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THE WORLD'S LARGEST MODELING, SIMULATION & TRAINING EVENT
HARNESSING NEW TECHNOLOGIES TO WIN IN A COMPLEX WORLD

MentorPal:
Interactive Virtual Mentors Based on Real-Life STEM Professionals

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The Problem

Mentorship

"Mentoring is a brain to pick, an ear to listen, and a push in the right direction." — *John Crosby*



But:

- Mentors are difficult to find
- Certain demographics lack access to mentors
- Mentorship programs lack scalability

MentorPal

- Virtual mentors for high school age students, scaled
- An interactive virtual agent that allows students to ask their own questions
- Tablet based chat system
- Mentors handpicked for their diverse set of experiences and mentoring ability

Background and Related Projects

- New Dimensions in Testimony (NDT)
  - 1400 answers could answer 70% of questions and 2000 would cover 95%
  - Can we reduce cost of such a system while maintaining effectiveness and also scale up?
- Personal Assistant for Life-Long Learning (PAL3)
  - Creates an interactive, personal guide for learning for Navy sailors as they progress in their career





Goals

1. Provide engaging, relevant responses for students interested in STEM fields
2. Create a low-cost, repeatable process that allows for scalability without significant loss of quality

Interaction



Choosing a Mentor

Criteria:

- Relevant experience in STEM fields
- Engaging and personable
- Ability to provide useful advice in an eloquent manner

Mentoring Topics and Questions

1. Accumulate questions
2. Develop criteria for assessing question quality
3. Rank questions
4. Categorize questions into topics

What qualities make a good response?

