Group 3 Research Plan

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I. Background

A. Introduction

Within fields like Human-Computer Interaction (HCI), collaborative projects help prepare students for challenges that come up in the professional world. Students in DePaul University's HCI graduate program carry out a significant amount of online group work. However, online platforms often lack the interpersonal interactions found in traditional classroom settings, which can hinder the development of a psychologically safe environment necessary for creativity and open communication. This limitation affects students' ability to express innovative ideas or challenge existing ones, thereby impacting the quality of collaborative outcomes. This research aims to explore these challenges and identify data-driven strategies to build rapport, improve trust, and the overall effectiveness in online HCI group projects to enhance educational outcomes.

B. Problem Statement

I am an online HCI grad student at DePaul trying to work effectively with my group but it is difficult to build trust and rapport with my teammates because human connection is more difficult online which makes me feel like I am not psychologically safe enough to be creative and dissent.

C. Literature Review

Preliminary research has been done to better understand the problem space of online group meetings between humans and the impact of AI involvement. The cursory literature review proved fruitful, revealing important insights into factors strengthening groups, the difficulties and frustrations of online group work, and the ways that AI can impact group work.

Our research into positive influences on group work resulted in two key insights regarding soft (interpersonal) skills and trust.

Developing soft skills without prior proficiency can be difficult, but according to Rajabzadeh et al's (2022) research, they can be learned through time. In her

study with undergraduate engineering students, she observed that younger students had a difficult time collaborating amongst each other in group projects compared to older, more experienced ones. The development of these soft skills led older students to take leadership roles and feel more satisfied with their contribution.

The presence of trust is seen to enhance cooperation, coordination and knowledge sharing, as seen in Ok-Kyu Choi and Erin Choi (2019) study. In their study, they surveyed 483 responses from South Korean residents on the impact of autonomy culture and task complexity modulated trust in virtual settings. Their findings were that stronger autonomy and more complex tasks tend to enhance both trust and collaboration.

Our further research into the difficulties of online group work highlighted the effects of digital meetings and the frustrations many students experience in online group settings. Brucks' and Levav's (2022) study on the effects of telework on remote workers concluded with the finding that online meetings did not inhibit the selection of ideas, but did limit the production of creative ideas. Their reasoning is that the computer screen narrows the cognitive scope of the worker. Bakir et al. (2020) study identified four key frustrations of students in group projects and attempted to ameliorate them with online tools. These frustrations were: a lack of understanding of the project's goal, a lack of interaction between teammates, poor team participation, and a lack of initiative. They found that the use of online collaboration tools such as Slack and Google Docs improved communication and accountability.

The majority of our research on the effects of AI on group work resulted in positive and negative findings. Porter and Grippa (2020) studied the positive impact of an AI meeting mediator on group participants. The mediator provided live feedback, demonstrating the dominance of group members in conversations. This feedback had a positive influence on members by allowing them to self-moderate their involvement to create an equally contributing group where members felt more satisfaction in their ability to contribute. Another study showed positive impacts on idea generation (Sahab et al. 2024) and discussion (Webber et al. 2019). However, not all impacts of AI are positive to group work. Researchers warn that powerful AI can actually stifle collaboration (Siemon, 2022; Flathmann et al. 2023). This negative effect can be attributed to human group members relying heavily on AI. Siemon (2022) proposes the solution of creating specified team roles for AI. Giving AI a specific task or role will keep it from dominating/exerting too much influence over the project. Flathmann et al. findings agree with Siemon's, that AI that gradually decreases its influence over time can actually encourage human members to improve their skills.

Conclusion

The insights gathered through our research will inform our research questions and provide guidance for where we should investigate further. We were able to develop preliminary design guidelines for a collaborative AI. These guidelines are as follows:

A collaborative AI…

- Should not be too powerful; otherwise, students will rely too heavily on it.
    - This can hamper the development of soft skills as well as negatively impact collaboration.
- Should have a clearly defined role in the group.
    - This limits the scope of the AI to prevent it from exerting too much influence.
- Should encourage group members to interact through idea discussions and regular communication.
    - Fostering communication can help members build trust, which will have a net positive impact on their work.

II. Objectives

A. Research Questions

1. How do online students build trust and rapport currently for group projects?
2. What are the primary obstacles to building trust and rapport within online HCI graduate student groups?
3. How does limited human connection online impact psychological safety and group creativity?
4. What data-driven solutions already exist in the market that improve trust and collaborative dynamics in virtual settings?

B. Hypothesis

The randomized nature of group project meetings can be overwhelming as students must quickly form and build rapport with each other while making progress towards their project goals in a short span of time. This can increase the likelihood for conflict and stifles collaboration and creativity as team members try to discuss without stepping on toes and hurting their teammates feelings. Adding an AI facilitator to these meetings may help ease rapport building, encourage more productive conversations, and prevent conflict.

III. Recruitment

We will use our personal connections to recruit observation/interview participants by distributing a survey link hosted on Qualtrics. The survey will include screening questions and other demographic questions to collect participant profiles.

