Carnegie Mellon University
Global Communication Center

Making the Case for Your Research

in Presentations, Posters, and Papers

Dr. Joanna Wolfe
GCC Director

We need to be able to articulate the relevance and importance of our work

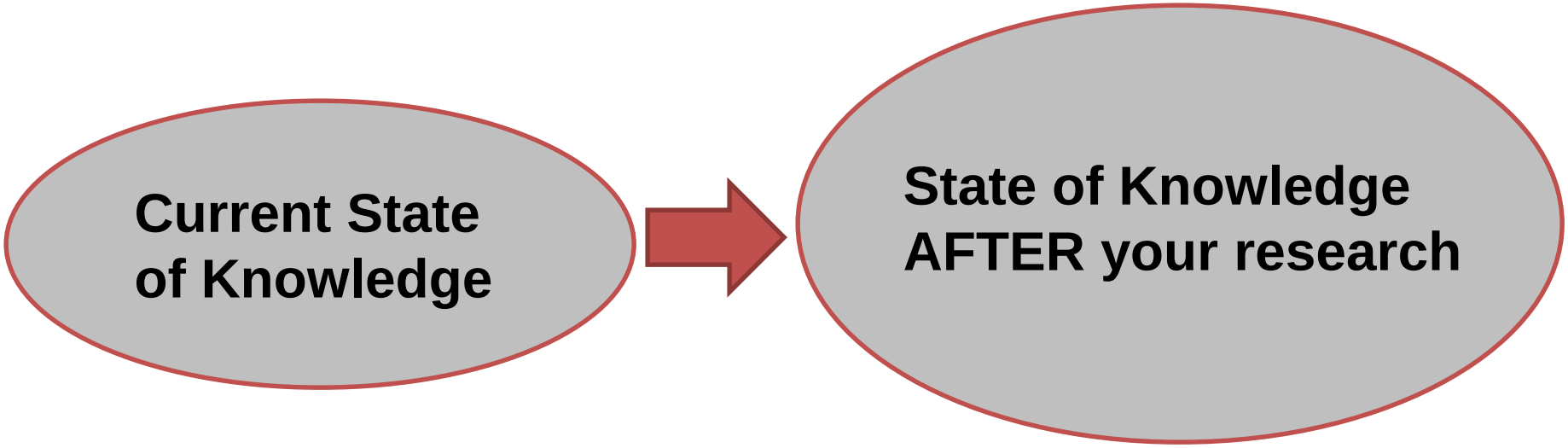
Appeal to diverse audiences

Receive funding

Promote yourself

However, articulating your contribution can be hard because you may suffer from tunnel vision

This workshop will help you convey the big picture: how your work contributes to the field



Outline

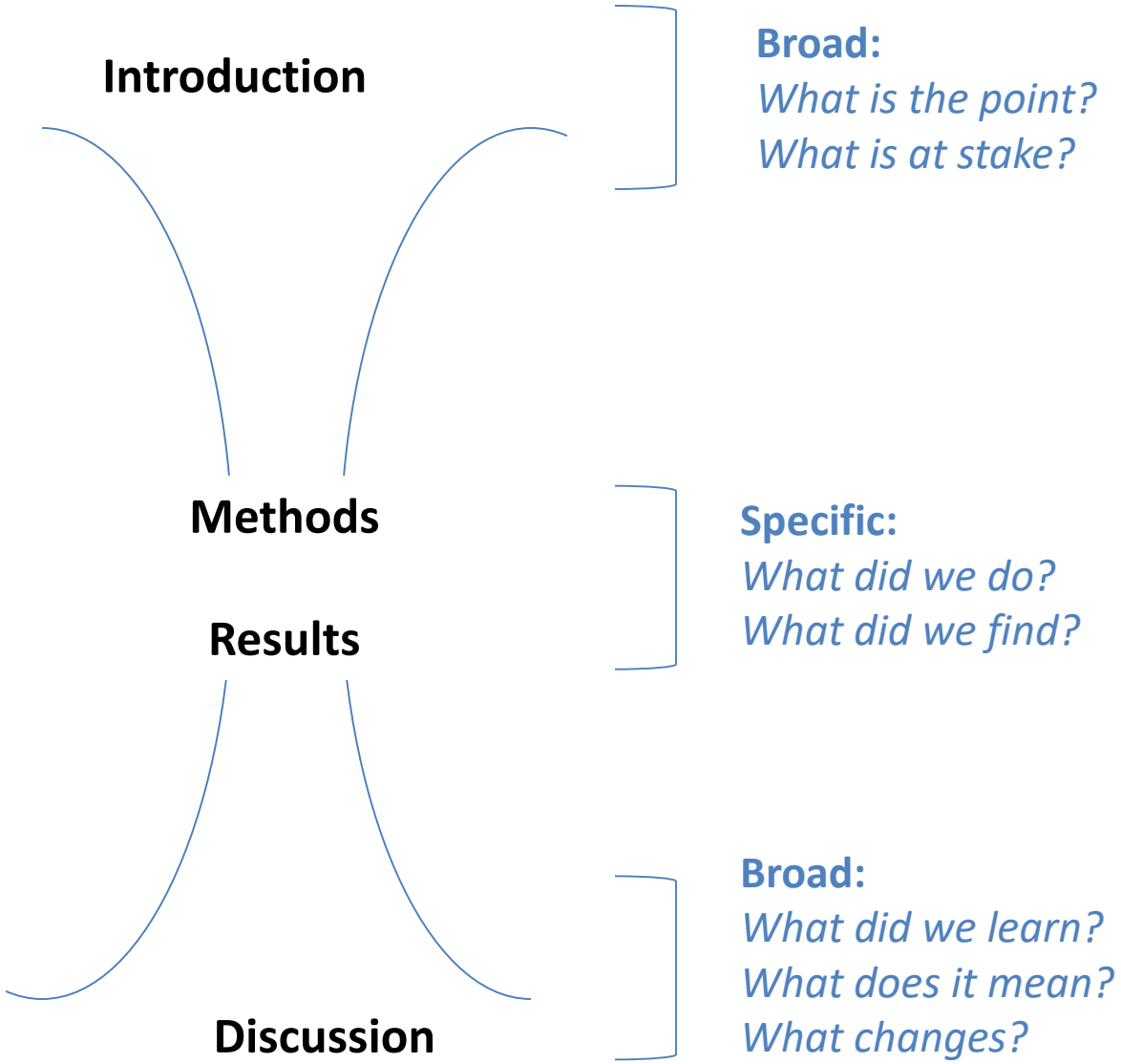
1. Organizing your project with IMRD
2. Introducing your project with the Novelty moves
3. Presenting data
   - Using sentence headlines
   - Reducing clutter
4. Making a GCC Appointment

Organizing your project with IMRD

Most academic research follows the IMRD format

Report Section	Alternative Names
Introduction	Motivation Background Related Work
Methods	Experimental Models Databases
Results	Analysis Findings Simulations
Discussion	Conclusion Future Work Implications

You can think of this organization like an hour glass



There are three basic variations of IMRD that depend on the type of research

Experimental	Problem/Solution	Theory-Building

Each type of research has a different focus

Experimental	Problem/Solution	Theory-Building
• What happens to X when we **study** it under different conditions? Is our **hypothesis** upheld? • What do we **observe** in the natural world when X occurs?		

Each type of research has a different focus

Experimental	Problem/Solution	Theory-Building
• What happens to X when we **study** it under different conditions? Is our **hypothesis** upheld?	• How can we **build** a better X?	
• What do we **observe** in the natural world when X occurs?	• How can we **improve** or **fix** existing tools or methods?	

Each type of research has a different focus

Experimental	Problem/Solution	Theory-Building
• What happens to X when we **study** it under different conditions? Is our **hypothesis** upheld?	• How can we **build** a better X?	• How can we understand & explain the **relationship** between X and Y?
• What do we **observe** in the natural world when X occurs?	• How can we **improve** or **fix** existing tools or methods?	• How can we **bring together** multiple phenomenon under a single explanation?

Each type of research has a different organization and emphasis

Experimental	Problem/Solution	Theory-Building
Introduction		
Methods		
Results		
Discussion		

Each type of research has a different organization and emphasis

Experimental	Problem/Solution	Theory-Building
Introduction	Introduction	
Methods	Solution	
Results	Evaluation: Methods & Results	
Discussion	Conclusion	

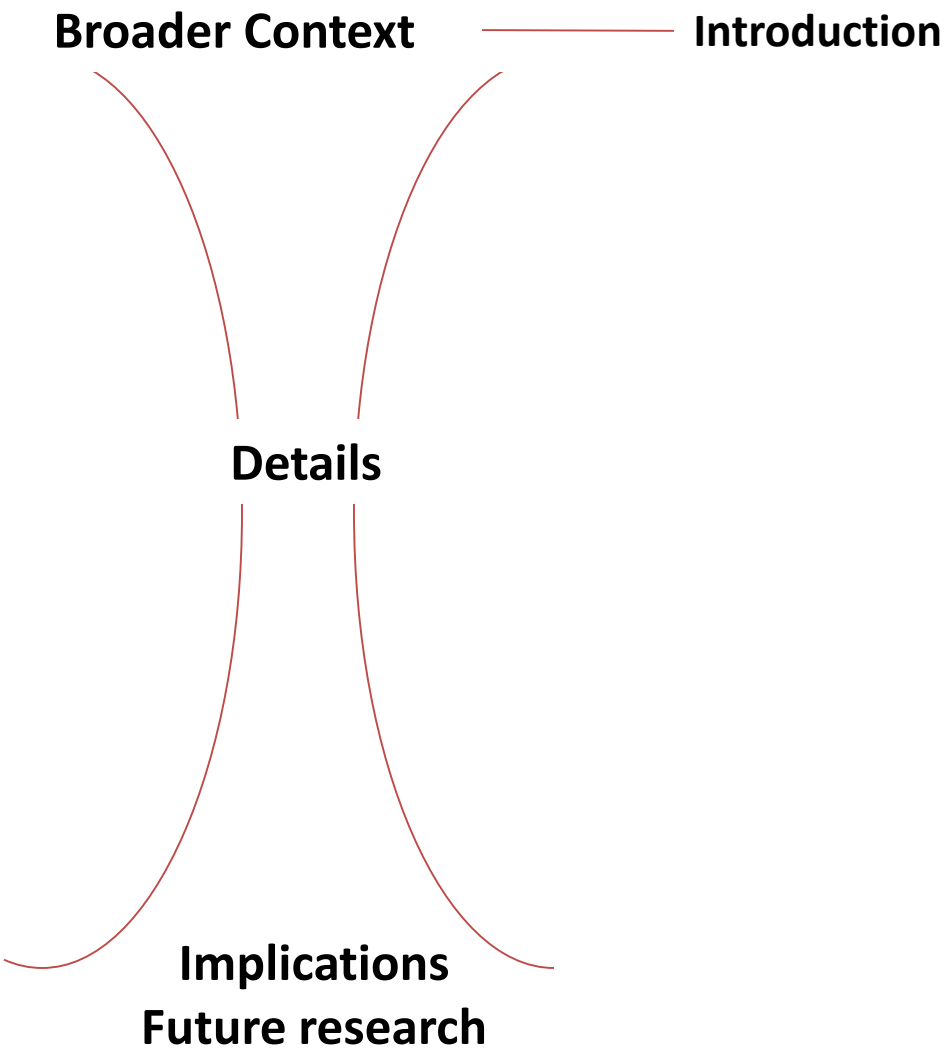
Each type of research has a different organization and emphasis