1. Emotional
2. Narrative
3. Answers frequently asked questions
4. Provides valuable information



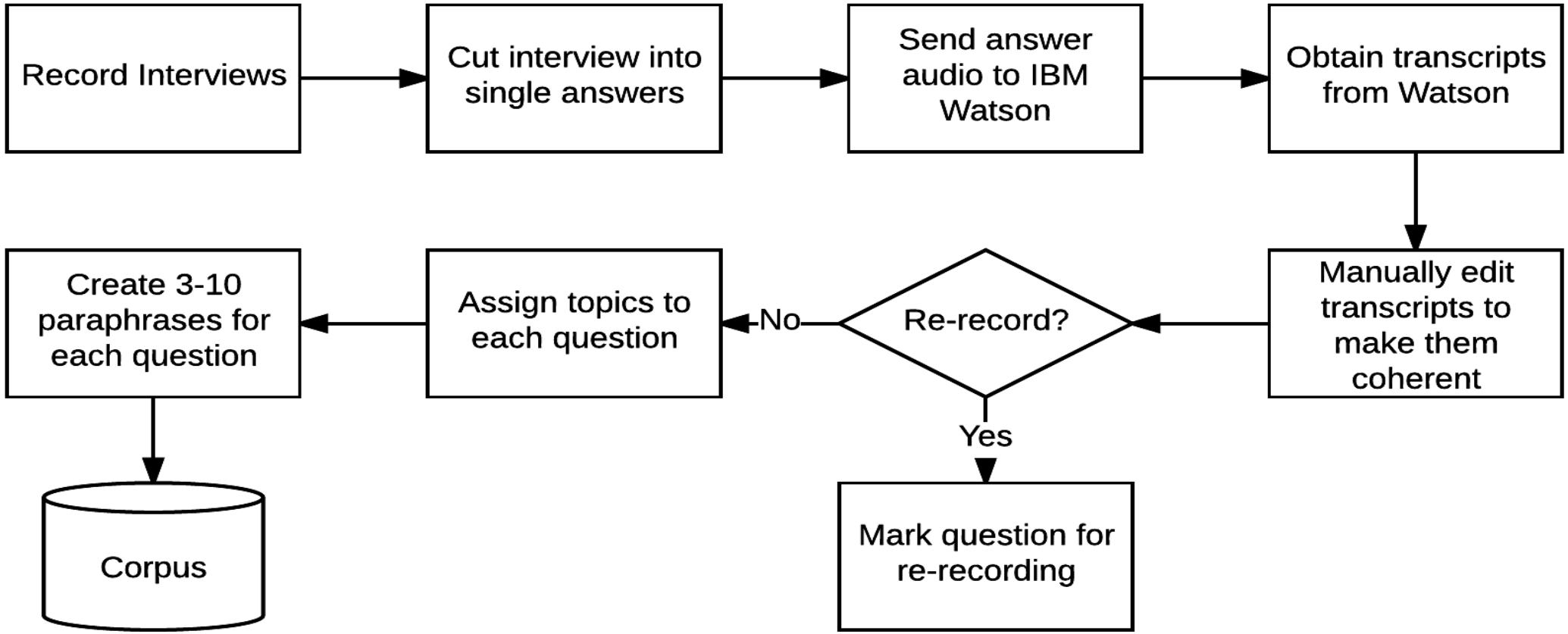
Question Topics

Category	Question
Advice	*Should I go to college before or after serving?*
Background	*Where did you grow up?*
Benefits	*How do the educational benefits of the military work?*
Challenges	*What is your strategy for overcoming hardships?*
Colleagues	*How do you and your coworkers socialize outside of work?*
Combat	*What if I want to join the military but I'm afraid of going into battle?*
Conflict	*Tell me about a time when your priorities conflicted with that of management.*
Culture	*What do you find unique about your career field?*
Decisions	*What branch of the military should I go into?*
Demographics	*What is the gender mix of your workplace?*
Education	*Should I go to college before or after serving?*
Ethics	*Is sexual harassment common in the military?*
Failure	*What are the failures for which you are the most unhappy?*
Fit	*What happens if I don't enjoy this kind of work?*
Future	*What sorts of changes are occurring in your occupation?*
Growth/learning	*What range of tasks and opportunities does this field allow me to grow?*
Impact	*How can your work change the world?*
Jargon	*What does EMC stand for?*
JobSpecific	*Though you were an Electrician's Mate, did you work on things other than electronics?*

Interview Process

- Choose mentor
- Provide mentors with equipment and setup instructions
  - Total equipment cost: $235
- Record five 3-hour interview sessions based on question framework
  - Follow up questions asked in-session and in later sessions

