challenges				
S2_66	When using the software to complete your assignment, what was the most useful feature of the technology you used (Microsoft Word or Lucid Chart) to complete this group assignment?	Technology_Features				

Appendix K

Summary of Composite Variables and Reliability Testing

This appendix presents a summary of all composite variables used in the dissertation analysis, including the items included in each construct, reliability testing results for both Survey 1 (S1) and Survey 2 (S2), and justification for item inclusion or removal. The reliability tests were conducted using Cronbach's alpha, and variables were refined to ensure appropriate internal consistency before being used in the final analysis. Items removed or added are also detailed, along with the final constructs used for each composite variable.

Table K1:

Summary of Composite Variables and Reliability Testing

Construct	Items Included Original	S1 Original Alpha / Final Alpha	S2 Original Alpha / Final Alpha	Items Added / [Items Removed]	Final Construct Variables	Justification
Academic Performance (Self-report)	S1_47 & S2_47 S1_57 & S2_57 S1_58 & S2_58	0.573 / n/a	0.587 / n/a	[S1_47 & S2_47] [S1_57 & S2_57] [S1_58 & S2_58]	Removed as a composite variable. These questions will be analyzed individually.	The Academic Performance (Self-report) composite was removed from analysis due to insufficient internal consistency across both surveys. Even after removing the lowest-performing item (S1_58/S2_58), Cronbach's alpha remained below the commonly accepted threshold for reliability, with α = .600 in S1 and α = .659 in S2. In addition, the retained

Construct	Items Included Original	S1 Original Alpha / Final Alpha	S2 Original Alpha / Final Alpha	Items Added / [Items Removed]	Final Construct Variables	Justification
						items measured distinct aspects of academic performance, such as perceived grade improvement and concept mastery, rather than representing a single, unified construct. For these reasons, the two strongest items were retained and analyzed independently in order to more accurately reflect the specific learning outcomes associated with group-based coursew
Cognitive Presence - Group Functioning and Conflict Resolution	S1_31 & S2_31 S1_32 & S2_32 S1_39 & S2_39 S1_41 & S2_41 S1_42 & S2_42	0.716 / 0.755	0.67 / 0.696	[S1_32 & S2_32] S1_33 & S2_33	S1_31 & S2_31 S1_33 & S2_33 S1_39 & S2_39 S1_41 & S2_41 S1_42 & S2_42	The item "The course encourages group members to take responsibility for their work within the team" (S1_32/S2_32) was removed from the Cognitive Presence – Group Functioning and Conflict Resolution construct due to consistently low corrected item-total correlations in both Survey 1 (S1 = .336) and Survey 2 (S2 = .223), which fall below the accepted threshold of .40. In addition, Cronbach's alpha remained unchanged in Survey 1 (α = .716) and increased in Survey 2 (α = .696) when the item was removed, indicating that it did not contribute to internal consistency across datasets.

Construct	Items Included Original	S1 Original Alpha / Final Alpha	S2 Original Alpha / Final Alpha	Items Added / [Items Removed]	Final Construct Variables	Justification
						Conceptually, the item focused more on course design and accountability norms than on the group's conflict resolution or decision-making processes, making it a weaker fit for this construct. Although this Responsibility item was removed from the Cognitive Presence – Group Functioning and Conflict Resolution construct due to low statistical alignment, it conceptually aligns more closely with the Structure construct. The item emphasizes role clarity and structural guidance rather than interpersonal or emotional dimensions. It complements Structure items such as S1_30 (“finding my role is easy”) and S1_48 (“tools help assign roles and responsibilities”). The item “The technologies we use for group work contributed to misunderstandings or conflicts within the group” (S1_33/S2_33) was added to the Cognitive Presence – Group Functioning and Conflict Resolution