Experimental	Problem/Solution	Theory-Building
Introduction	Introduction	Introduction
Methods	Solution	Present Existing Theory Analyze Cases
Results	Evaluation: Methods & Results	Develop New Theory
Discussion	Conclusion	Implications

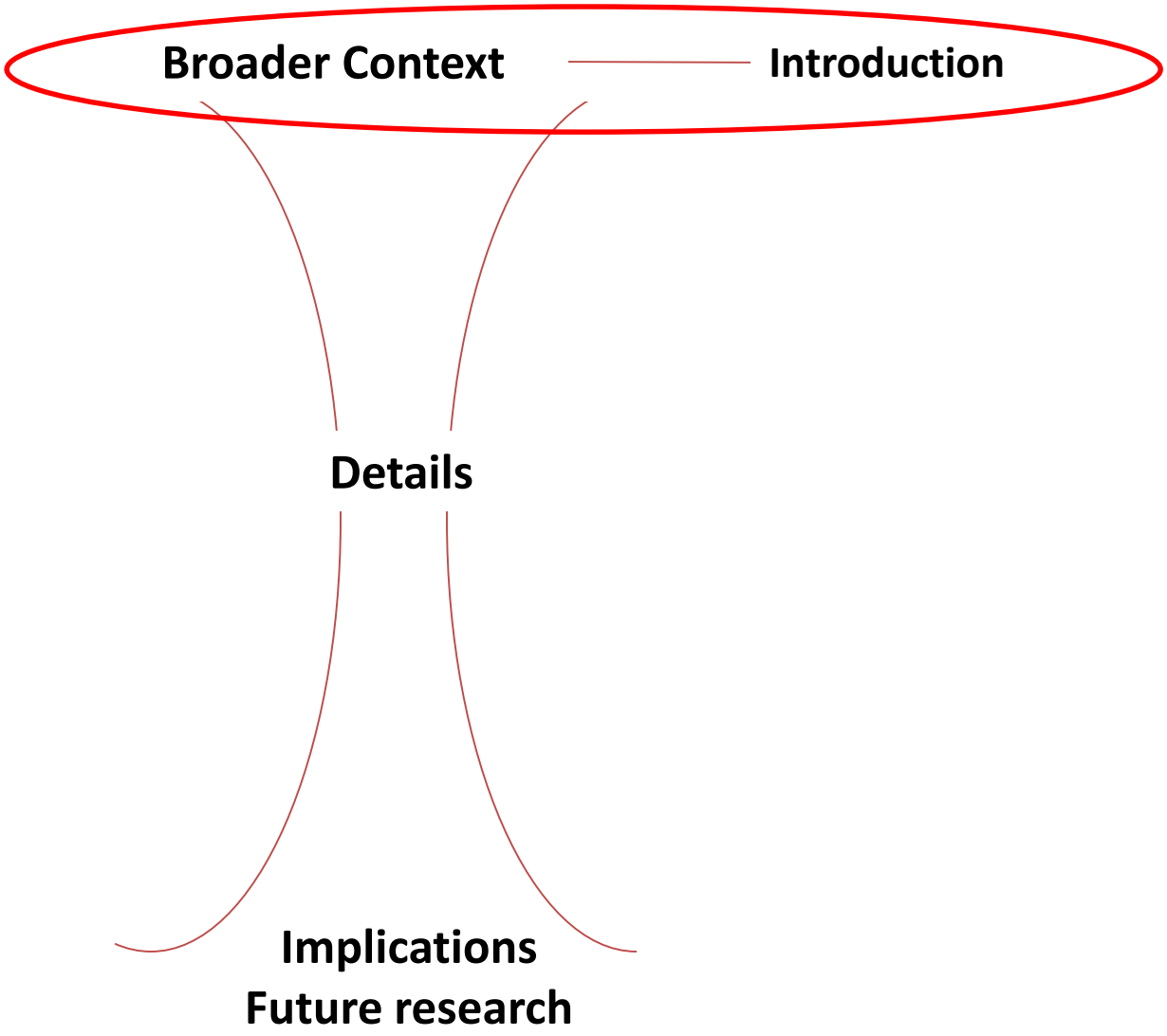
Your presentation, poster or paper should reflect this organization and emphasis

Experimental	Problem/Solution	Theory-Building
Introduction	Introduction	Introduction
Methods	Solution	Present Existing Theory Analyze Cases
Results	Evaluation: Methods & Results	Develop New Theory
Discussion	Conclusion	Implications

But in all cases you want to move from broad to narrow back to broad



And the broader context is one of the most difficult parts to communicate



Introducing your Project

With the 4 Novelty “Moves”

Which version of this intro is stronger? Why?

1. The long-term goal of this project is to analyze neural signals collected from human brain and eventually use these signals to build a brain computer interface (BCI). BCI aims to provide a direct control pathway from brain to external devices such as a computer. It is a radically new communication option for those with neuromuscular impairments that prevent them from using conventional augmentative communication methods. In this project, I will develop an application programming interface (API) to extract electroencephalography (EEG) signals and translate them into specific commands.

2. Many different disorders can disrupt the brain's neuromuscular channels, making communication impossible for those afflicted. One radically new communication option for those with neuromuscular impairments is the brain computer interface (BCI). BCI aims to provide a direct control pathway from electroencephalography (EEG) signals in the brain to external devices, such as a computer. Currently, no programming tools exist to aid researchers in encoding and interpreting commands embedded in EEG signals. Thus, the goal of this project is to develop an application programming interface (API) for translating EEG signals into specific commands to assist BCI development.

Researchers use four moves to show their ideas are worth implementing

1. Explain Significance

Why should we care?
What is at stake?

2. Describe the Status Quo

What is currently known?
What is current practice?

3. Identify a "Gap"

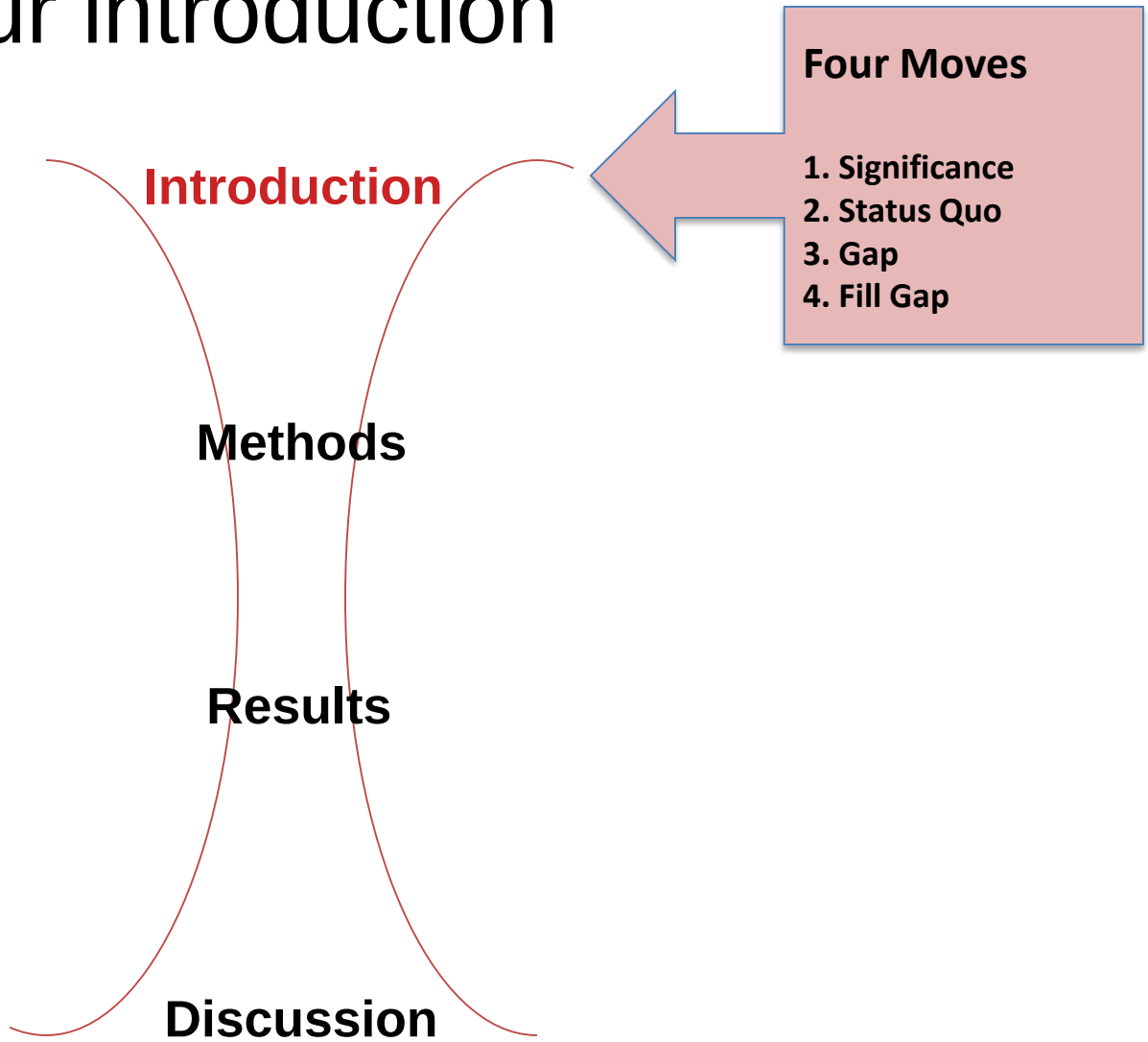
What is the problem?
What is missing or unknown?
What is the flaw?

4. Fill the Gap

How am I solving the problem?
How am I filling the gap?

Based on the work of John Swales

These four introductory moves should be located in your introduction



These moves help you avoid tunnel vision

Peptic ulcer disease is a chronic disease characterized by frequent recurrences. Recent studies have suggested that the eradication of *Helicobacter pylori* infection affects the natural history of duodenal ulcer disease such that the rate of recurrence decreases markedly (1-6). However, the interpretation of these results has been complicated by the fact that several of the larger studies did not use control groups or any form of blinding (3, 5, 6) . In addition, studies of the effect of *H. pylori* eradication in patients with gastric ulcer have not been done. We report the results of a randomized, controlled trial in which we evaluated the effect of therapy designed to eradicate *H. pylori* on the pattern of ulcer recurrence in patients with duodenal or gastric ulcer.

