UTILIZING PAWR PROGRAM TO DEVELOP ADVANCED HANDS-ON LABS FOR NETWORKING AND CYBERSECURITY COURSES

MISSION STATEMENT

Following the shutdown of the GENI Infrastructure, our Networking and Cybersecurity Courses face a challenge with no platform for developing interactive labs for student education. This necessitates a solution to uphold and continue educational opportunities.

Leveraging the ARA platform, a backed PAWR initiative, offers a promising solution. Transitioning existing labs to ARA ensures continuity in student learning while having the new functionalities and educational possibilities - especially with it being a local team.
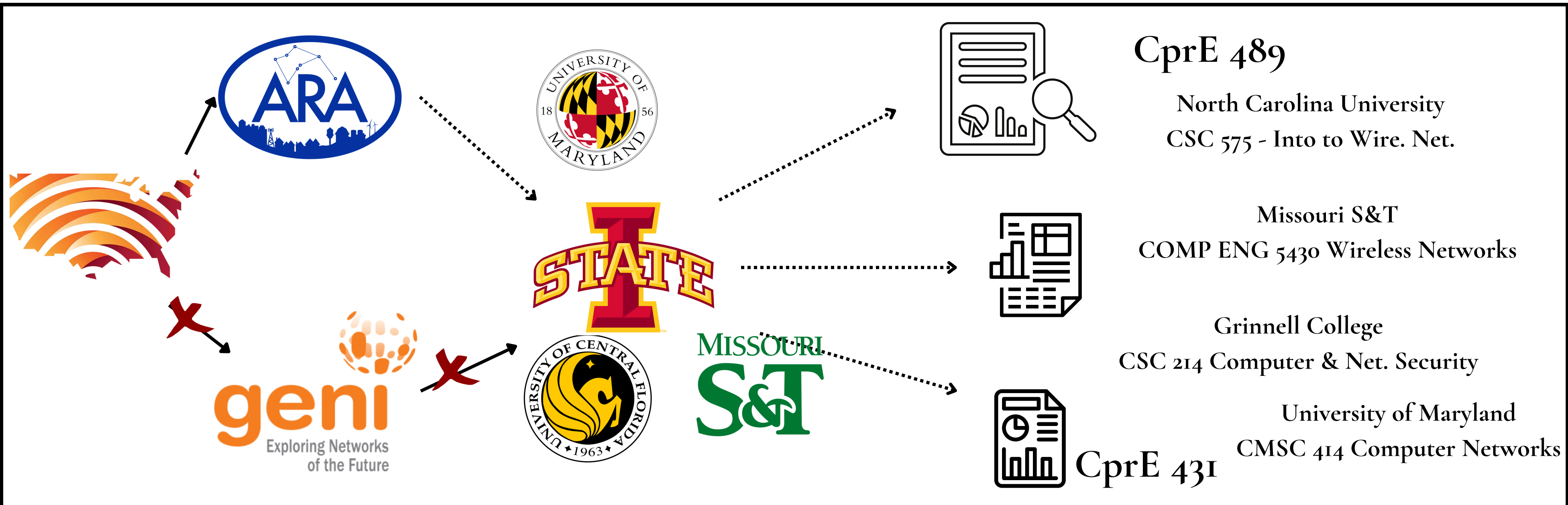
Beyond adaptation, we're dedicated to creating new, tailored labs for our courses. Working within ARA's infrastructure allows us to craft unique learning environments that meet diverse classroom needs.

INTENDED USES & USERS

Our proposed design and efforts is geared towards Iowa State Univeristy courses that offer Wireless Networking and Cybersecurity curriculums, such as CprE 431 and CprE 489.

We've since broaden our efforts to other universities across the nation to share our research and develop on these labs within the ARA Infrastructure.

Our target audience has become educators in Wireless Networking and Cybersecurity courses across the nation!

CprE 489

North Carolina University
CSC 575 - Into to Wire. Net.

Missouri S&T
COMP ENG 5430 Wireless Networks

Grinnell College
CSC 214 Computer & Net. Security

University of Maryland
CMSC 414 Computer Networks

CprE 431

LIMITATIONS & CONSTRAINTS

With ARA launching on September 6th, 2023, it was a new infrastructure and platform that was bound to have bugs. The constant downtime for maintenance, the heavy presence of bugs, and the inconsistency was a heavy constraint on our success and progress.

TESTING

With having six (6) completed and adapted labs for the ARA Infrastructure, we tested the usability, sustainability, and accessiblity of our Lab Documents. We provided our Lab Documents to a small classroom size and collected quantitative and qualitative data from their responses through a survey.