Construct	Items Included Original	S1 Original Alpha / Final Alpha	S2 Original Alpha / Final Alpha	Items Added / [Items Removed]	Final Construct Variables	Justification
						construct based on strong conceptual alignment and improved internal consistency. This item directly addresses the role of technology in shaping group misunderstandings, which is central to conflict resolution and group dynamics. Its inclusion increased Cronbach's alpha from .716 to .755 in Survey 1 and from .696 to .736 in Survey 2, supporting its statistical and conceptual fit within the construct.
Cognitive Presence - Learning Engagement and Transfer	S1_51 & S2_51 S1_52 & S2_52 S1_59 & S2_59 S1_60 & S2_60	0.7 / 0.766	0.691 / 0.758	S1_53 & S2_53	S1_51 & S2_51 S1_52 & S2_52 S1_53 & S2_53 S1_59 & S2_59 S1_60 & S2_60	The item "I feel empowered to direct my own learning process in this online course due to the technology and course structure" (S1_53/S2_53) was added to the Cognitive Presence – Learning Engagement and Transfer construct based on both conceptual relevance and statistical support. The item reflects learner agency and autonomy, which are foundational elements of cognitive presence, particularly in relation to meaningful engagement and the transfer of knowledge. Statistically, the addition of this item improved internal consistency in both survey

Construct	Items Included Original	S1 Original Alpha / Final Alpha	S2 Original Alpha / Final Alpha	Items Added / [Items Removed]	Final Construct Variables	Justification
						administrations. In Survey 1, Cronbach's alpha increased from .700 to .766, and in Survey 2, from .691 to .758. The item showed strong corrected item-total correlations across both datasets (.600 in S1 and .589 in S2), indicating a solid contribution to the overall construct. These improvements support the inclusion of this item as a reliable and conceptually aligned measure of learning engagement and transfer in the online course context.
Cognitive Presence - Social Cognitive Learning with Peers	S1_44 & S2_44 S1_46 & S2_46 S1_50 & S2_50 S1_56 & S2_56	0.868 / 0.868	0.817 / 0.817		S1_44 & S2_44 S1_46 & S2_46 S1_50 & S2_50 S1_56 & S2_56	Acceptable reliability for exploratory research. All items verified to match created construct. All items retained for analysis in the composite.
Cognitive Presence - Tool Enabled Collaboration and Learning - Concurrent Update	S1_06 & S2_06 S1_08 & S2_08 S1_12 & S2_12 S1_14 & S2_14	0.742 / 0.788	0.807 / 0.798		S1_06 & S2_06 S1_08 & S2_08 S1_12 & S2_12	Although all four items initially met the .40 item-total correlation threshold and demonstrated acceptable internal consistency (α = .788 for Session 1 and α = .798 for Session 2), Item S1_14 was removed from the final composite. This decision was based on analytical

Construct	Items Included Original	S1 Original Alpha / Final Alpha	S2 Original Alpha / Final Alpha	Items Added / [Items Removed]	Final Construct Variables	Justification
						considerations rather than psychometric concerns. Specifically, S1_14 was needed for direct comparison with its counterpart from the standard-tool condition, and including it in the composite would have precluded this analysis. As a result, the item was excluded to permit independent-samples t-testing, ensuring consistency across comparative analyses of tool-specific effects.
Cognitive Presence - Tool Enabled Collaboration and Learning - Standard	S1_18 & S2_18 S1_20 & S2_20 S1_24 & S2_24 S1_26 & S2_26	0.424 / 0.843	0.615 / 0.883	[S1_26 & S2_26]	S1_18 & S2_18 S1_20 & S2_20 S1_24 & S2_24	The item "Using Google Sheets would have helped me to learn more from this assignment than using Excel that did not have live updating" (S1_26/S2_26) was removed from the Cognitive Presence – Tool Enabled Collaboration and Learning – Standard construct due to poor alignment with the other items. In both datasets, this item demonstrated a negative corrected item-total correlation (S1 = –.296; S2 = –.258), suggesting it did not measure the same underlying construct. Additionally, Cronbach's alpha for the composite increased substantially