Significance

Status Quo

Twofold Gap

Fill the Gap

Although plastic has revolutionized modern life, the environmental impact of traditional petroleum plastics is staggering. Bioplastics may provide a sustainable alternative to petroleum plastics because they use fewer fossil fuels in production and reduce greenhouse gas emissions as they biodegrade. One particularly promising bioplastic is polylactic acid (PLA)… PLA resembles traditional plastic and can be processed on equipment already used for petroleum plastics. However, the commercial viability of PLA is currently limited because it is only compostable in industrial facilities and cannot be mixed with other recyclable materials [1, 2]. To make PLA more commercially viable, we propose a device that composts PLA and other bioplastics within a home composting environment [3]. Such a device, we argue, would encourage the production of more sustainable and economic bioplastics.

Significance

Status Quo

Gap

Fill the Gap

These novelty moves can be applied to a variety of other contexts

Your turn: apply the novelty moves to your current work or a recent project

1. For the next few minutes, brainstorm about how these moves apply to your work (approx. one sentence per move – write them down!)

2. In groups of 2-3, have each person give an “elevator pitch” of their work, using these moves.

   Group members: listen to and critique these pitches, offering insight into what was clear and what was confusing.

Presenting Data

Use a sentence and a visual to communicate the “news” of your data

Help Seeking Among Undergraduate Men and Women in Engineering

Joanna Wolfe ◆ Jaime Fawcett ◆ Elizabeth Powell ◆ Sasha Kirshon
Carnegie Mellon University Tennessee Tech University

Succeeding in the Future

Asking for help when necessary is critical to success in the workplace, but newcomers often fear how they will be perceived when they request assistance.

To better understand factors that motivate or inhibit various groups of students from seeking help, we interviewed **32 female and 15 male engineering undergraduates.**

> *"Most of the time I'm very hesitant to go to their office. I do it, but I'm always scared that they're gonna think I'm an idiot when I walk back out."*

Women worry about how professors will perceive them for requesting help

Nearly 70% of women expressed fear that their professor would perceive them as unintelligent or unprepared for asking questions, compared to only 27% of men

> *"I see most of the students are boys and they are very—I don't know, maybe they get it better than I do. Sometimes I'll feel maybe embarrassed to ask them questions."*

Pride and independence inhibit some students from seeking help

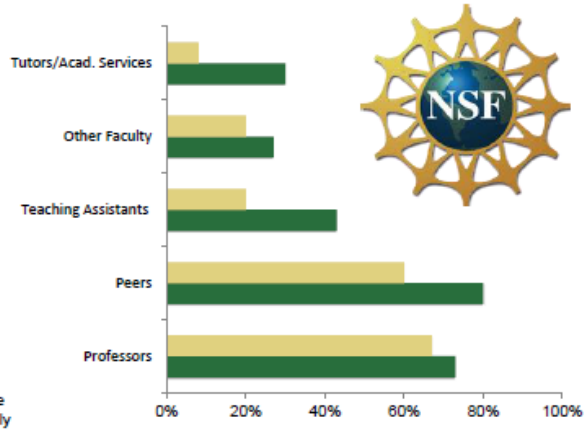
Nearly 30% (n=14) of the students we interviewed stated a strong preference to figure problems out themselves. This sentiment was more commonly expressed by male students **(40%)** than female students **(25%)**

Nearly 40% (n=7) of the under-represented minorities we interviewed expressed concerns about their peers' perceptions compared to 14% (n=4) of their majority peers, a marginally significant difference ($p < .08$, Fisher's exact test).

Tellingly, the only men who expressed concern about how their peers would perceive them for asking help were under-represented minorities.

> *"I'm really stubborn and prideful on that. I will not go to tutoring if I need help or if I'm having trouble on a problem, I'd rather just sit down and figure it out myself."*

Women reach out to more resources than men



Over 90% of the women reported using two or more resources ($p < .01$, Fisher's exact test)

Despite fears, many students learned to ask for help

Many Students reported feeling more comfortable after a positive experience with an instructor

Students developed strategies for asking questions such as doing as much of the work as possible in advance in order to **form specific questions.**

> *"I try to do all the work beforehand so I can point out to him exactly what's going wrong, and why I'm not understanding."*

Seeking Academic Help Optimally

Students need to be persuaded that knowing when to **ask for help** and how to **ask competently** are valued life-long skills.

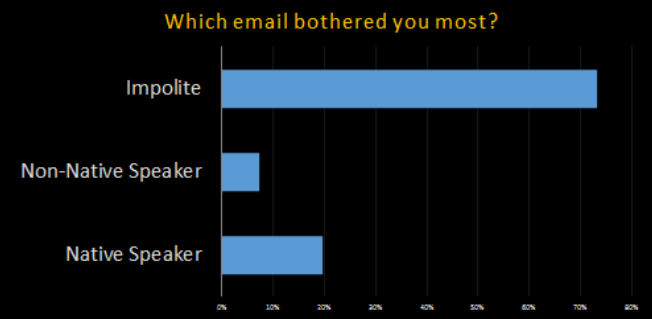
If asking for help effectively is framed as an engineering competency, women and other marginalized students may experience fewer fears of stigmatization when asking questions

“hey professor!”

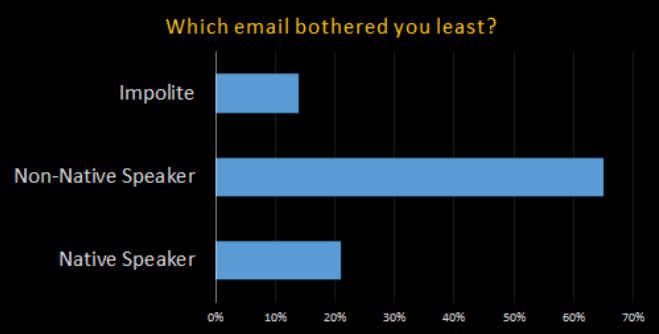
Valuing politeness and formality in emails

Joanna Wolfe
Carnegie Mellon University

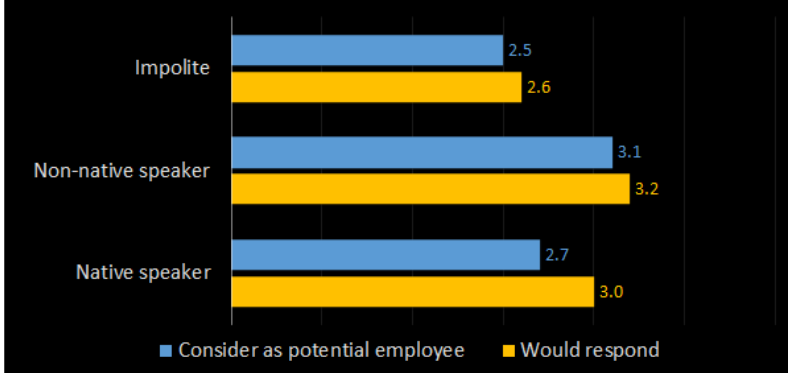
Participants ranked the impolite email as most bothersome



They ranked the email with non-native errors least bothersome



They were least likely to respond to the impolite email or consider this individual as a potential employee



Use sentence headlines to tell your data’s story

Results

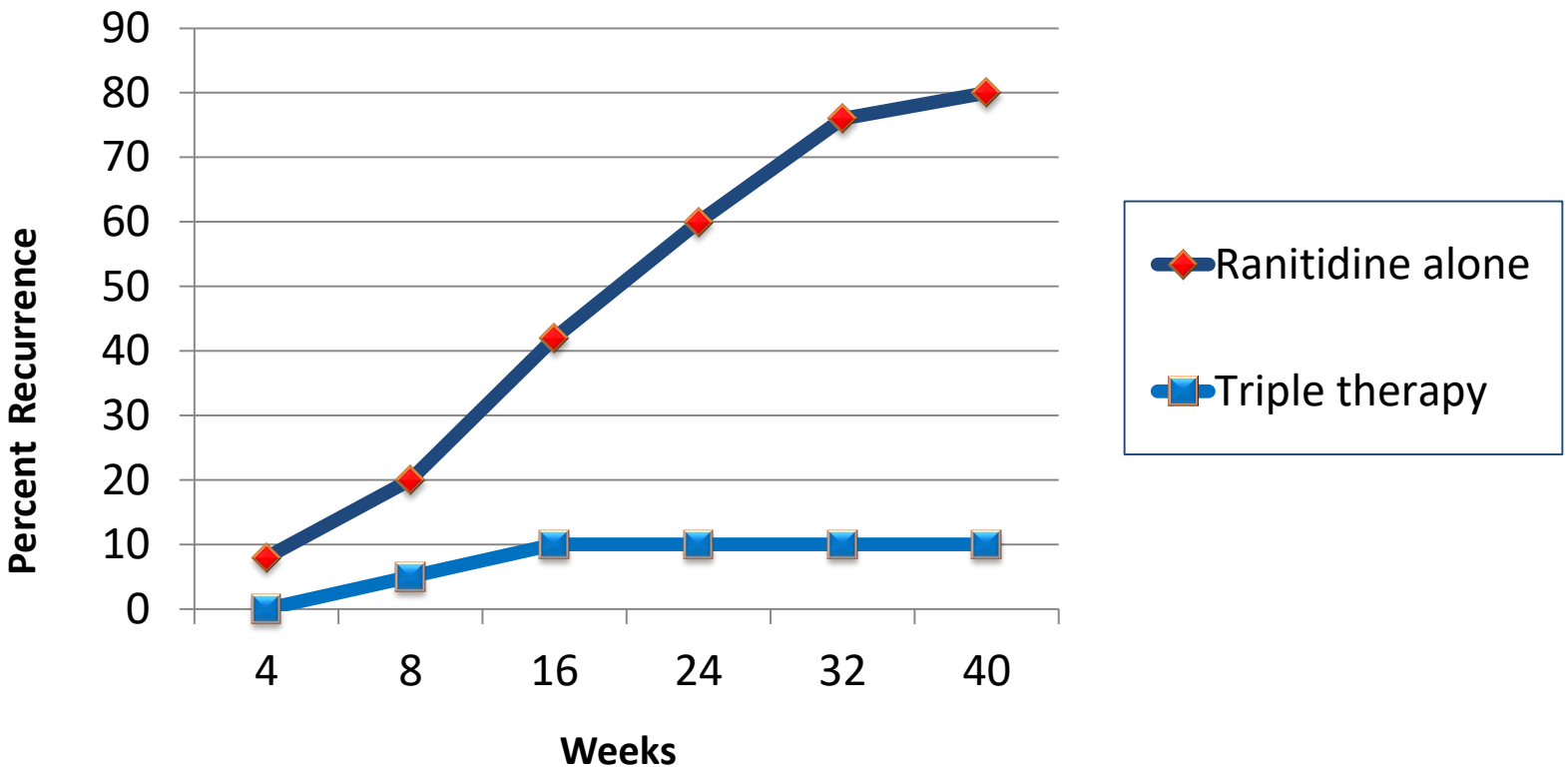


Figure 1: Ulcer recurrence with ranitidine vs. triple therapy treatments after 40 weeks, no maintenance given