Quantitative Data on Lab Aspects

■ Average
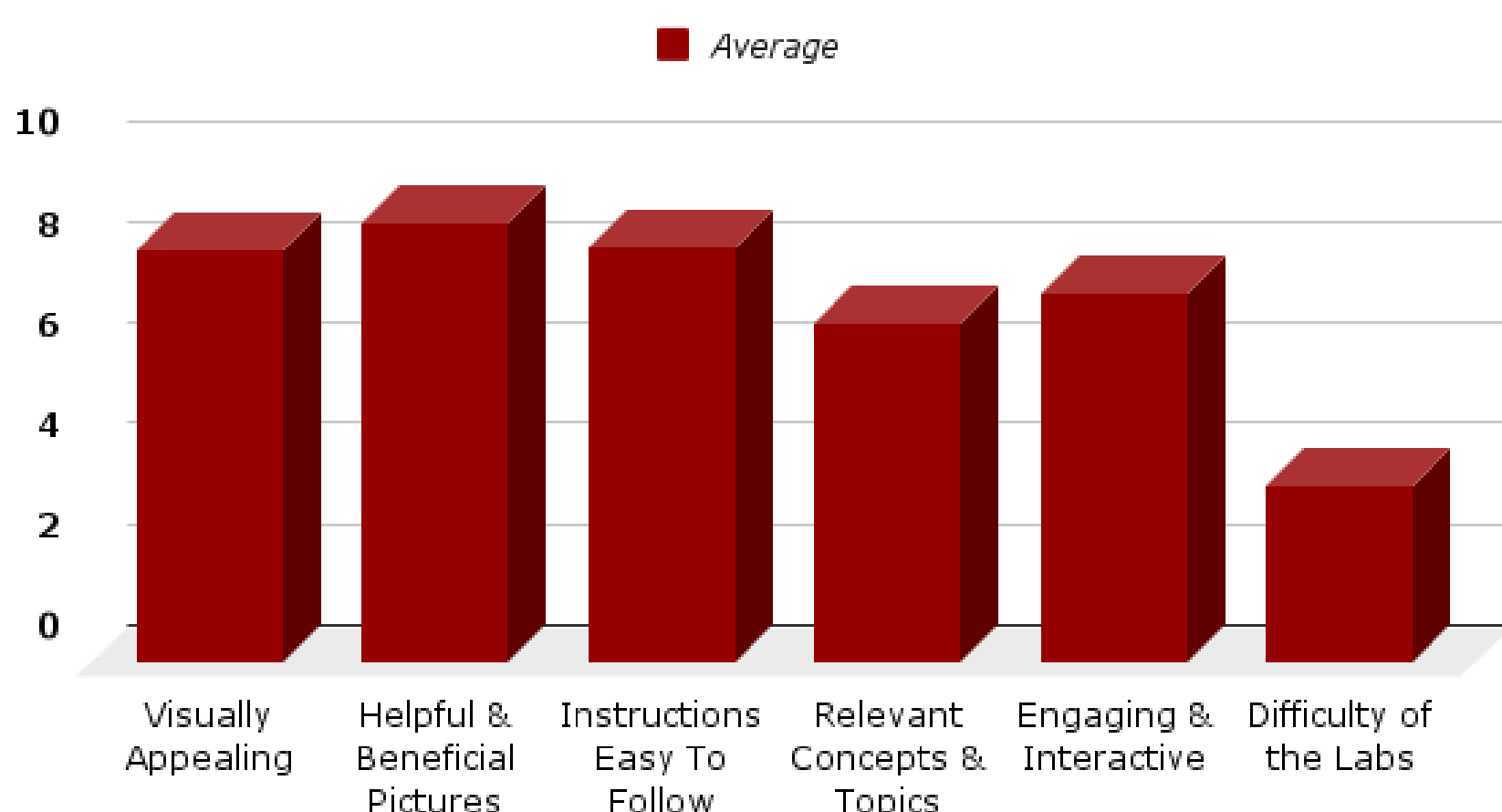
COURSE MATERIAL

Over the time working through ARA, we developed 6 labs that utilize the ARA platform and cover different areas of understanding within the aforementioned courses. Among these are the following: Lab 0 - introduction to Ara and Jumpbox, Lab 1 - 4G Throughput, Lab 2 - Visualizing Waveforms, Lab 3 - MIMO, Lab 4 - Outdoor 5G Channel COTS UE, Lab 5 - Packet Analysisi, Lab 6 - Jamming & Spoofing

DESIGN

Our lab documents were all formatted very similarly and touched on specific points for the students.

- introduction/summary of the lab
- learning objectives/goals
- step-by-step instructions for setting up the lab as well as completing it
- comprehension questions along the way to be answered in the lab report

We also provided a lab key and a report template for the instructors and students, respectively, to work off of with each of the individual labs.

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GROUP MEMBERS

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