

Human-Computer Interaction

Computer-Mediated Communication

Professor Bilge Mutlu

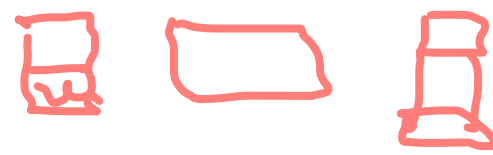
Today's Agenda

Catalina
Toana //

- » Topic overview: CMC
- » Discussion
- » Project ~~Activity~~: *Determining Method*

Topic overview: *CMC*

What is CMC?



Definition: Human communication via computers and includes many different forms of synchronous, asynchronous or real-time interaction that humans have with each other using computers as tools to exchange text, images, audio, and video.¹



¹Webopedia

What are CMC technologies?

- Email
 - Instant messaging
 - Text messaging
 - Social media
 - Hypertext — *blog*
 - Internet forums, newsgroups, bulletin boards, distribution lists
- MOC*
- Online learning
 - Online shopping
 - Phone conversations
 - Videoconferencing
 - Robot-mediated communication

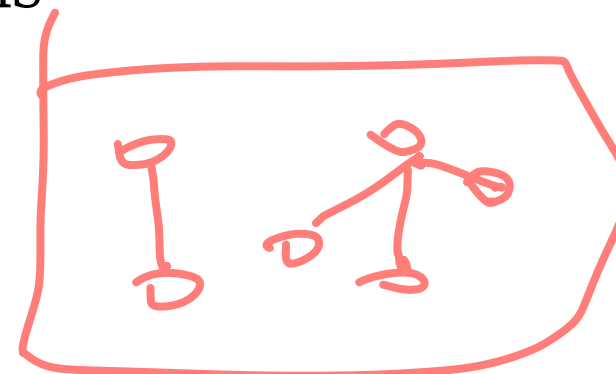
What are some characteristics of CMC technologies?

» Temporal structure of the communication:

- » Synchronous: Face-to-face, videoconferencing
- » Asynchronous: Email, forum discussions
- » Near-synchronous: Instant messaging, text messaging

» Social structure of the communication:

- » One-to-one: Videoconferencing, email
- » One-to-many: Blogs, online learning
- » Many-to-many: Social media, chat rooms



CSCW

TABLE 7.1
Technologies and Their Affordances

Affordance		Interactivity	
		Interactive	Noninteractive
Mode	Linguistic	Phone, audioconference, chat, instant messaging	E-mail, answerphone, voicemail, FAX, letter, Usenet
	Linguistic and visual	Videoconference, video-phone, shared workspace	Videomail

Facetime



²Whittaker, 2003, Theories and methods in mediated communication

TABLE 7.2
Effects of Different Affordances on Communication Behaviors and Processes

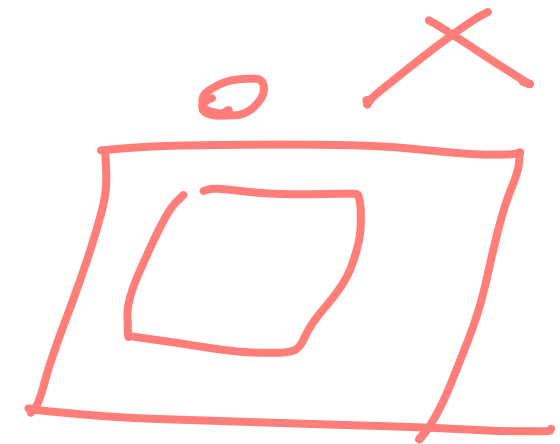
<i>Affordance Type</i>	<i>Communication Behaviors Affected by Affordance</i>	<i>Core Communicative Phenomena Affected</i>
VISUAL MODE	Facial expressions	Attention, understanding, agreement
	Head nods	Conveying affect, attitude Attention, understanding, agreement
	Gaze	Turn taking Attention
	Gesture	Turn taking, reference Conveying affect, attitude Attention
	Visual access to objects in a shared physical environment	Turn taking, reference Reference, attention
INTERACTIVITY	Physical presence	Availability and initiation of impromptu conversation
	Feedback via backchannels, completions, interruptions	Attention, understanding, agreement Turn taking, reference, repairs Socioemotional feedback

²Whittaker, 2003, Theories and methods in mediated communication

What are some CMC theories?

Why do we need so many theories to understand CMC?