A. Participants

Who: Online Design DePaul Students

- Online HCI DePaul Graduate students
- Other online Design students

Amount: 6 participants and 2 groups

- Each interview will consist of two team members.

B. Screening Criteria

- Must be 18 or older
- Must be an online HCI grad student at DePaul University
- For individual interviews:
- Must have participated in group projects in the past 6 month
- Subjects with more recent experience will be prioritized
- For group observations:
- Must currently be participating in a group project
    - ■

C. Screening Survey

Screening Questions

S1. What is your age?
[r1] [Open numeric field] [Terminate if <18]

S2. Are you a graduate student in Masters in Human-Computer Interaction at DePaul?
[r1]Yes
[r2]No [Terminate]

S3. When was the last time you had a group project where you worked with other students you have not met before?
[r1] Less than 3 months ago

[r2] 3 - 6 months ago
[r3] 6 - 12 months ago [Terminate]
[r4] More than 12 months ago [Terminate]
[r5] I don't know/I have not had a group project [Terminate]

S4. Which of the following research are you willing to participate in?
[r1] Remote 1on1 interview (Approx. 45 minutes)
[r2] Remote group work observation and a 1on1 follow-up interview (Approx. 90 minutes. You will be asked to have our research member(s) join your group meeting, and we will ask you questions immediately after the group meeting)
[r3]Neither of the above [Terminate]

Contact Information

S5. What is your name?
[r1][Open Text Field]

S6. What is your email address we can reach out to?
[r1][Open Text Field, Email Validation]

Demographics/Profile Questions

S7. What is your gender?
[r1]Woman
[r2]Man
[r3]Non-binary
[r4]Other
[r5]Rather not answer

S8. How long have you been in the program?
[r1]Less than 6 months
[r2]6 months -1 year
[r3]1 - 2 years
[r4]2 - 3 years
[r5]More than 3 years

S9. How comfortable are you with group projects in your program?
[r1] 1 - Not at all comfortable
[r2] 2 - Not very comfortable
[r3] 3 - Somewhat comfortable
[r4] 4 - Very comfortable

[r5] 5 - Extremely comfortable

IV. Methodology

A. Semi-Structured Interviews

We will conduct semi-structured interviews with 6 participants who are Depaul Human-Computer Interaction graduate students and have taken an online course in the past six months. The interviews will be remote via Zoom and last approximately 1 hour. We will take notes on our observations and questions.

At the start of our interview, we will obtain verbal consent from the participant. We will introduce the purpose of our research and the format of our interview, then ask questions about their experiences, challenges, and opportunities for building rapport and trust while collaborating with their peers remotely. After wrapping interview questions, the participant will have the opportunity to provide additional feedback.

Semi-structured interviews are an appropriate method because they allow for a structured approach to answering key research questions but offer flexibility to dig into complex topics like trust and rapport. Additionally, this open format is conducive to early stages of discovery where the problem is yet defined.

B. Observations and Post-Observation Interviews

We will conduct observations with 2 teams for Depaul Human-Computer Interaction graduate courses during the 2024 Spring quarter. The observations will be remote via the meeting platform utilized by the team being observed and last the duration of the meeting. We will take notes on our observations and ask the team follow-up questions for clarity.

Observation and post-observation interviews will allow us to see the desired behavior in action and give us an idea of the nuances we will need consider while designing a solution.

V. Data Discussion Guide

A. Data Analysis

Interviews will be the primary source of data for this research project. The interviews will be recorded and then transcribed before any analysis is conducted. The transcribed interview responses will be inputted into an airtable. This airtable will allow us to better view and group the data as a whole. We will perform inductive coding on the data collected to organize it into insights and broader themes. These insights and themes will be used to inform future design decisions.

A similar process will be taken for data collected during observations.

B. Data Points

We believe the following data points will be necessary to collect in order to drive an AI-enabled solution. They are separated into categories by their purpose.

Group Dynamic - Indicator of how this specific group of people may work together

- Number of strangers vs acquaintances/friends
- Number of people in group
- Time zones present
- Primary speaker
- Who speaks to whom
- Participation levels
- Discussion response times
- Communication styles

Signs of Tension/Conflict - Indicator of need for mediation

- Number of curse words used
- Percentage of time spoken per member out of the total time of meeting
- Lengths of silence
- Occurrence of conflict words (“I don’t like that”, “That’s stupid”, “I hate this”, etc.)
- Occurrence of “tag questions” (questions that are put at the end of sentences, often to seek approval, hedge when there’s a lack of confidence or challenge)
- Voice decibel (shouting)
- Conversation tone

Team Member Data - Indicators that would help adjust meeting scheduling, and flow

- Member’s daily schedule

- Personal comfortability with the group/project/progress
- Preferences (morning vs. night meetings, cameras on vs off, talk things out, deliberate then discuss, etc)
- Professional background
- Relevant personality traits
- Interests/disinterests

Signs of Rapport - Indicator of need for encouragement, or to stay out of the way

- Laughter
- Words of affirmation
- Continued progress/synergy

C. Interview Guide

Introduction

Hello! I'm [Your Name], and I'm part of a team that's working on understanding the experiences of HCI graduate students when collaborating online for group work. First and foremost, thank you so much for agreeing to participate in this interview. Your insights and experiences are invaluable to our project, and we truly appreciate the time you're taking to help us.