Dialogue Model and Development



Process for Creating Corpus of Question-Answer Data for a Mentor

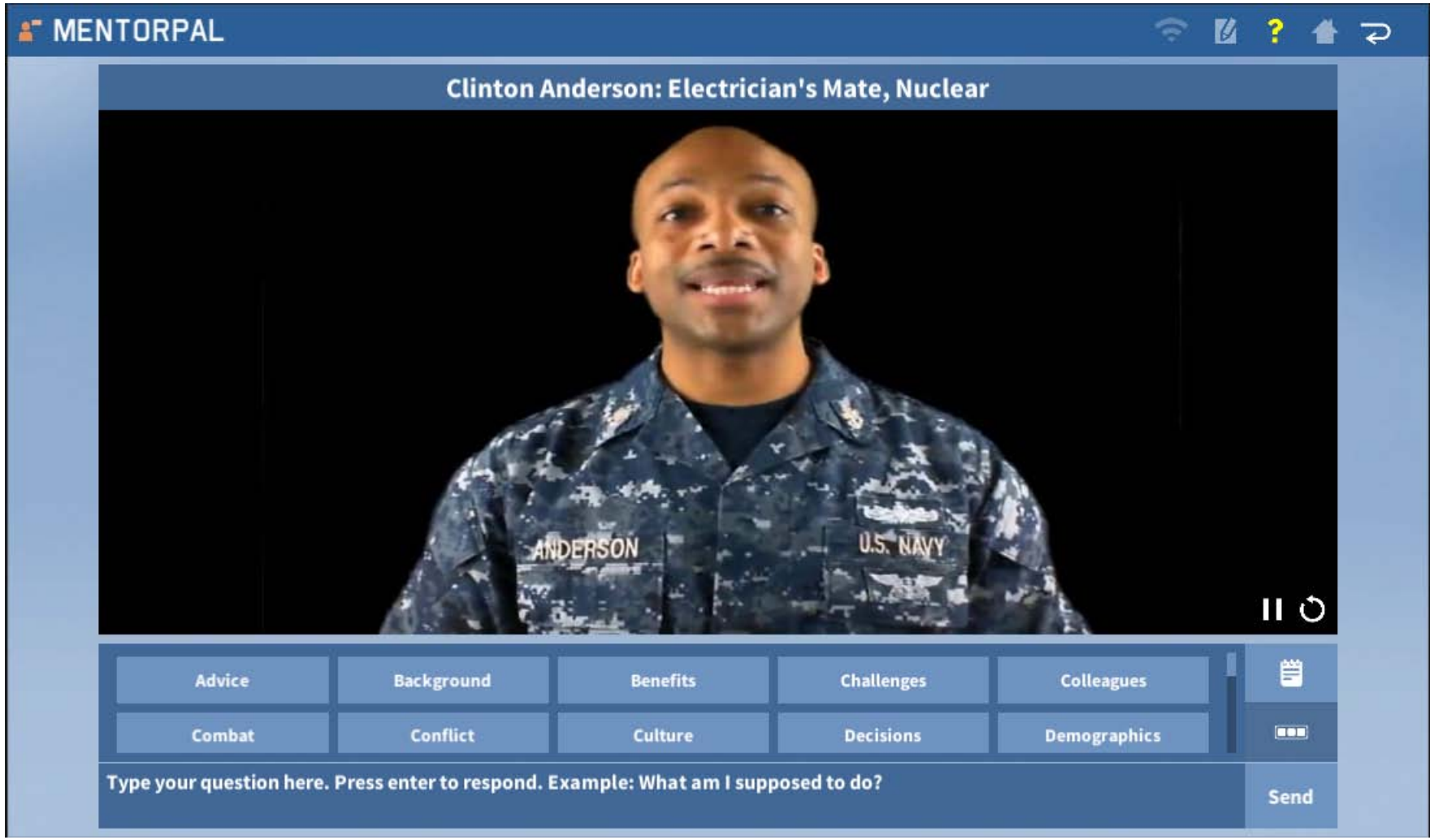
Special Cases

- What happens when a user doesn’t ask a question for a while?
- How should irrelevant questions be handled?
- What if the user repeats questions?
- Deviation from agenda

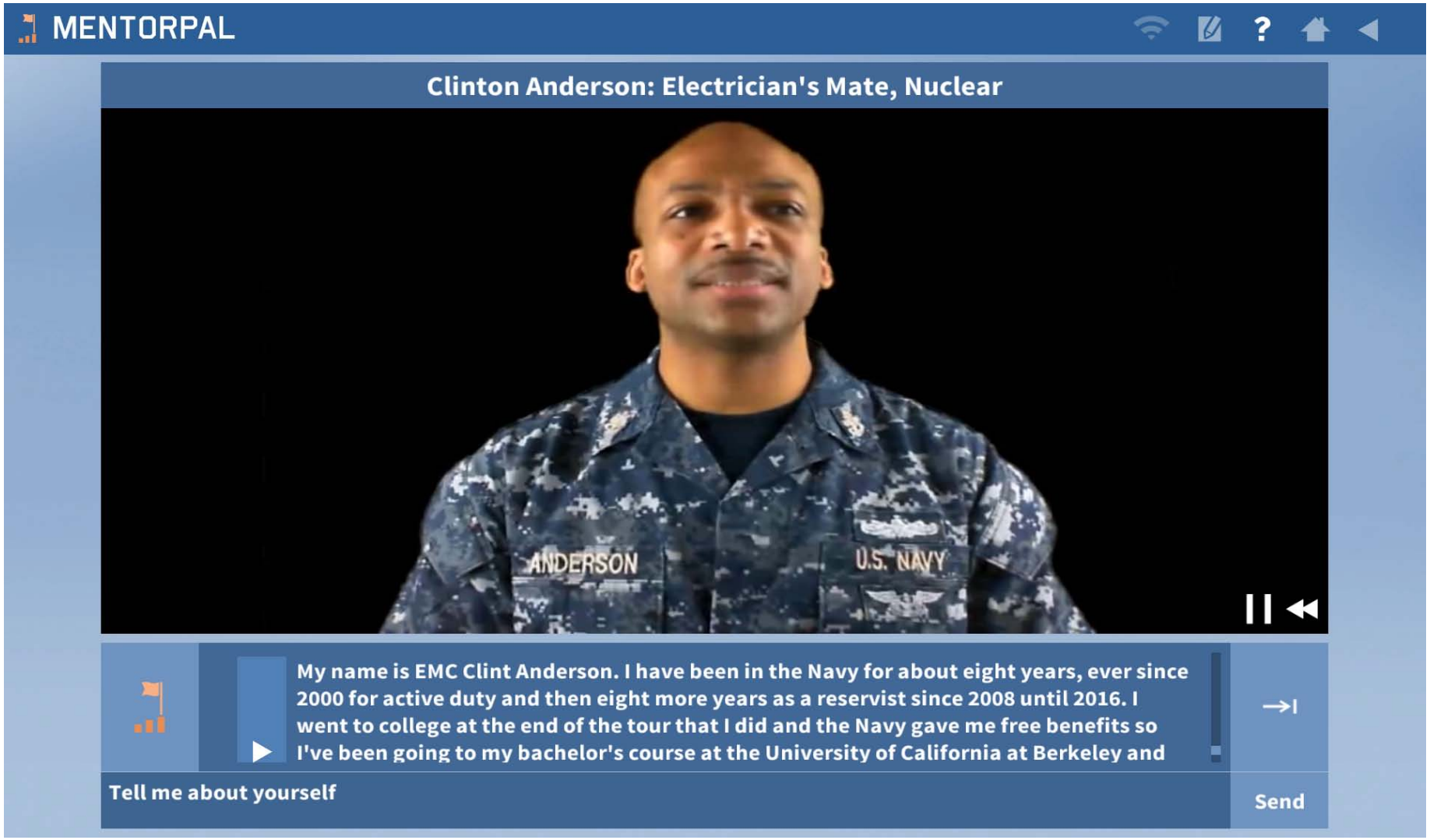
Initial Accuracy Results

Dialogue Model	NDT (Train: 10000, Test: 400)	MentorPal (Train: 1600, Test: 200)
NPCEditor	0.734	0.392
Classifier	-	0.471
Ensemble	-	0.466