- » CMC is extremely diverse.
- » Technologies are ever changing.
- » Outcomes are sometimes counterintuitive.



Deficit vs. Compensation Views

Deficit view: The medium imposes restrictions on communication, and the resulting communication necessarily involves certain *deficits* that require communicators to manage.

Compensation view: People adapt to the restrictions media may impose on communication to *compensate* for the potential deficits, even often using it to their advantage.

An example **deficit** theory

Media Richness Model (the Bandwidth Hypothesis); Social Presence Theory

E.g., the Bandwidth hypothesis posits that the closer the modes supported by a technology correspond to those of FtF communication, the more efficient the communication with that technology.

An example compensation theory

Social Information Processing (SIP) Theory; Social Identity/Deindividuation (SIDE) Theory

E.g., *Social Information Processing Theory* posits that communicators exchange social information through the content, style, and timing of verbal messages on-line. People use platform affordances to make up for missing cues.



- Walther (1993)³ example shows FTF and CMC groups following different trajectories but arriving at similarly detailed impressions of group members.

³Wather, 1993, Impression development in computer-mediated interaction

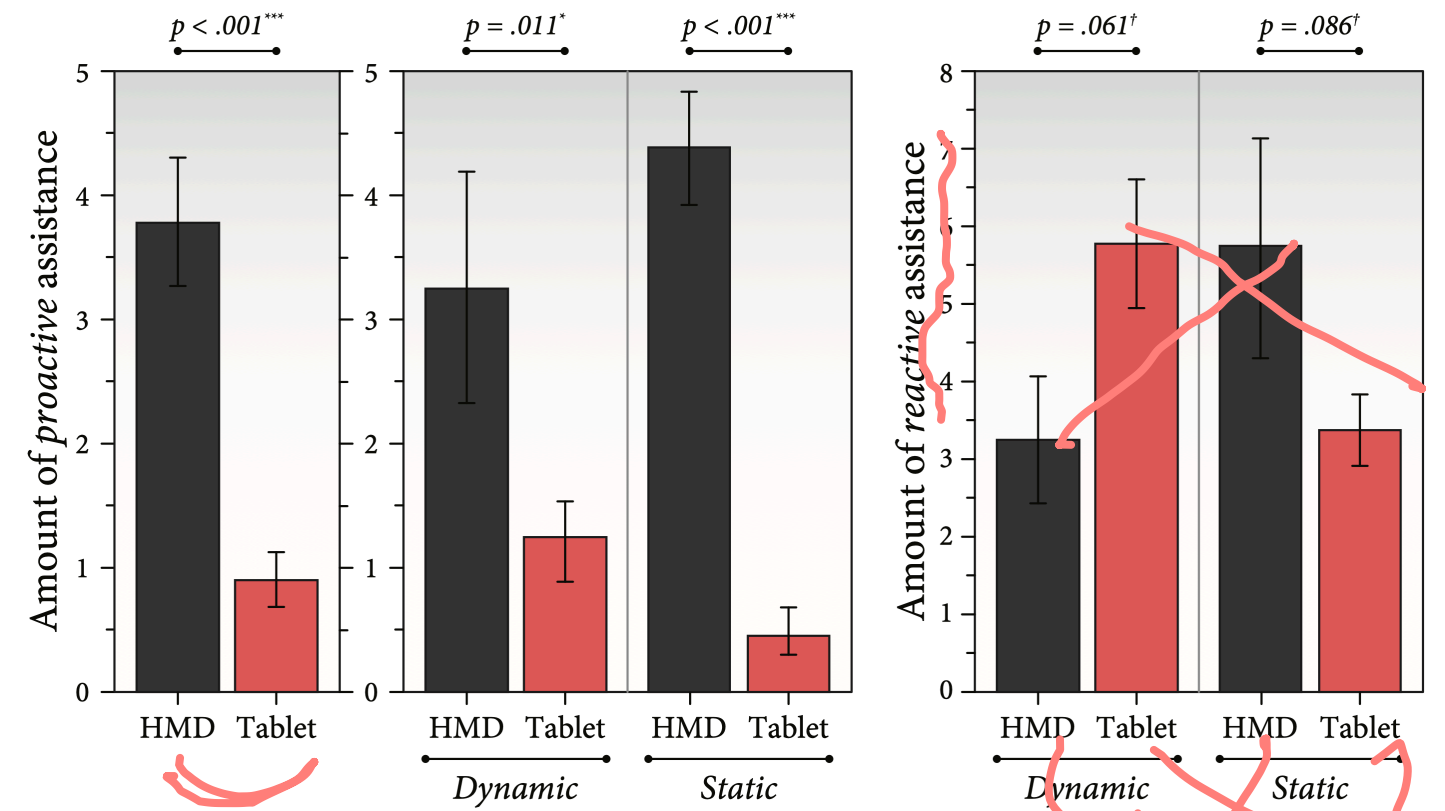
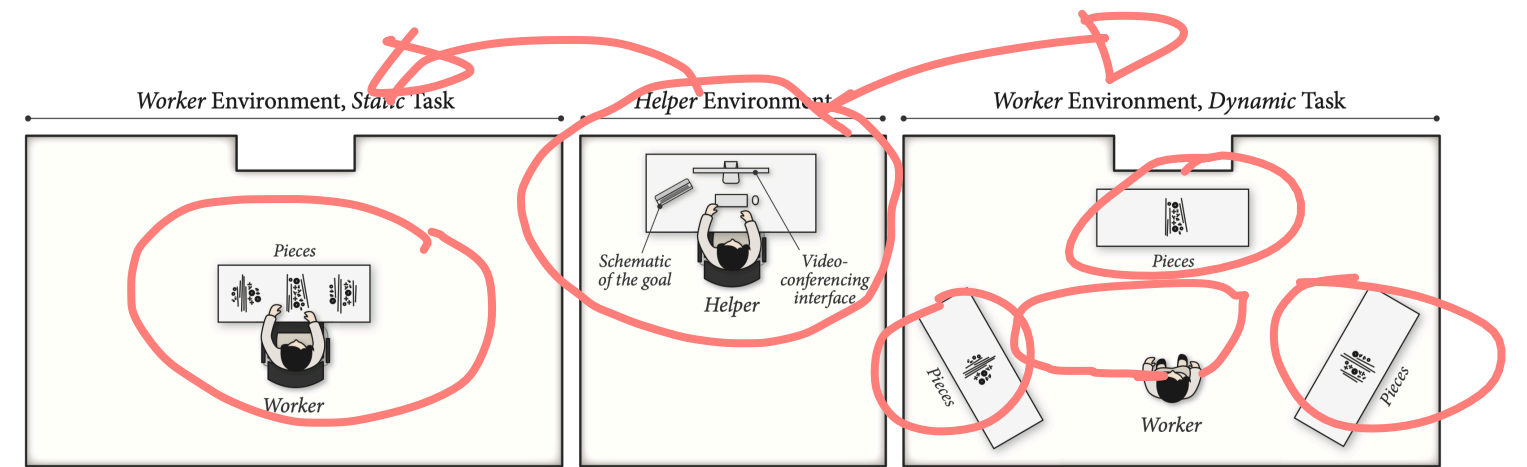
What are some newer forms of CMC?⁴⁵⁶