Construct	Items Included Original	S1 Original Alpha / Final Alpha	S2 Original Alpha / Final Alpha	Items Added / [Items Removed]	Final Construct Variables	Justification
						when this item was removed (S1 α = .843; S2 α = .883), supporting the decision to exclude it. Conceptually, this item was comparative in nature and emphasized the superiority of a different tool rather than directly assessing how Excel supported collaborative learning, making it a weak conceptual fit.
Real-Time Collaboration Tools Concurrent Update	S1_06 & S2_06 S1_07 & S2_07 S1_10 & S2_10 S1_11 & S2_11 S1_12 & S2_12 S1_13 & S2_13 S1_16 & S2_16	0.674 / 0.814	0.701 / 0.816	[S1_11 & S2_11]	S1_06 & S2_06 S1_07 & S2_07 S1_10 & S2_10 S1_12 & S2_12 S1_13 & S2_13 S1_16 & S2_16	The item "Using Google Sheets (Lucid Chart) for this assignment did not require any interaction with my group members" (S1_11/S2_11) was removed from the Real-Time Collaboration Tools – Concurrent Update composite due to poor statistical and conceptual alignment. In both datasets, this item demonstrated negative corrected item-total correlations (S1 = –.144; S2 = –.063), indicating it was inconsistent with the rest of the construct. Removing this item increased Cronbach's alpha from .674 to .814 in S1 and from .701 to .816 in S2, suggesting stronger internal consistency without it. The negatively worded structure and

Construct	Items Included Original	S1 Original Alpha / Final Alpha	S2 Original Alpha / Final Alpha	Items Added / [Items Removed]	Final Construct Variables	Justification
						focus on a lack of interaction contrasted with the composite's emphasis on collaboration, performance, and group connection. Therefore, the item was excluded from the final construct.
Real-Time Collaboration Tools Standard	S1_18 & S2_18 S1_19 & S2_19 S1_22 & S2_22 S1_23 & S2_23 S1_24 & S2_24 S1_25 & S2_25 S1_28 & S2_28	0.78 / 0.83	0.851 / 0.881	[S1_23 & S2_23]	S1_18 & S2_18 S1_19 & S2_19 S1_22 & S2_22 S1_24 & S2_24 S1_25 & S2_25 S1_28 & S2_28	The item "Even though the assignment focused on collaboration, my group still did most of the assignment without direct interaction or communication" (S1_23/S2_23) was removed from the Real-Time Collaboration Tools – Standard construct due to consistently weak alignment with the composite. Corrected item-total correlations were low in both sessions (S1 = .131; S2 = .254), and the composite's reliability improved when the item was excluded (S1 α = .830 if deleted; S2 α = .881 if deleted). Conceptually, the item measured absence of interaction rather than perceived benefits of collaboration tools, making it a poor fit for the intended construct.
Social Presence -	D_22	0.783 / 0.801	0.76 / 0.778	[D_22]	S1_34 & S2_34	D22 was removed due to low corrected item-total correlations in

Construct	Items Included Original	S1 Original Alpha / Final Alpha	S2 Original Alpha / Final Alpha	Items Added / [Items Removed]	Final Construct Variables	Justification
Affective and Relational Connection	S1_34 & S2_34 S1_35 & S2_35 S1_54 & S2_54 S1_55 & S2_55				S1_35 & S2_35 S1_54 & S2_54 S1_55 & S2_55	both S1 (.378) and S2 (.353), and higher Cronbach's alpha values when deleted (.801 and .778, respectively). The item measures general comfort with group work rather than affective or relational connection, and thus misaligns with the construct.
Social Presence - Group Interaction and Participation	S1_36 & S2_36 S1_40 & S2_40 S1_43 & S2_43 S1_45 & S2_45 S1_49 & S2_49	0.747 / 0.747	0.79 / 0.79		S1_36 & S2_36 S1_40 & S2_40 S1_43 & S2_43 S1_45 & S2_45 S1_49 & S2_49	Acceptable reliability for exploratory research. All items verified to match created construct. All items retained for analysis in the composite.
Structure - Concurrent Update Tools & Overall	S1_09 & S2_09 S1_17& S2_17 S1_30 & S2_30 S1_32 & S2_32 S1_33 & S2_33 S1_37 & S2_37	0.786 / 0.793	0.749 / 0.793	[S1_33 & S2_33]	S1_09 & S2_09 S1_17& S2_17 S1_30 & S2_30 S1_32 & S2_32 S1_37 & S2_37 S1_38 & S2_38	The item "The technologies we use for group work contributed to misunderstandings or conflicts within the group" (S1_33/S2_33) was removed from the Structure construct due to its poor statistical performance and weak conceptual alignment. In both sessions, this reverse-coded item showed the lowest corrected item-total correlations among the group (S1 = .334; S2 = .186), and