Ranitidine alone vs. triple therapy

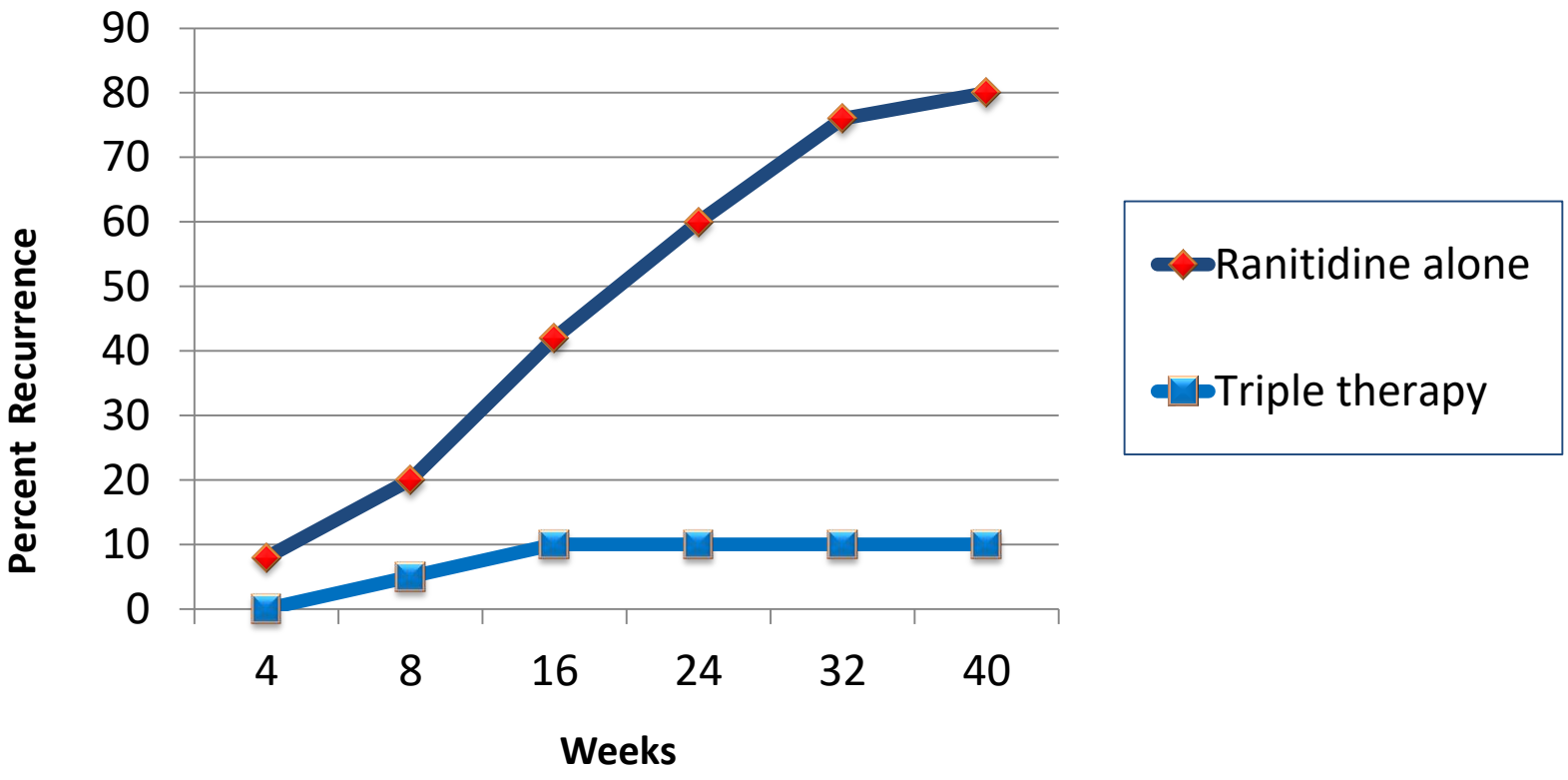
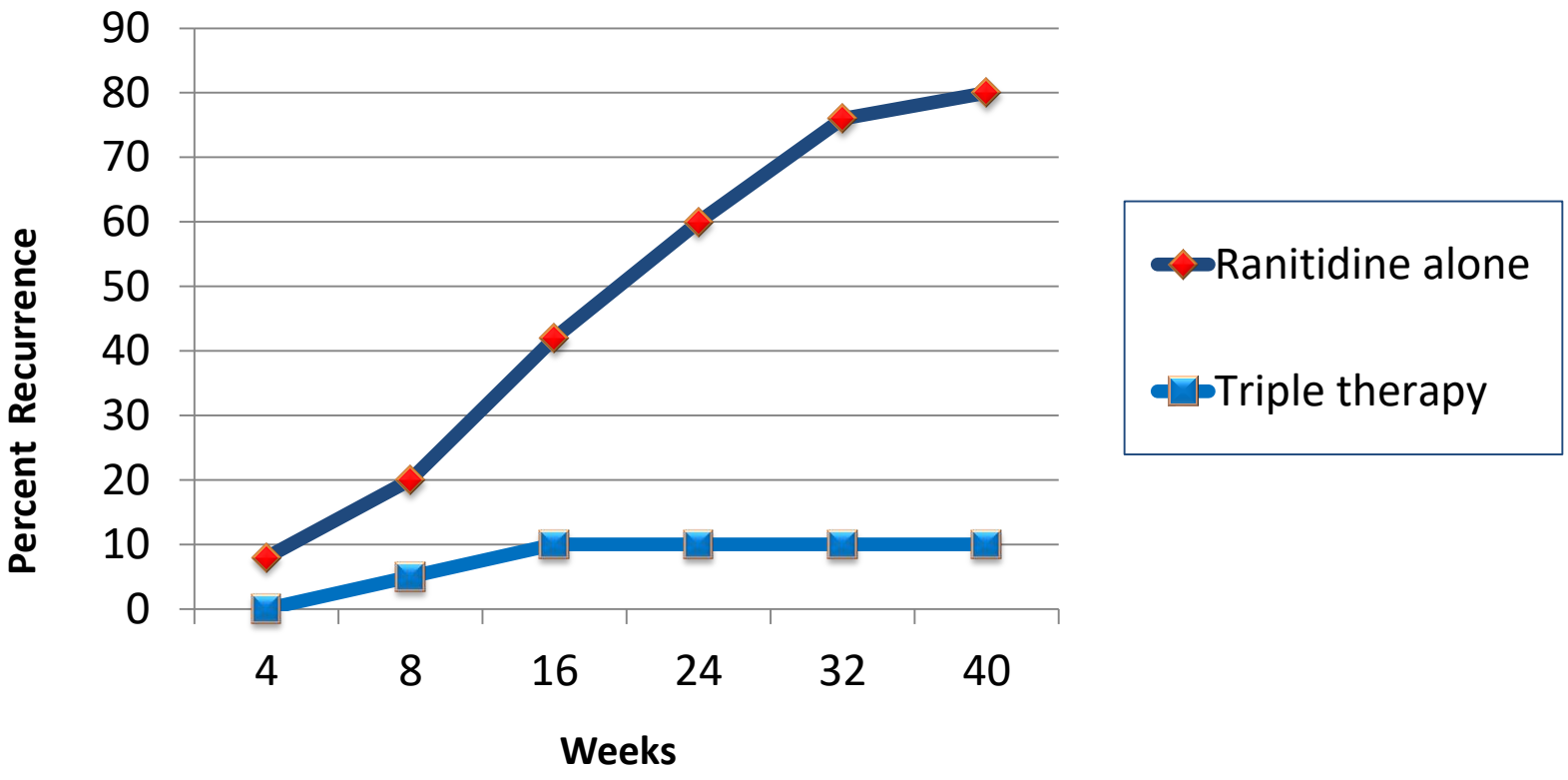


Figure 1: Ulcer recurrence with ranitidine vs. triple therapy treatments after 40 weeks, no maintenance given