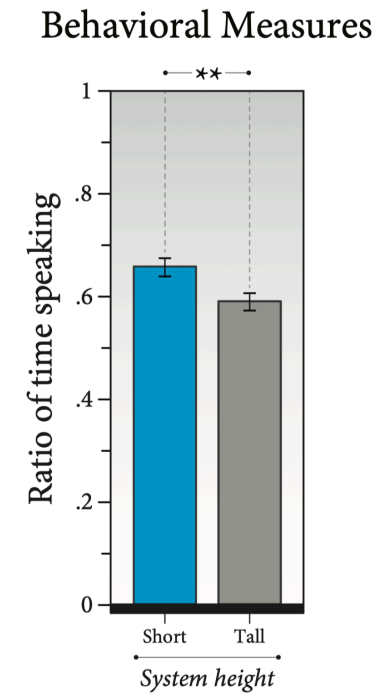
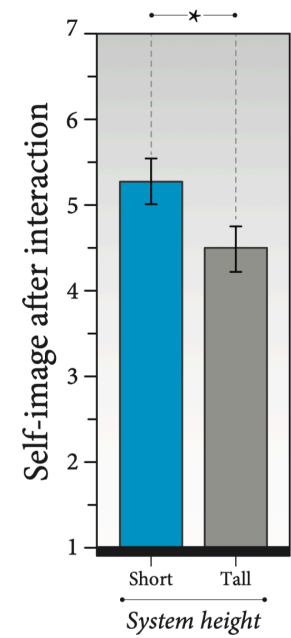
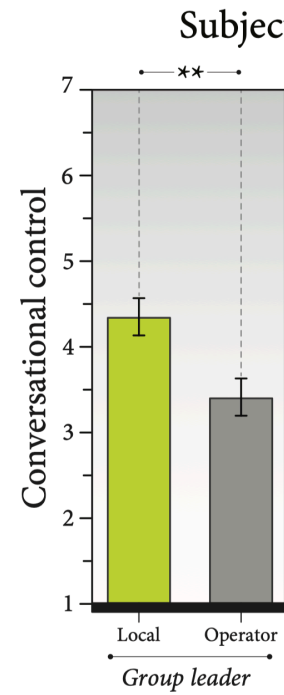
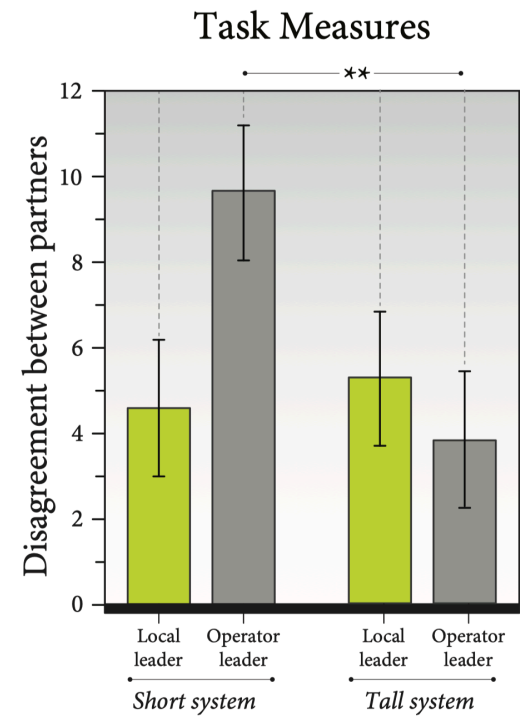
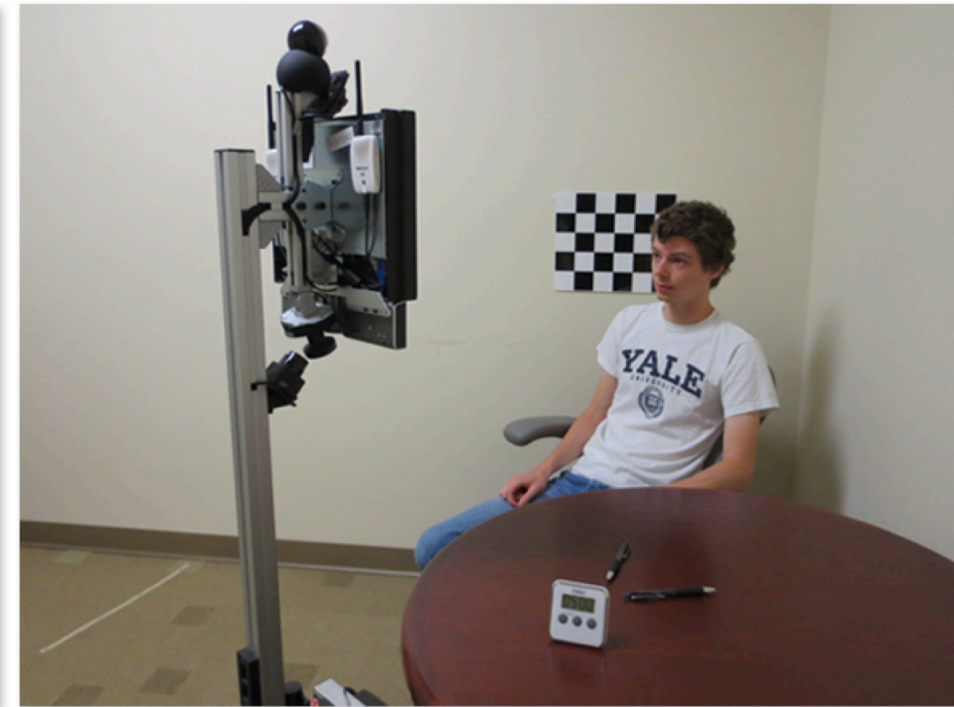