Construct	Items Included Original	S1 Original Alpha / Final Alpha	S2 Original Alpha / Final Alpha	Items Added / [Items Removed]	Final Construct Variables	Justification
	S1_38 & S2_38 S1_48 & S2_48				S1_48 & S2_48	Cronbach's alpha for the Structure composite increased when the item was excluded (S1 α increased from .786 to .793; S2 α increased from .749 to .793). These findings indicate that the item did not contribute meaningfully to internal consistency. Conceptually, the item focuses more on interpersonal conflict within groups rather than on structural clarity, course design, or role assignment. Because of this, it was reassigned to the Cognitive Presence – Group Functioning and Conflict Resolution construct, where it aligns more directly with the construct's emphasis on group processes, decision-making, and the resolution of misunderstandings.
Structure - Standard Tools & Overall	S1_21 & S2_21 S1_29 & S2_29 S1_30 & S2_30 S1_32 & S2_32 S1_33 & S2_33	0.786 / 0.793	0.793 / 0.818	[S1_33 & S2_33]	S1_21 & S2_21 S1_29 & S2_29 S1_30 & S2_30 S1_32 & S2_32 S1_37 & S2_37	The item "The technologies we use for group work contributed to misunderstandings or conflicts within the group" (S1_33/S2_33) was removed from the Structure – Standard Tools construct due to poor conceptual alignment and low item-total correlations. Although Cronbach's alpha remained within

Construct	Items Included Original	S1 Original Alpha / Final Alpha	S2 Original Alpha / Final Alpha	Items Added / [Items Removed]	Final Construct Variables	Justification
	S1_37 & S2_37 S1_38 & S2_38 S1_48 & S2_48				S1_38 & S2_38 S1_48 & S2_48	acceptable levels with the item included (S1 α = .786; S2 α = .793), the corrected item-total correlations for this item were below the recommended .40 threshold in both surveys (S1 = .334; S2 = .220). Additionally, Cronbach's alpha increased when the item was excluded (S1 α = .793; S2 α = .818), indicating improved internal consistency. Conceptually, the item focuses on group conflict and miscommunication, which aligns better with the Cognitive Presence – Group Functioning and Conflict Resolution construct than with Structure. The Structure construct is intended to reflect role clarity, group organization, and tool-enabled coordination, whereas this item measures breakdowns in group interaction. Therefore, the item was removed from the Structure composite and reassigned accordingly.

Appendix L – IRB Approval Letters



February 17, 2025

Enilda Jannet Romero-Hall,
UTK - Coll of Education, Hlth, & Human - Theory & Prac-Teacher Ed

Re: UTK IRB-25-08690-XP
Study Title: Collaborative Online Learning Mediated Through Concurrent Update Technology in Asynchronous and Synchronous Courses

Dear Enilda Jannet Romero-Hall:

The UTK Institutional Review Board (IRB) reviewed your application for the above referenced project. It determined that your application is eligible for expedited review under 45 CFR 46.110(b)(1), categories (5) , (6), and (7). The IRB has reviewed these materials and determined that they do comply with proper consideration for the rights and welfare of human subjects and the regulatory requirements for the protection of human subjects.

Therefore, this letter constitutes full approval by the IRB of your application (Version 1.1) as submitted, including:

Documents Stamped:

- Main Consent Form (English) - (Version 2.0)
- Canvas Announcement 3 - (Version 1.0)
- Canvas Announcement 2 - (Version 1.0)
- Canvas Announcement 1 - (Version 1.0)
- Appendix G_Demographics Survey - (Version 2.0)
- Small Group Collaboration Survey 2 - (Version 1.0)
- Small Group Collaboration Survey 1 - (Version 1.0)

That have been dated and stamped IRB approved. You are approved to enroll a maximum of 1300 participants. Approval of this study will be valid from 02/17/2025to 02/16/2028.