Triple therapy reduced ulcer recurrence



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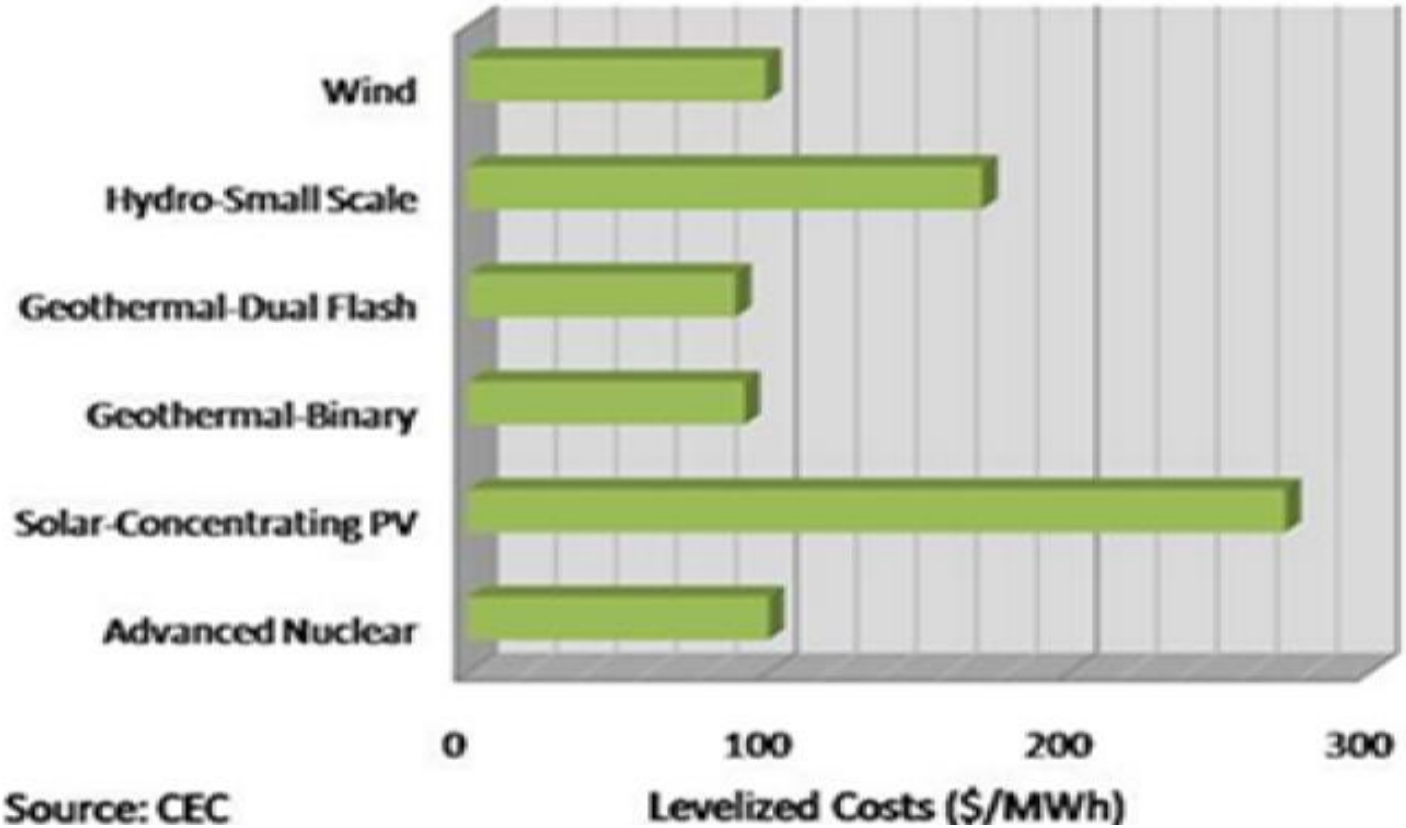
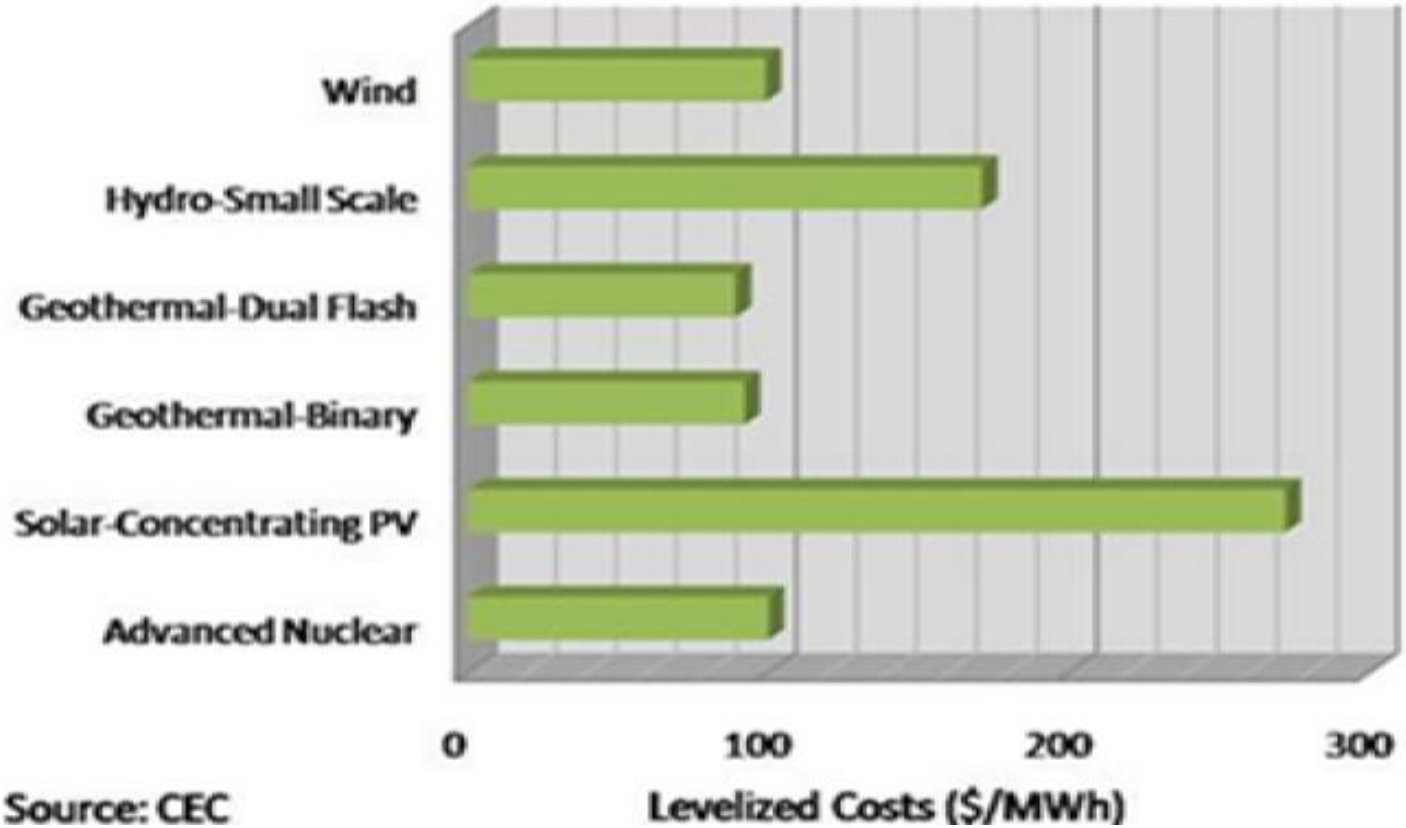
Levelized costs of selected technologies



Source: CEC

Geothermal technologies had the lowest levelized costs and solar had the highest



Source: CEC

Results

Table 1: Results of Fog Warning System Implementation

Implementation	***Before***	***After***
Average vehicle speed	45.5 mph	45.7 mph
Standard deviations in vehicle speed	9.4 mph	7.2 mph

Speed deviations decreased after the fog warning system was implemented

Table 1: Results of Fog Warning System Implementation

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Average vehicle speed	45.5 mph	45.7 mph
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The fog warning system produced safer road conditions by decreasing speed deviations

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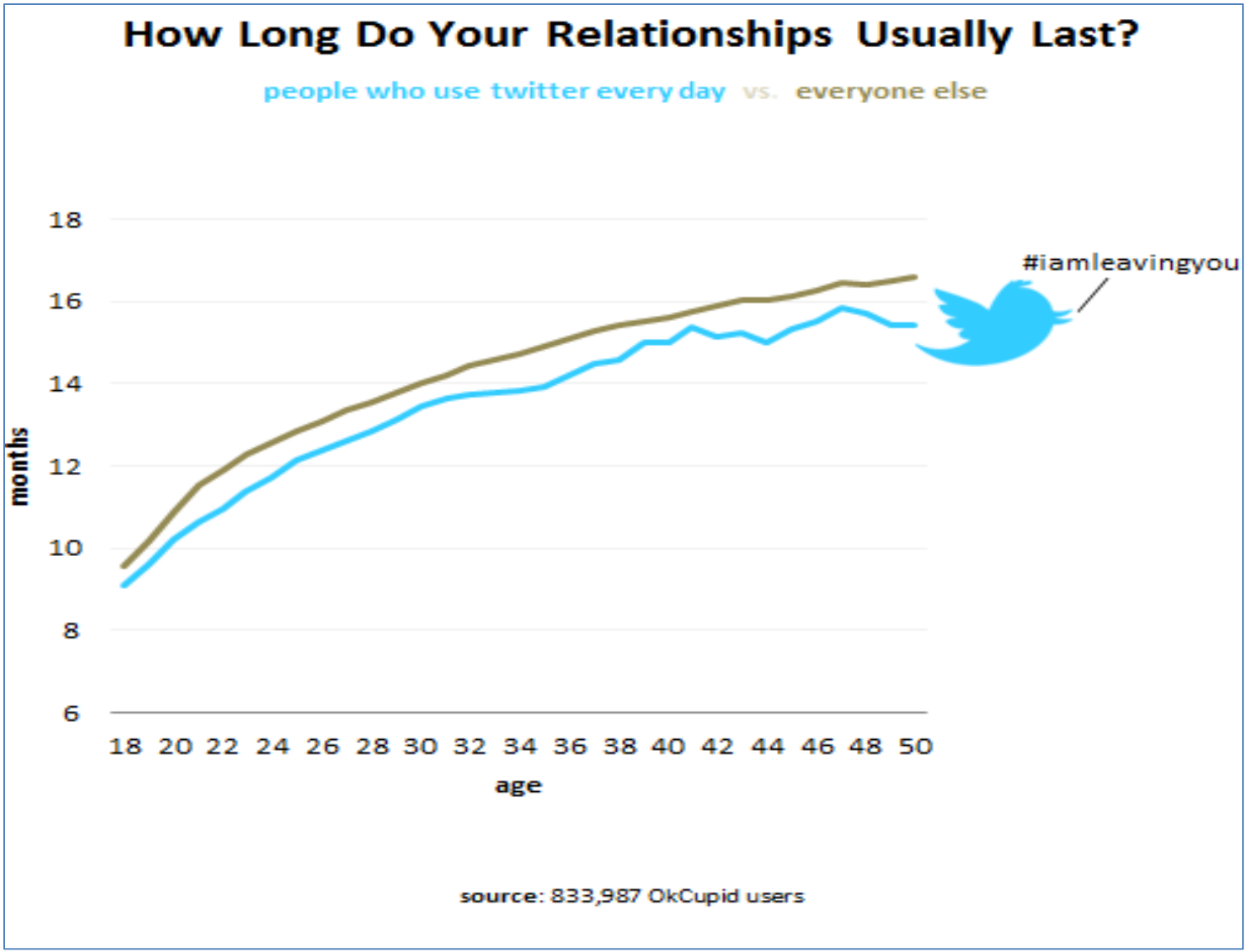
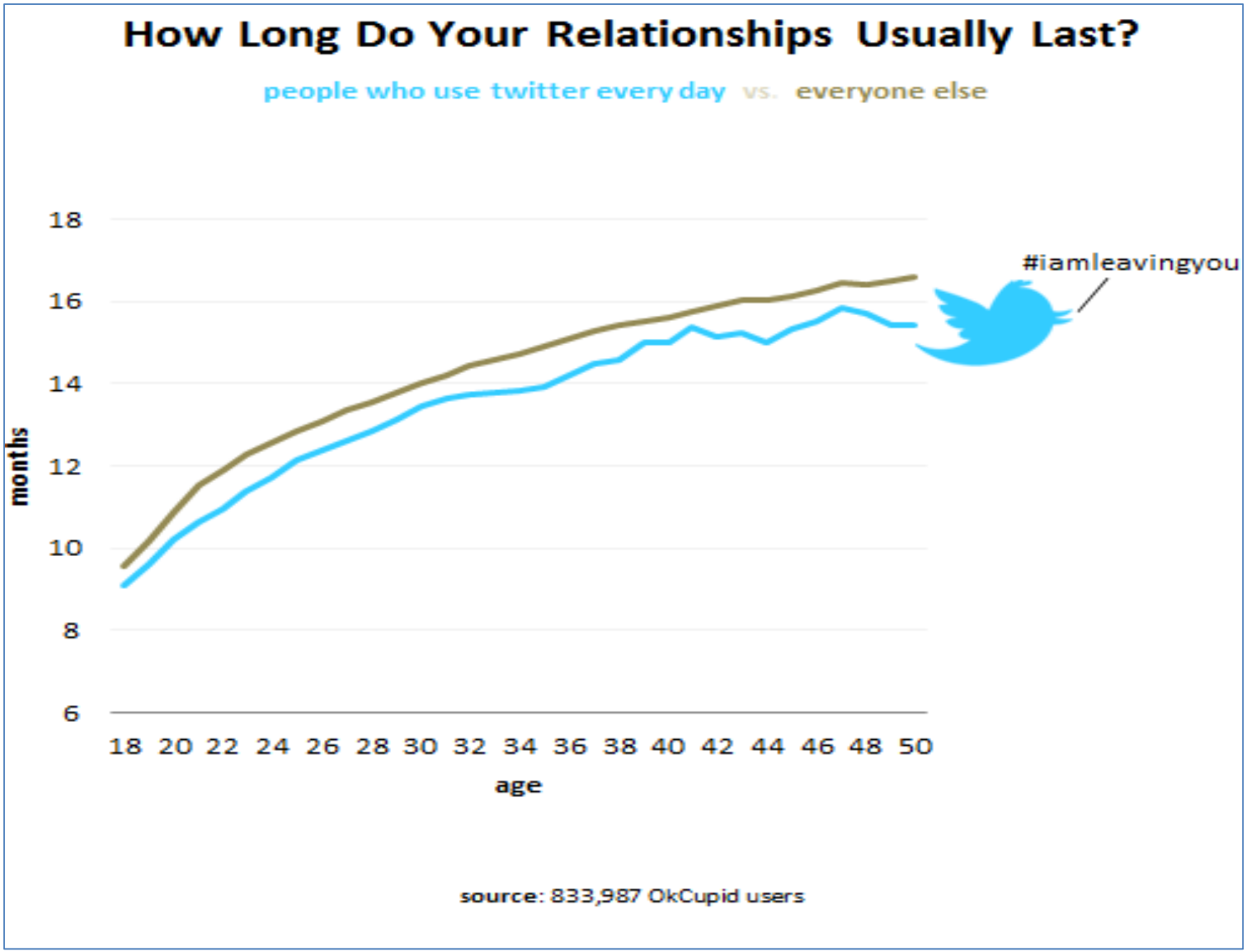
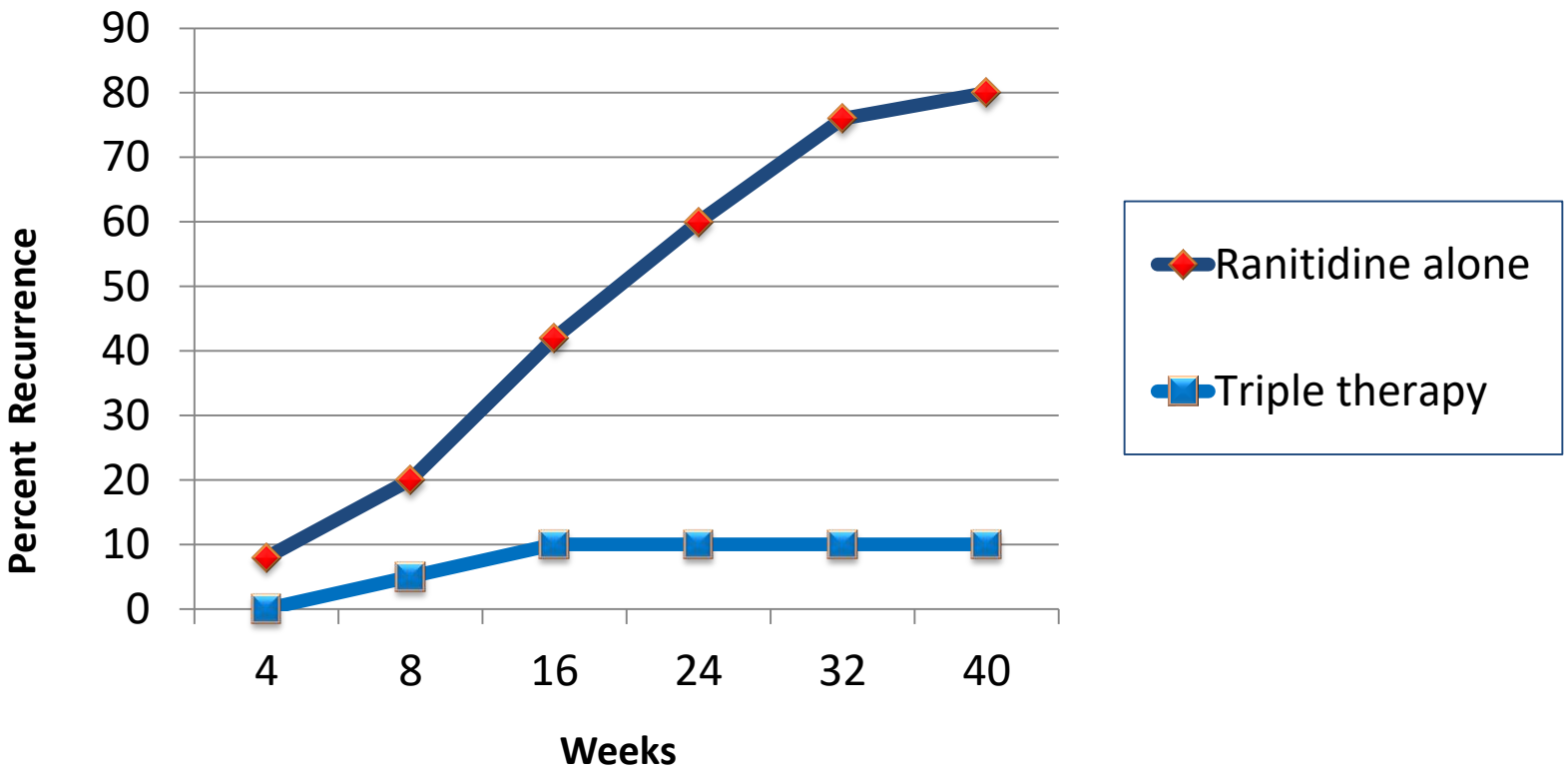