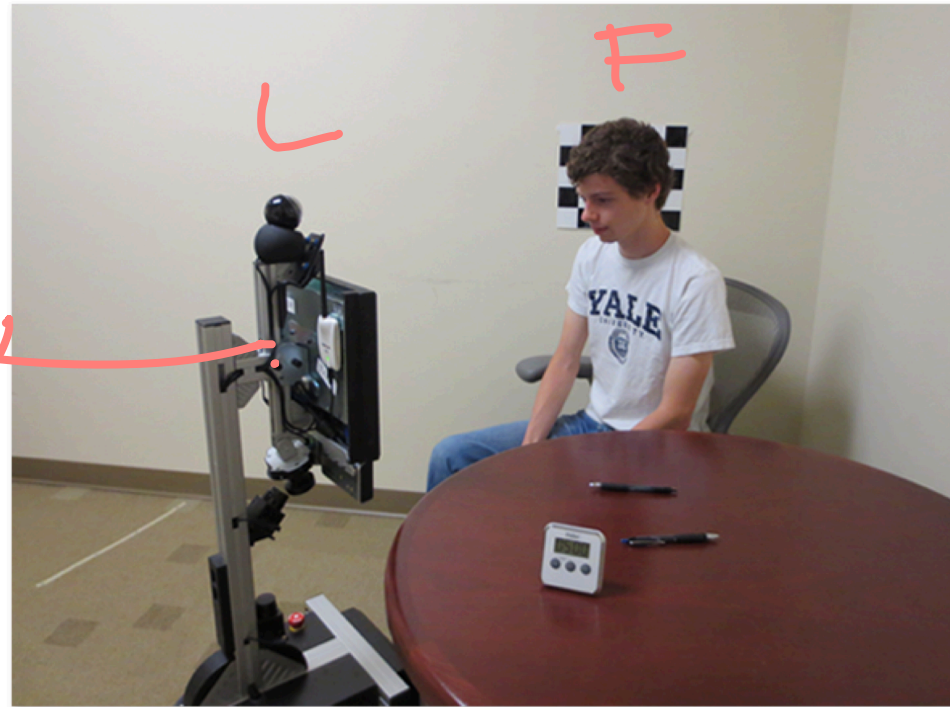
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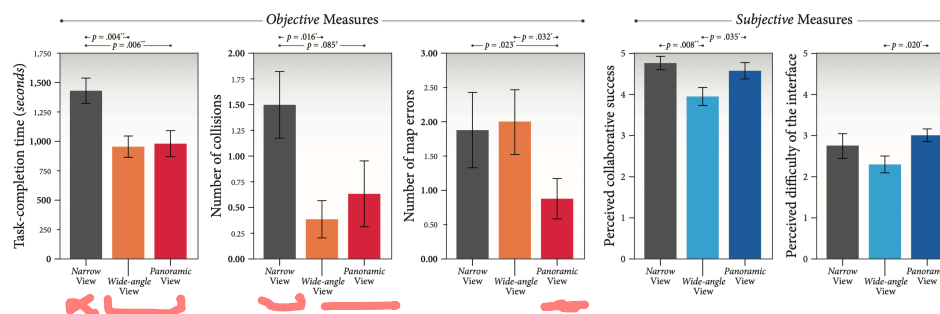
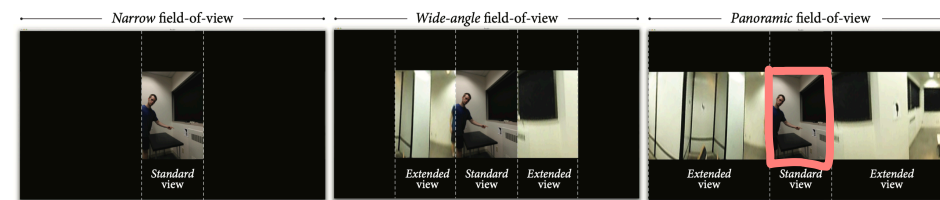