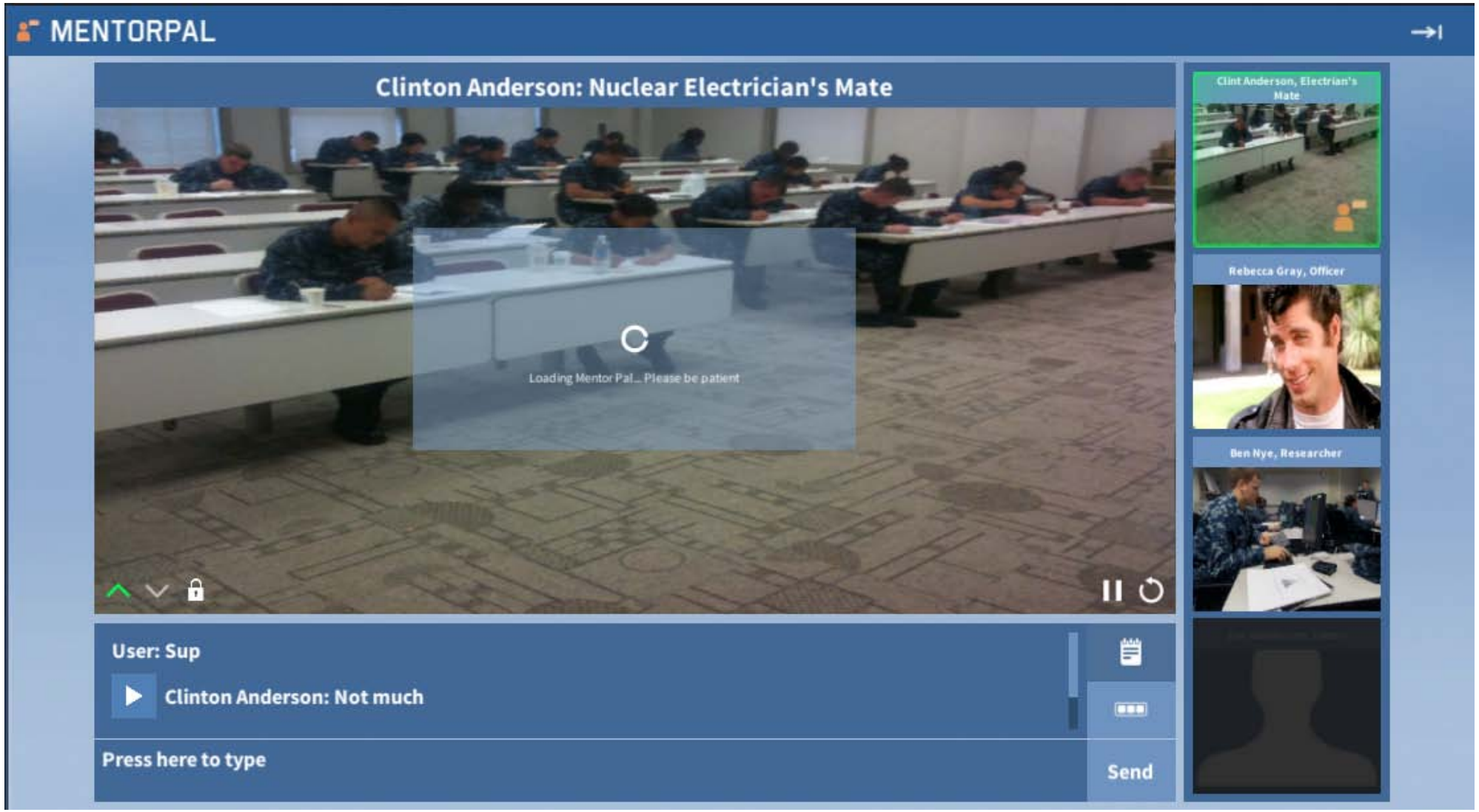
User Interaction and Interface



Interface with Transcriptions



Mentor Panel



Future

- The goal of MentorPal is to increase the realism of a student's career goals
- In a large-scale setup, a student would be able to talk to multiple mentors in the same field and receive several points of view
- MentorPal offers greater breadth, but less depth
- Dialogue model can be replicated
- Cost of scaling up is low, and we aim to streamline the system to make a 'MentorPal Recorder' that can be used by anyone to build such mentors simply by entering questions and recording

Questions?