How Long Do Your Relationships Usually Last?
people who use twitter every day vs. everyone else
months
18
16
14
12
10
8
6
18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
age
#iamleavingyou
source: 833,987 OkCupid users

Daily twitter users average shorter relationships than others



Get rid of clutter

Triple therapy reduced ulcer recurrence



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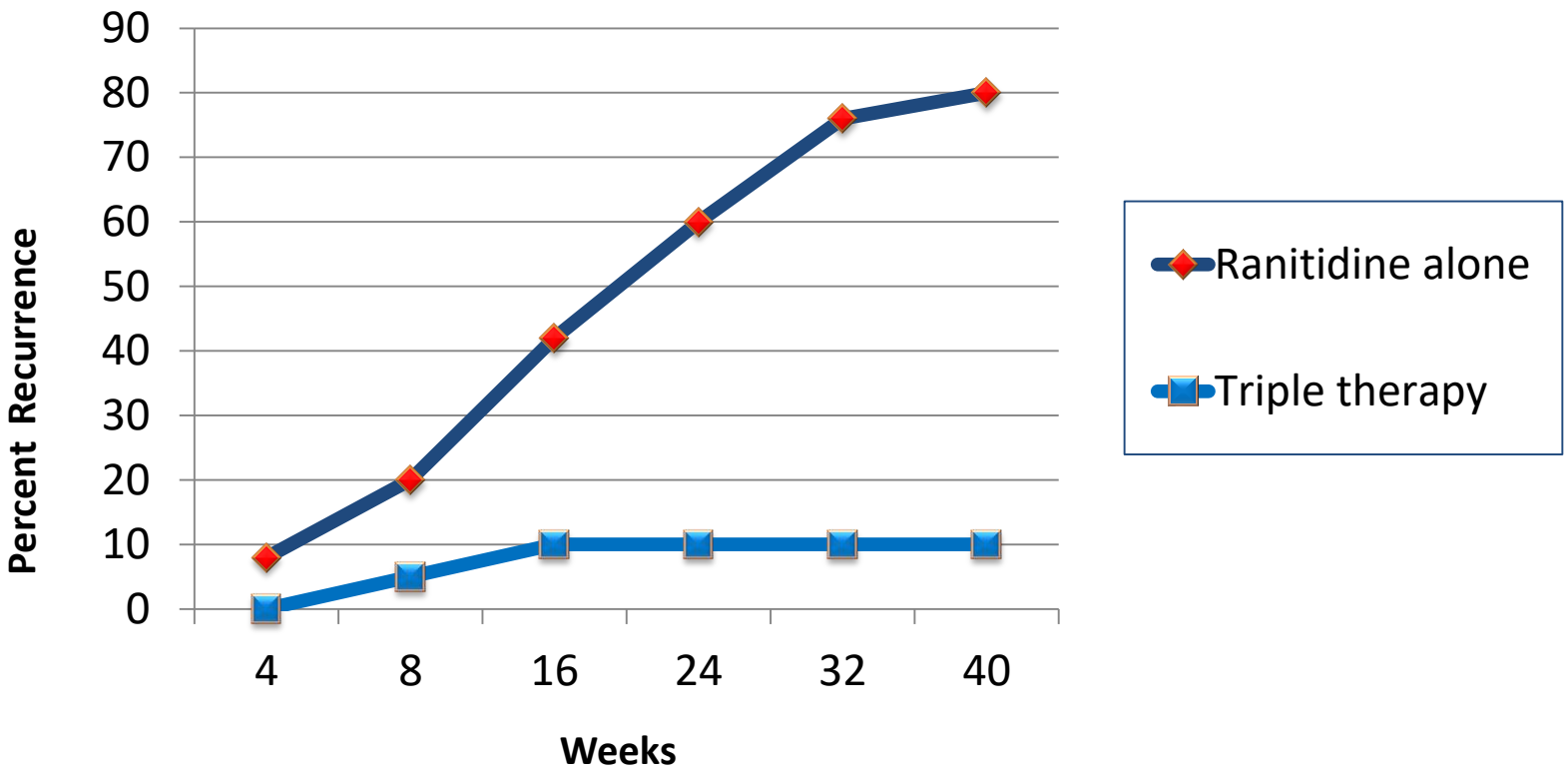