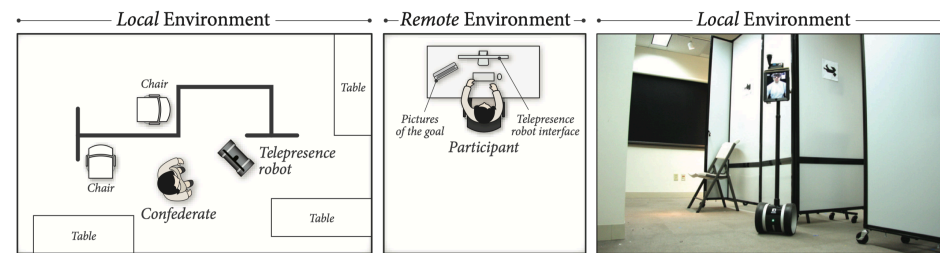
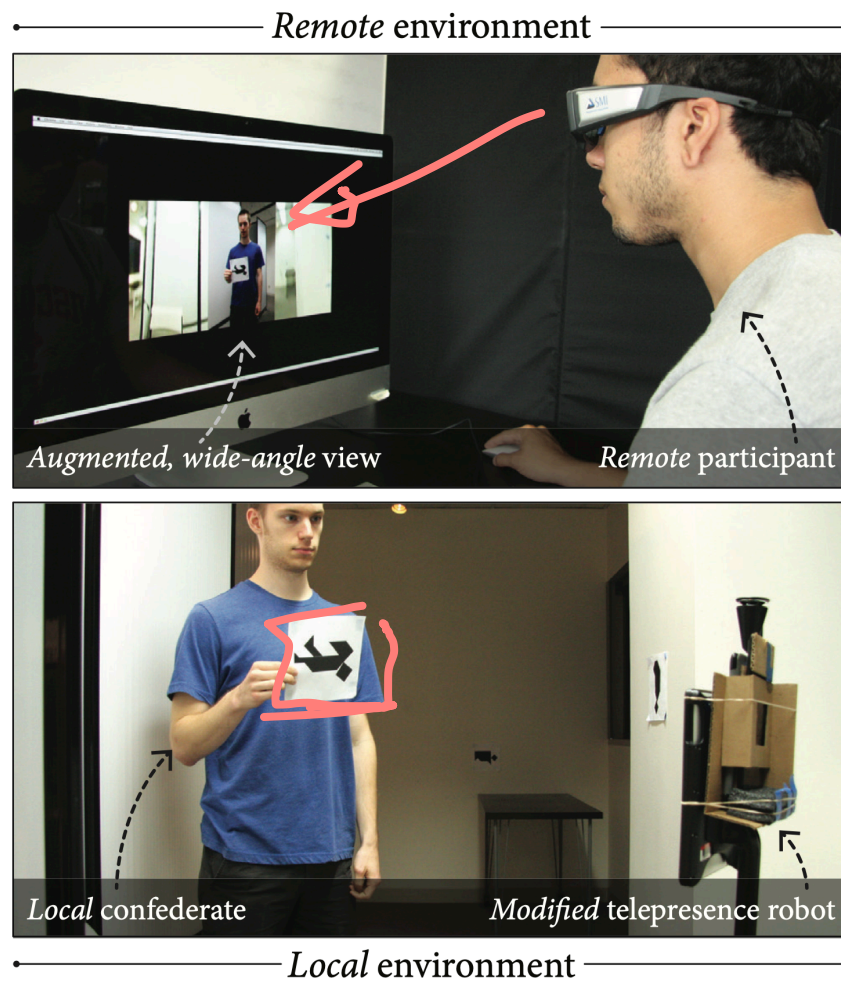
⁴Johnson, Gibson, & Mutlu, 2015, Handheld or handsfree? Remote collaboration via lightweight head-mounted displays and handheld devices