Today's conversation should last about forty-five minutes. We'll discuss various aspects of your experience doing group work online with other students, including the challenges you face, any technologies or services you use, and ideas you might have for improving the overall experience.

I also want to let you know that a few of my teammates are here with me. They're here to listen in and learn but will hold any questions they have until the end of our conversation. This approach helps us keep the discussion flowing and ensures that all focus is on your experiences and thoughts.

Lastly, we'd like to record this interview for reference and to ensure we accurately capture your insights. I assure you that your responses will be kept confidential and used solely for the purpose of improving public transportation accessibility. Do we have your permission to record this conversation?

Any questions before we start?

Great, let’s jump in.

Statement of Consent from the Subject

You have the option to review this document before the study session. Have you had all your questions and concerns answered? If not, please ask me anything else you would like. If all your questions have been answered, do you provide your verbal consent to be in the research? By giving your verbal consent, you indicate to:

- Participate in the research study
- Be recorded during the study

Can I start recording our session?

start recording

Can I reconfirm your consent to participate in this study and to be recorded?

D. Interview Questions

Background

- Could you start by telling us a little bit about yourself?
  - Year in program
  - Location
- How is this program going so far? What's been high or low?

Goals/Motivations

- How do you feel about group projects in your program?
- What experience or skills do you hope to get out of group work?
- What does a successful collaboration look like to you for group work?

Group Work Experience

- User journey/past experience
  - Could you walk me through your most recent experience doing group work online, starting with the initial formation of the group to the completion of the project (or wherever you left off in the project, if it's in-flight). Try and describe steps, how you interacted with team members and tools at each step, and any challenges you faced, and how you addressed them.
- Initial formation/planning
  - How do you ensure that your goals are aligned with those of your team?
  - Can you talk a little about how tasks were distributed among the group.
- Tools
  - What tools did you use for your online group work?
  - Which ones were most/least helpful?
- Team Dynamics (Trust, Comfort, Conflict, Leadership)
  - Comfort
    - Can you talk a little about the correlation between your comfort level with your team and it's impact on your work?
    - How did sharing or challenging ideas impact your experience?
  - Trust
    - Did you feel like you could trust your group members? Why or why not?
  - Conflict

        - Can you tell me about a conflict(s) within an online team meeting?
        - How did you address conflicts with your team members?
    - Leadership
        - Can you share a bit about how/if anyone in the group took the lead and what that was like.
    - Support
        - Can you describe a time when someone on your virtual team offered support to another team member?
    - Ability
        - What skills do you find most important for contributing effectively to online projects?
        - In the past, how have you assessed the ability of your teammates?
    - Integrity
        - What does integrity mean to you when it comes to group work?
        - How does someone acting with integrity make you feel in online group work?
- Productivity
    - When did you feel the most product or creative?
- Reflection
    - What were the highs of the experience?
    - What were the lows of the experience?

Comparing/contrasting

- Have you noticed any differences between in-person and online meetings when it comes to human interaction? If so, can you please explain?
- Do you feel more or less creative or productive in one format vs another?

AI Experience and Expectations

- What is your experience with AI technology?
    - How comfortable are you using these products/tools?
- How would you feel about taking direction from an AI?
- What challenges do you believe AI should solve when it comes to online group meetings?
- What challenges related to online group work do you NOT want AI/machines to solve?

Wrap-Up

- Thank you for participating in this interview! Before we conclude this meeting, is there anything else you'd like to mention?

VI. Ethical Considerations

In this research project, we must be mindful of the following ethical considerations:

- Informed consent: Participants must be fully informed about the purpose, procedures, and their rights as participants, and must give their consent to proceed with the research.
- Confidentiality/Participant Privacy: The privacy of participants must be protected at all times. Their information should be kept confidential and anonymous, using first names or pseudonyms, and access to the data should be limited to research team members only.
- Voluntary participation (opt-in/opt-out): Participation in the research is on a voluntary basis, and participants have the right to opt-out at any time without any consequences.
- Data protection: Information gathered from participants will be anonymized and protected. It will be used solely by the research team for note-taking and research purposes. The content will be stored in a secure Google folder and will be deleted upon completion of the research project.

VII. Timeline

Week	Milestone
5 (5/1 - 5/7)	● Finalize discussion guide/observation protocol ● Start recruitment ● Conduct observations and interviews
6 (5/8 - 5/14)	● Continue observations and interviews ● Analyze the data and synthesize findings ● Create an opportunity deck
7 (5/15 - 5/21)	● Ideate based on research findings ● Create low-fi prototypes
8 (5/22 - 5/28)	● Create mid-fi prototypes
9 (5/29 - 6/4)	● Draft and finalize product design requirements ● Prepare final presentation deck

VIII. References

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