Any revisions in the approved application, consent forms, instruments, recruitment materials, etc., must also be submitted to and approved by the IRB prior to implementation. In addition, you are responsible for reporting any unanticipated serious adverse events or other problems involving risks to subjects or others in the manner required by the local IRB policy.

Finally, re-approval of your project is required by the IRB in accord with the conditions specified above. You may

not continue the research study beyond the time or other limits specified unless you obtain prior written approval of the IRB.

Sincerely,



Lora Beebe, Ph.D., PMHNP-BC, FAAN
Chair

THE UNIVERSITY OF TENNESSEE KNOXVILLE

February 19, 2025

Enilda Jannet Romero-Hall,
UTK - Coll of Education, Hlth, & Human - Theory & Prac-Teacher Ed

Re: UTK IRB-25-08690-XP
Study Title: Collaborative Online Learning Mediated Through Concurrent Update Technology in Asynchronous and Synchronous Courses

Dear Enilda Jannet Romero-Hall:

The UTK Institutional Review Board (IRB) reviewed your application for **revision** of your previously approved project, referenced above.

The IRB determined that your application is eligible for **expedited** review under 45 CFR 46.110(b)(2). The following revisions were approved as complying with proper consideration of the rights and welfare of human subjects and the regulatory requirements for the protection of human subjects:

Amendment revises survey to replace Microsoft Visio with Microsoft Word.

Documents Stamped:
- *Small Group Collaboration Survey 2 - Updated*, version 1.0 (version date 2/19/2025)

Documents Voided:
- *Small Group Collaboration Survey 2*, version 1.0 (version date 2/10/2025)

Any additional revisions in the approved application, consent forms, instruments, recruitment materials, etc., must be submitted to and approved by the IRB prior to implementation. In addition, you are responsible for reporting any unanticipated serious adverse events or other problems involving risks to subjects or others in the manner required by the local IRB policy.

Sincerely,

Lora Beebe, Ph.D., PMHNP-BC, FAAN
Chair

Appendix M

Survey Items that Appear in Multiple Constructs and Composite Variables

This appendix provides a detailed mapping of survey items that were used in multiple constructs across the instruments deployed in this dissertation. Some items contributed to more than one composite variable or were analyzed both individually and as part of a broader construct. This mapping supports transparency in construct development and aids in the interpretation of overlapping variable usage.

Table M1:

Survey Items that Appear in Multiple Constructs and Composite Variables

Survey Question Number	Full Text	Constructs assigned to	Composite Variables	Stand alone variable analyzed separately	Research Questions
53	I feel empowered to direct my own learning process in this online course due to the technology and course structure.	Cognitive Presence Learner Autonomy	Cognitive Presence - Learning Engagement and Transfer	Yes	RQ2 and RQ3
6	Using Google Sheets (Lucid Chart) improved my ability to collaborate with peers for this assignment.	Cognitive Presence Real Time Collaboration Tools	Cognitive Presence - Tool Enabled Collaboration and Learning - Concurrent Update Real-Time Collaboration Tools Concurrent Update	No	RQ3
12	Using Google Sheets (Lucid Chart) improved our overall performance on the assignment.	Cognitive Presence Real Time Collaboration Tools	Cognitive Presence - Tool Enabled Collaboration and Learning - Concurrent Update Real-Time Collaboration Tools	No	RQ3