⁵Rae, Takayama, & Mutlu, 2013, The influence of height in robot-mediated communication

⁶Johnson, Rae, Mutlu, & Takayama, 2015, Can you see me now? how field of view affects collaboration in robotic telepresence.







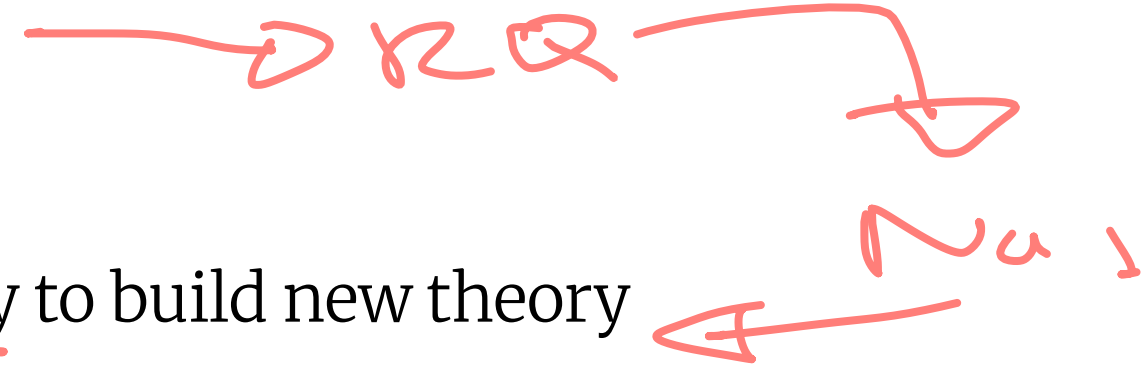
Prior result	Comparison	Explanation
Keyhole effect	Supported	Increased collisions, slower completion times in narrow view
Cognitive tunneling	Supported	Errors in distance/depth judgments increased collisions in narrow view
Wide views increasing cognitive workload	Supported	Perceived interface difficulty increased in panoramic condition
Wide views distort velocity perception, reducing driving speed	Unsupported, Contrasting	Wide-angle and panoramic views support faster task completion than narrow views
Wider views associated with motion sickness	Unsupported	No participants commented on feeling motion sickness
Impoverished video inhibits mental map formation	Unsupported, Contrasting	Low-quality periphery improved mental map formation over wide-angle and narrow views