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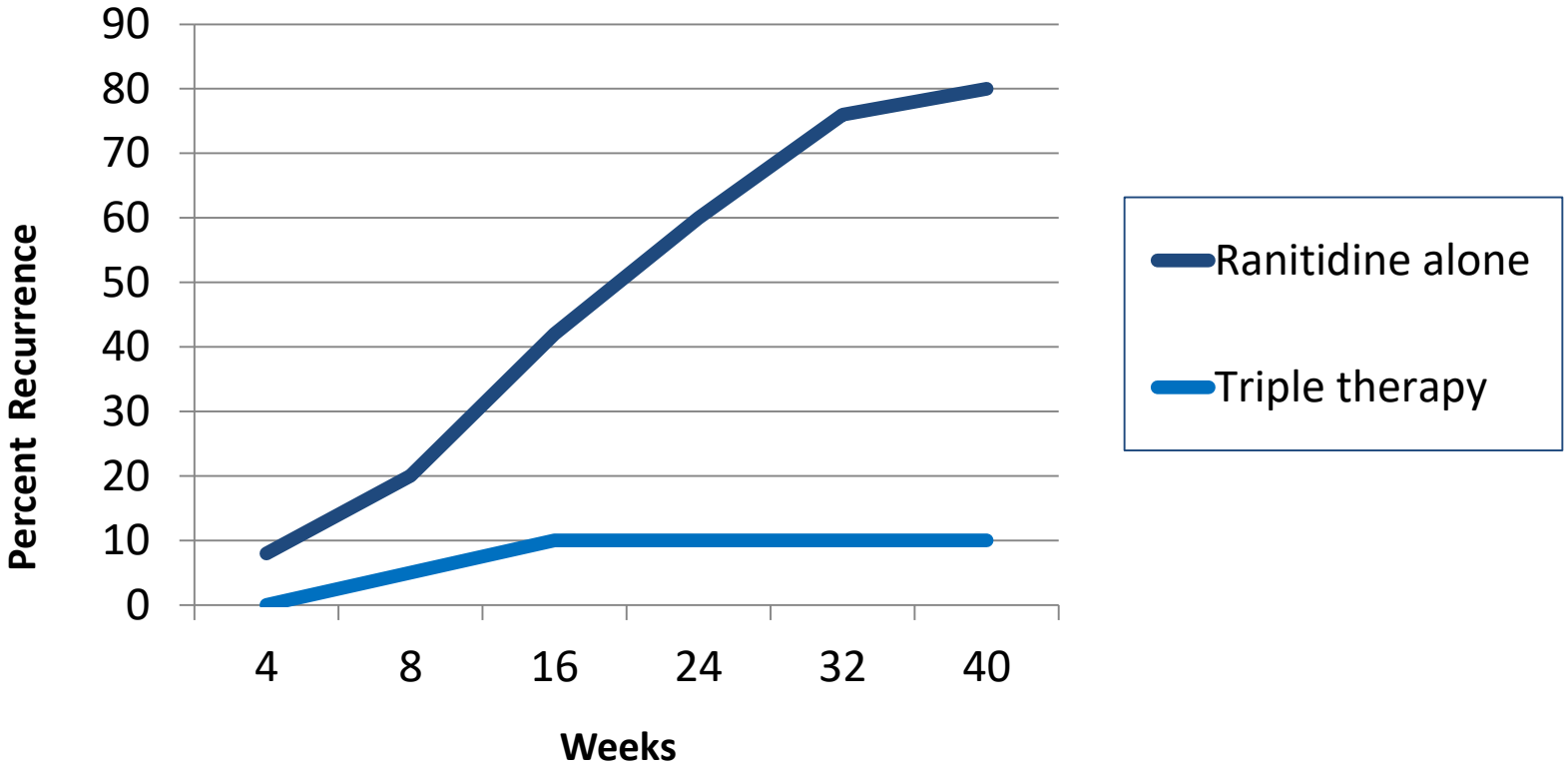

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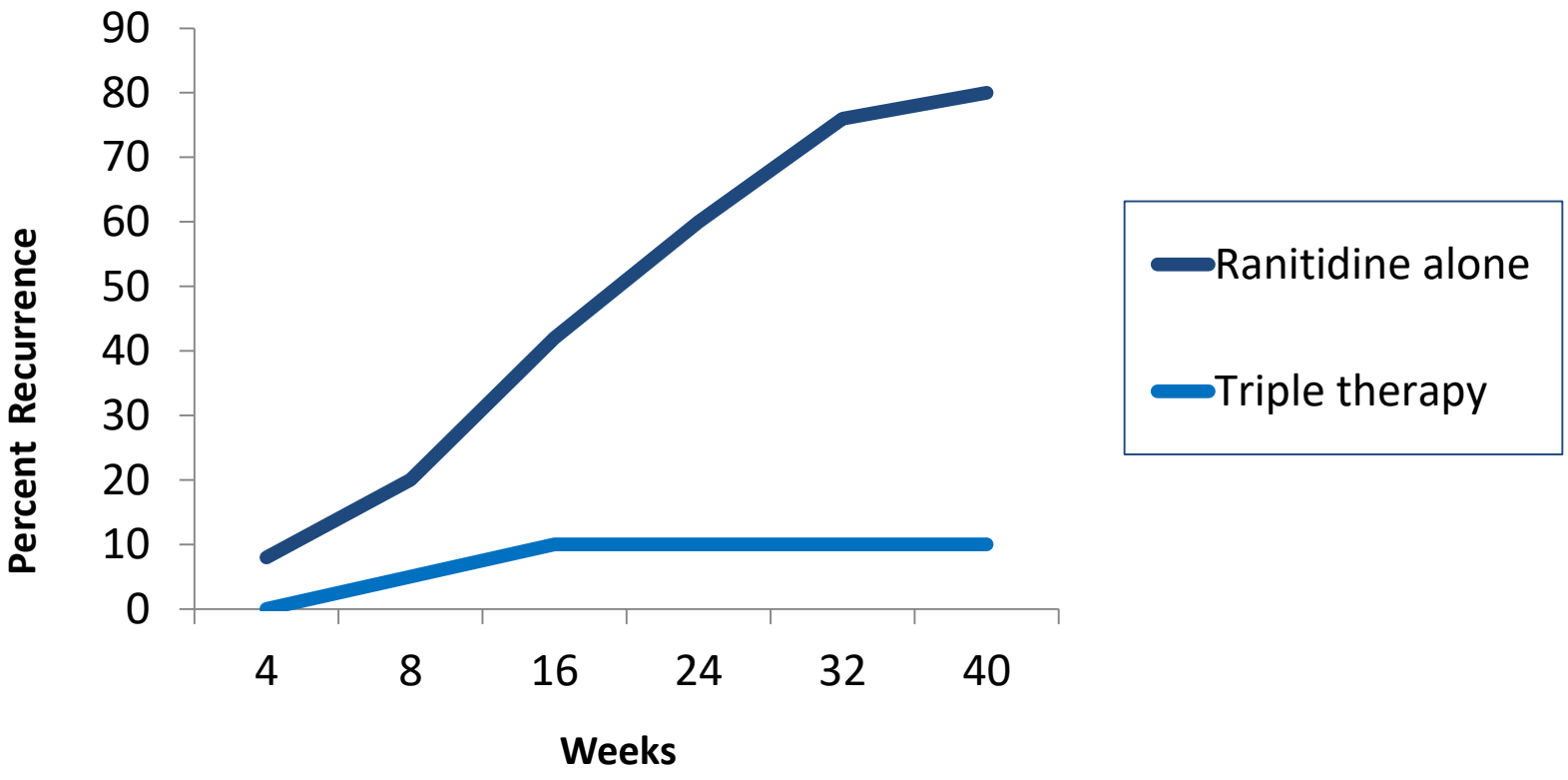

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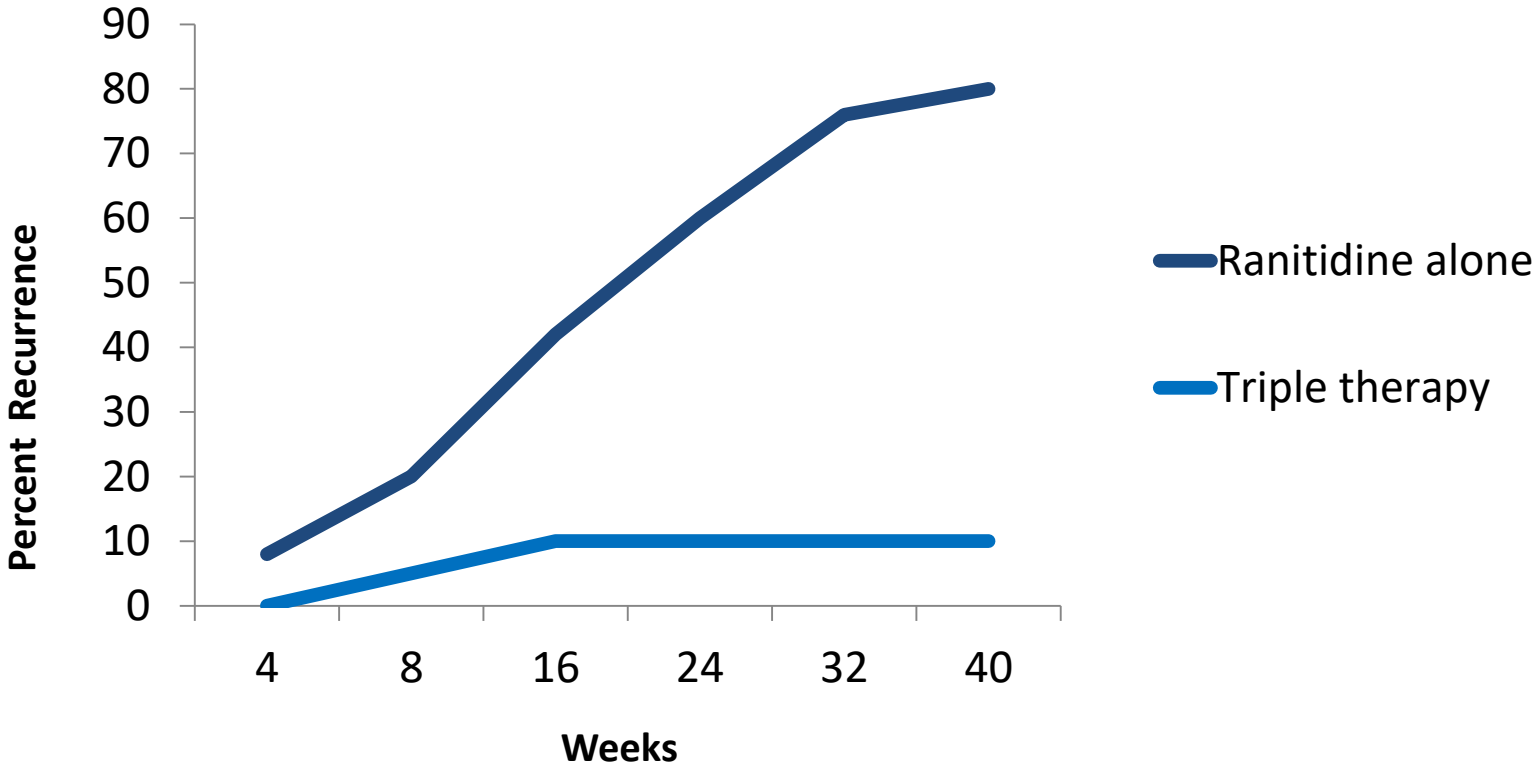

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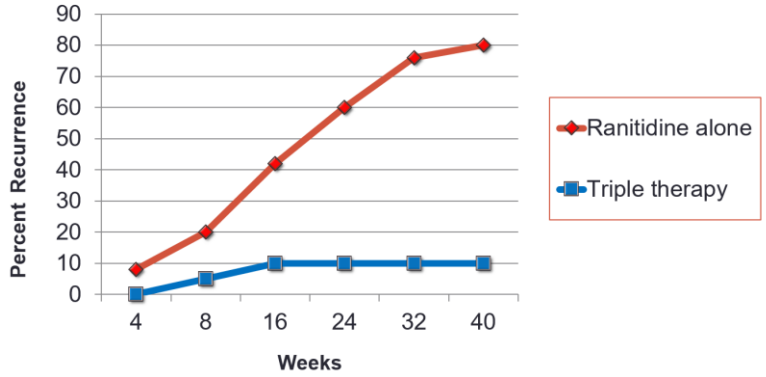