Survey Question Number	Full Text	Constructs assigned to	Composite Variables	Stand alone variable analyzed separately	Research Questions
			Concurrent Update		
18	Using Excel (Word) to complete the assignment improved my ability to collaborate with peers.	Cognitive Presence Real Time Collaboration Tools	Cognitive Presence - Tool Enabled Collaboration and Learning - Standard Real-Time Collaboration Tools Standard	No	RQ3
24	The features of Excel (Word) improved our overall performance on the assignment.	Cognitive Presence Real Time Collaboration Tools	Cognitive Presence - Tool Enabled Collaboration and Learning - Standard Real-Time Collaboration Tools Standard	No	RQ3
32	The course encourages group members to take responsibility for their work within the team.	Structure	Structure - Standard Tools Structure - Concurrent Tools	No	RQ3
37	The design of the course and the group activity guidelines have allowed us to work as a team more effectively.	Structure	Structure - Standard Tools Structure - Concurrent Tools	No	RQ3
38	The use of technology in our group work ensures that communication is clear and reduces the	Structure	Structure - Standard Tools Structure -	No	RQ3

Survey Question Number	Full Text	Constructs assigned to	Composite Variables	Stand alone variable analyzed separately	Research Questions
	chance of miscommunication.		Concurrent Tools		
48	The online tools (e.g., group homepages, shared documents, breakout rooms) help us clearly assign roles and responsibilities	Structure	Structure - Standard Tools Structure - Concurrent Tools	No	RQ3

Appendix N – Alternative Assignment Instructions

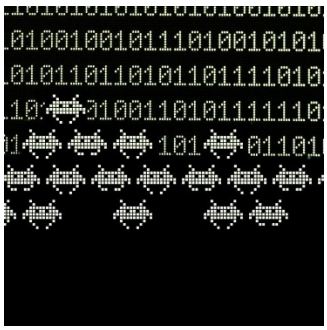
Students who completed all three surveys related to this semester's research will receive 40 points extra credit. Students who did not receive the 40 points when the assignment is posted are eligible to complete the alternative assignment noted below.

Alternative assignment - due by 4/25 at 11:59pm.

This assignment is designed to take the place of the research surveys that were given as an option to complete this semester. It should take the same amount of time as completing the surveys (approximately 1 hour).

Assignment:

Visit the Dark Side of Data playlist created by TED Talks. https://www.ted.com/playlists/130/the_dark_side_of_dataLinks to an external site.



The dark side of data | TED TalksLinks to an external site.

Data can be used for good, harnessed for the betterment of society, but it can also be abused. Find out about some hidden not-so-sunny uses of Big Data.

www.ted.comLinks to an external site.

Watch 4 videos of your choice.

Write a 1-page summary (12 point single spaced font) of what you learned in the talks, how it relates to your life and/or your future career. Please also include in your summary which videos you watched.

Please submit your summary in a word document.

Submissions for this assignment will be checked for the use of AI. The use of AI is not permitted for this alternative assignment.

Failure to complete all parts of the assignment by the due date will result in no credit for the assignment.

Appendix O: Follow-Up ANCOVA Analyses for RQ1-RQ3

Appendix O presents the results of follow-up analyses of covariance (ANCOVAs) conducted for each of the three research questions. These analyses controlled for learners' prior online course experience, self-rated technology proficiency, and reliability of internet access to determine whether significant or marginal effects observed in Chapter 4 remained when accounting for background differences. Each model included the relevant fixed factors of tool type (standard vs. concurrent update) and/or instructional modality (asynchronous vs. synchronous), consistent with the corresponding ANOVA designs. The "Model Factors" column in each table specifies whether the ANCOVA examined tool effects, modality effects, or both.

Table O1:

RQ1: Academic Performance

Dependent Variable	Model Factors	Covariates Controlled	F (df_1, df_2)	p	Partial η^2	Significant?	Direction / Interpretation
Assignment 1 Raw Score	Tool Type × Modality	Prior Online Experience, Tech Proficiency, Internet Reliability	1.73 (1, 230)	.19	.007	No	Tool and Modality effects not significant after controlling for covariates
Assignment 2 Raw Score	Tool Type × Modality	Same as above	3.67 (9, 230)	< .001	.125	Yes (overall model)	Covariate interactions significant: Tech Proficiency (p = .001), Internet Reliability (p = .010)
Assignment 1 Related Test (% Correct)	Tool Type × Modality	Same as above	1.12 (1, 230)	.29	.005	No	No significant adjusted differences