Discussion Questions

- » What other forms of CMC have you used that are not discussed in the readings?
- » In your use of CMC technologies, what are examples of these theories holding or not holding?
- » What external resources have you found that supported/challenged these theories?
- » How do you think we could use these theories?
- » ...

Project

Determining Method



Feasible research templates:

- » Nascent theory → Ethnography, Grounded Theory to build new theory
- » Mature theory → Experimental study extending/testing existing theory
- » Artifact → New system/extension, preliminary evaluation with users

Research contexts:

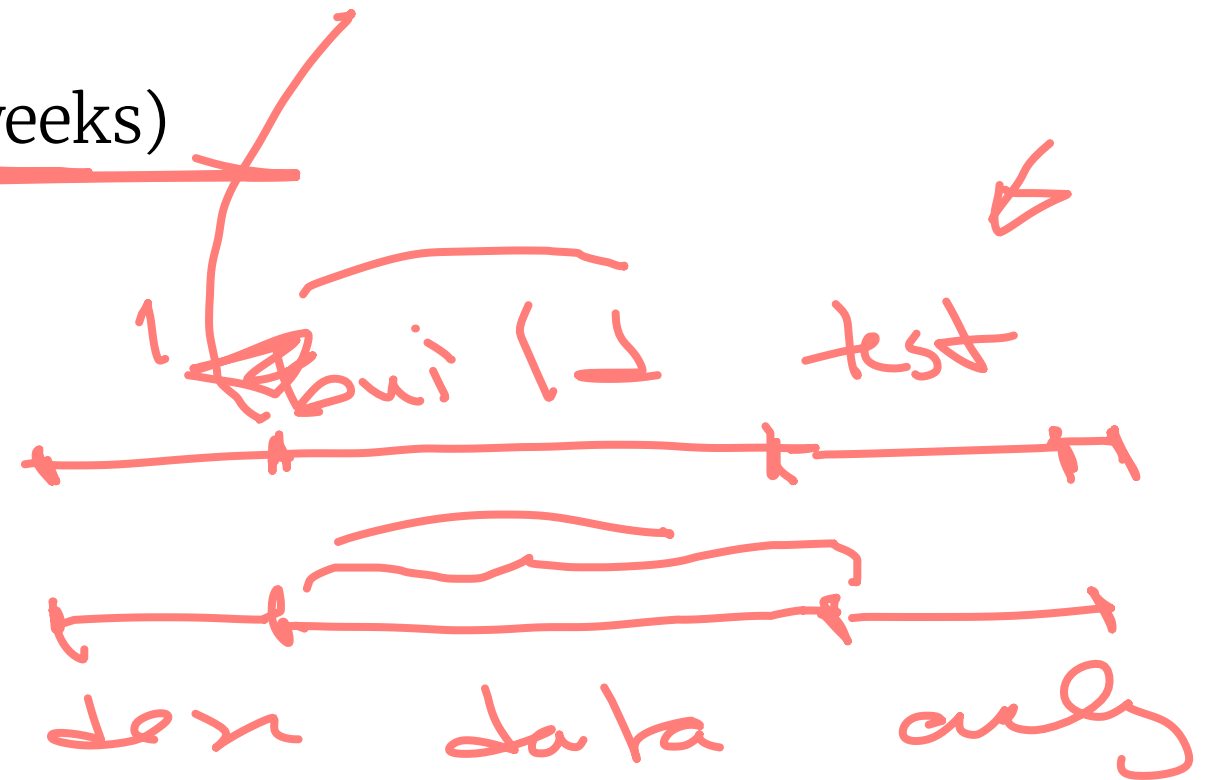
- » In-person: studying phenomena in the real world
- » Virtual: studying online phenomenon *max*
- » Online: using online methods to study phenomenon in the real world