Table O1 Continued

Dependent Variable	Model Factors	Covariates Controlled	F (df_1, df_2)	p	Partial η^2	Significant?	Direction / Interpretation
Assignment 2 Related Test (% Correct)	Tool Type × Modality	Same as above	1.06 (1, 230)	.31	.004	No	No significant adjusted differences
Overall Exam Score (% Correct)	Tool Type × Modality	Same as above	0.97 (1, 230)	.33	.004	No	No significant adjusted differences

Table O2:

RQ2: Learner Perceptions of Academic Performance

Dependent Variable	Model Factors	Covariates Controlled	F (df_1, df_2)	p	Partial η^2	Significant?	Direction / Interpretation
Perceived Empowerment	Tool Type × Modality	Prior Online Experience, Tech Proficiency, Internet Reliability	1.61 (9, 231)	.112	.059	No	Differences not significant after adjustment
Perceived Group Performance	Tool Type × Modality	Same as above	2.50 (9, 231)	.009	.089	Yes (overall model)	Covariate interactions: Online Experience (p = .042), Internet Reliability (p = .019)
Enhanced Learning with Concurrent Update	Tool Type	Same as above	0.61 (3, 119)	.608	.015	No	Tool effect no longer significant after adjustment

Table O3:

RQ3: Collaborative Experience and Perceived Learning Gains

Dependent Variable	Model Factors	Covariates Controlled	F (df_1, df_2)	p	Partial η^2	Significant?	Direction / Interpretation
Cognitive Presence – Group Functioning & Conflict Resolution	Tool Type	Prior Online Experience, Tech Proficiency, Internet Reliability	3.52 (6, 234)	.002	.083	Yes	Concurrent > Standard; remained significant after adjustment
Structure – Managing Learning	Tool Type × Modality	Same as above	3.45 (6, 234)	.003	.081	Yes	Concurrent > Standard; Prior Online Experience significant (p = .037)
Cognitive Presence – Tool Collaboration	Tool Type	Same as above	6.19 (6, 234)	< .001	.137	Yes	Concurrent > Standard; covariates not significant
Real-Time Tools Score	Tool Type	Same as above	6.18 (6, 234)	< .001	.137	Yes	Concurrent > Standard; covariates not significant
Structure – Tool Related	Tool Type	Same as above	3.03 (6, 234)	.007	.072	Yes	Concurrent > Standard; Internet Reliability marginal (p = .061)
Cognitive Presence – Learning Engagement & Transfer	Modality × Tool Type	Same as above	3.44 (6, 234)	.003	.081	Yes	Synchronous > Asynchronous; Modality × Internet Reliability interaction (p = .003)
Cognitive Presence – Social Cognitive Learning with Peers	Modality	Same as above	1.38 (6, 234)	.224	.034	No	Trend toward Synchronous > Asynchronous
Social Presence – Group Interaction & Participation	Modality	Same as above	1.61 (6, 234)	.144	.040	No	Not significant after controlling for covariates

Summary of Appendix O Findings

Overall, the follow-up ANCOVA analyses provided a more nuanced understanding of how learner background characteristics influenced the primary findings reported in Chapter 4. When prior online course experience, technology proficiency, and internet reliability were introduced as covariates, several main effects identified in the original ANOVA and t-test results were attenuated or rendered nonsignificant. For Research Question 1, assignment-level performance differences by tool type and modality were largely explained by technological readiness factors, particularly students' self-rated proficiency and internet reliability. For Research Question 2, perceptions of empowerment, group contribution, and enhanced learning also decreased in magnitude once the same covariates were controlled, suggesting that prior experience and technology confidence may have shaped these self-reported perceptions more strongly than the experimental conditions themselves. In contrast, several of the Research Question 3 composites—most notably Cognitive Presence – Group Functioning and Conflict Resolution, Structure – Managing Learning, and Tool Collaboration—retained statistical significance even after covariate adjustment, indicating that the benefits of concurrent update tools on group coordination and structural clarity persisted beyond individual differences. Taken together, these results emphasize that while learner background characteristics exert a measurable influence on perceived and actual performance, collaborative tool design and synchronous interaction continue to play a critical role in shaping effective and cohesive online learning experiences.