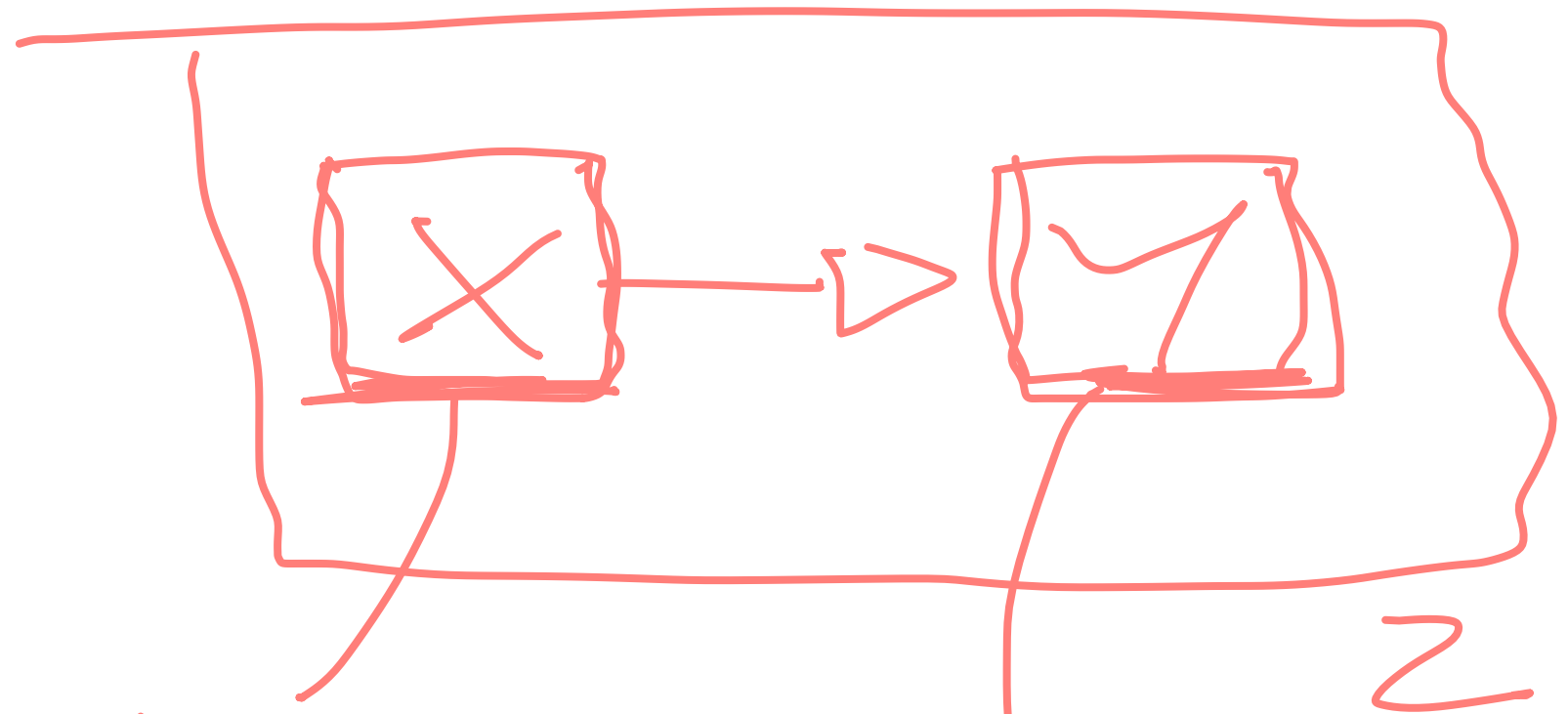
What's Next?

Nov 1 → Due date for your method description (you have 3 weeks)

What is expected?

- » A description of your method
- » All your "study materials" must be ready
 - » Ethnography → Site identification, permissions, etc.
 - » Experimental study → Materials, instruments, surveys, etc.
 - » Artifact → Design requirements, preliminary evaluation plan, etc.





distance?

comfort?

immersive
VR
familiar
naive users