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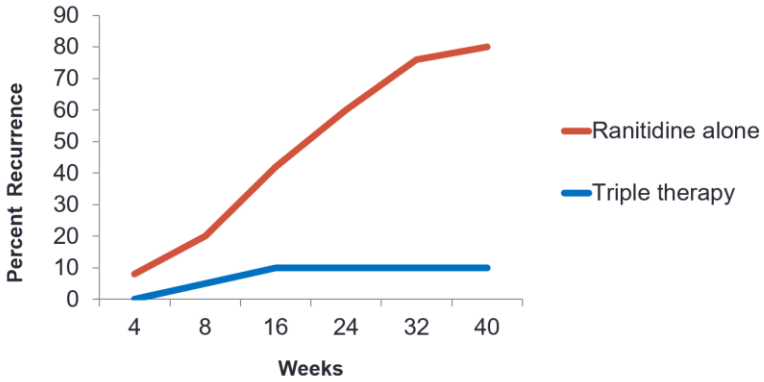

The fog warning system produced safer road conditions by decreasing speed deviations

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Compressor	Efficiency score
LZOP	1.00
PAR	1.00
PKZIP	1.00
JAR	.99
WINACE	.98
WINZIP	.97
STUFFIT	.94
DEEPFREEZE	.91
HUFFMANCE	.91
OPAQUE	.71
BLINK	.58

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Sort to emphasize your story

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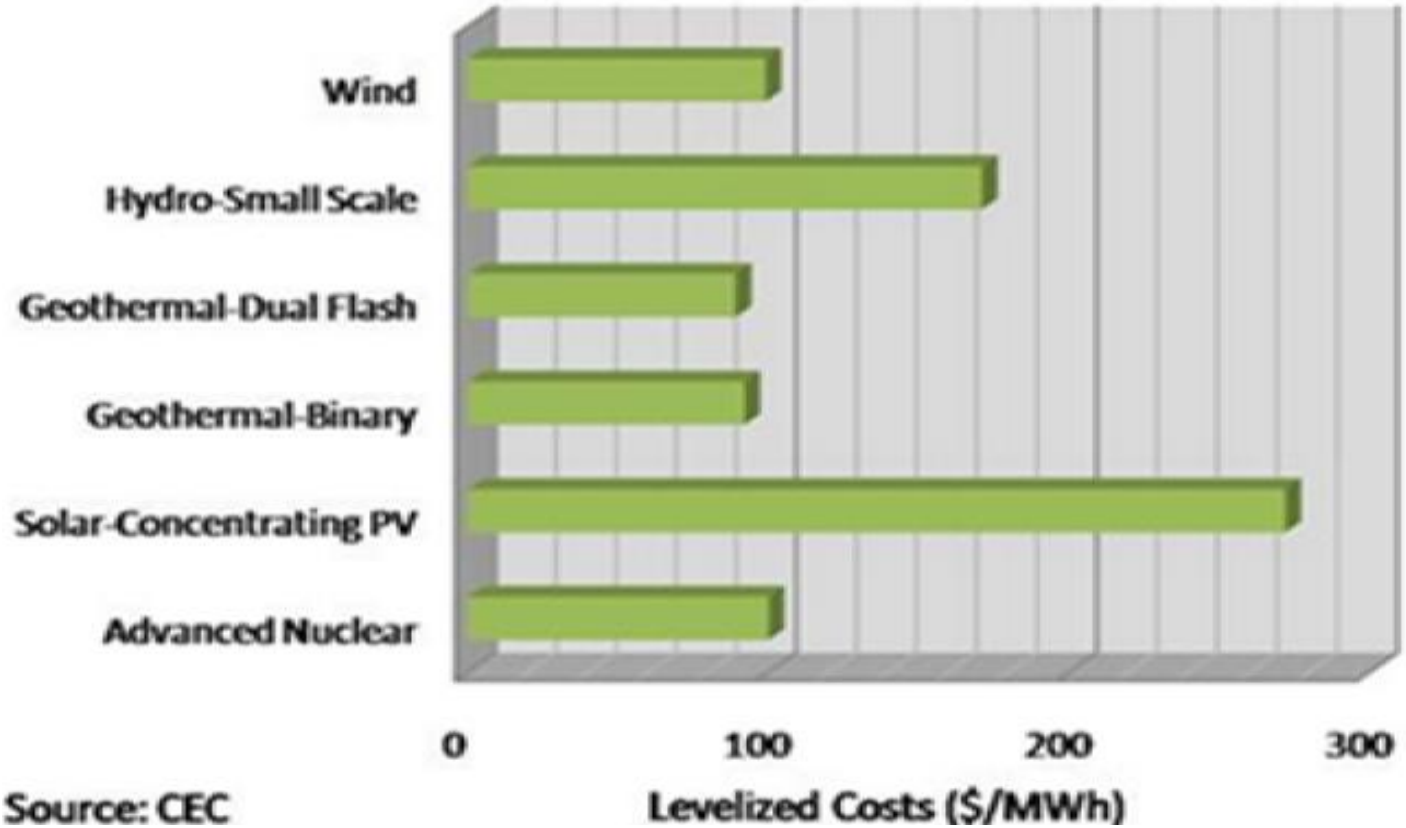

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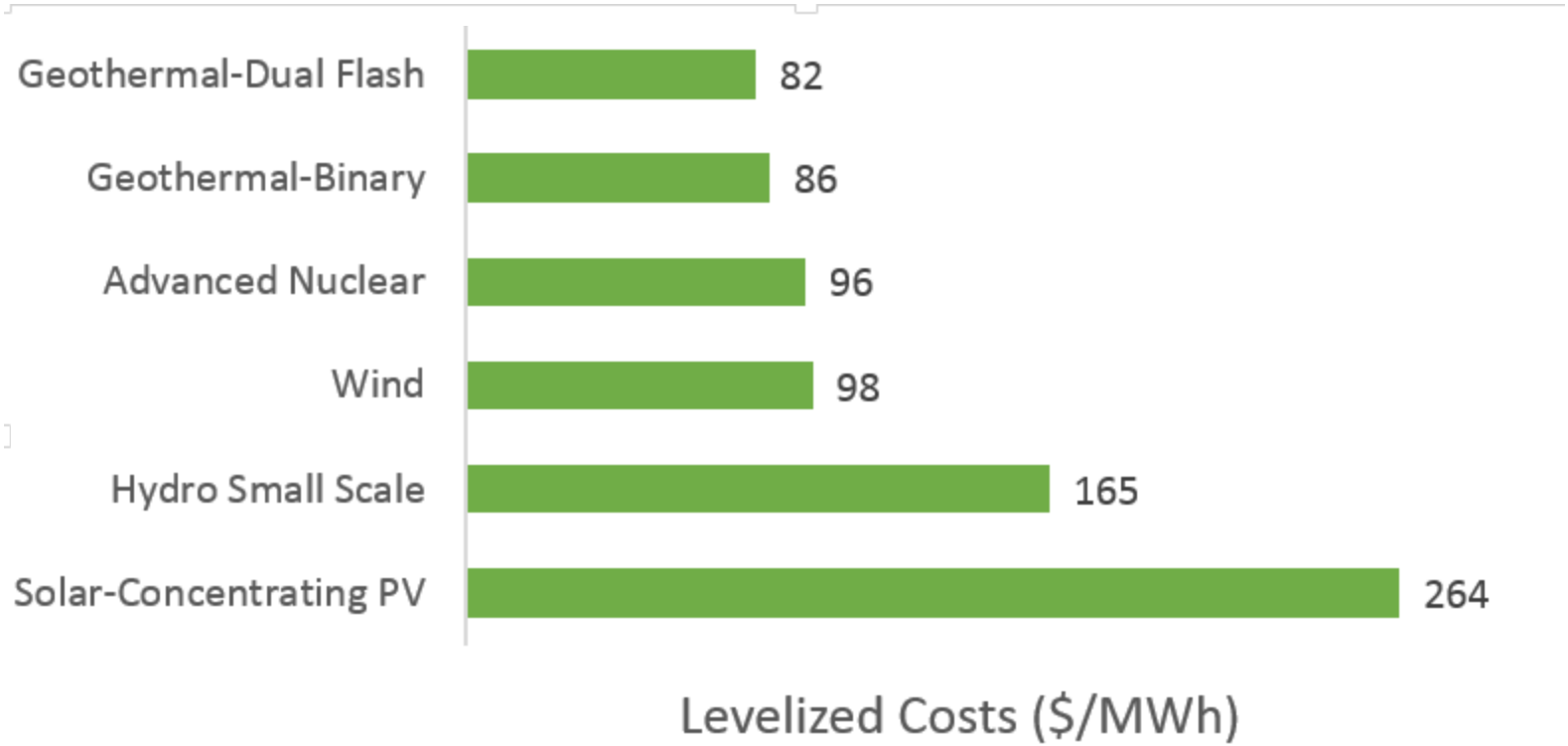

State	Homicide Rate per 100,000
Alabama	12
Arizona	9
California	8.8
Colorado	4.7
Connecticut	3.9
Florida	7.7
Georgia	8.7
Louisiana	16
Maine	1.8
Mississippi	14.2
New Hampshire	2.2
New Mexico	9.5
New York	6.3
Rhode Island	2.8

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Maine	1.8
New Hampshire	2.2
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New York	6.3
Florida	7.7
Georgia	8.7
California	8.8
Arizona	9.0
New Mexico	9.5
Alabama	12.0
Mississippi	14.2
Louisiana	16.1

Review

1. Organizing the project (IMRD)
2. Introducing your project (The 4 Novelty Moves)
3. Presenting data
   - Using sentence headlines
   - Reducing clutter
4. Making a GCC Appointment

Questions?

Make an appointment at the Global Communication Center

Email

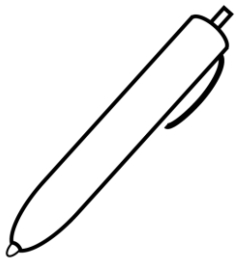
gcc-cmu@andrew.cmu.edu

Website

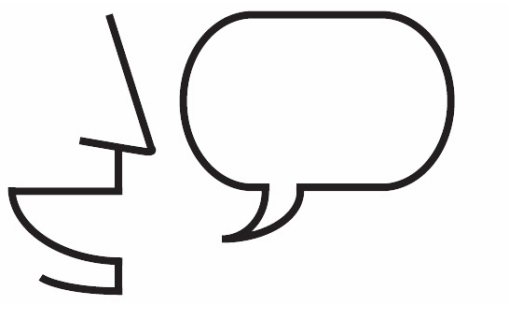
www.cmu.edu/gcc

The GCC supports CMU students on any academic or professional communication project

Written

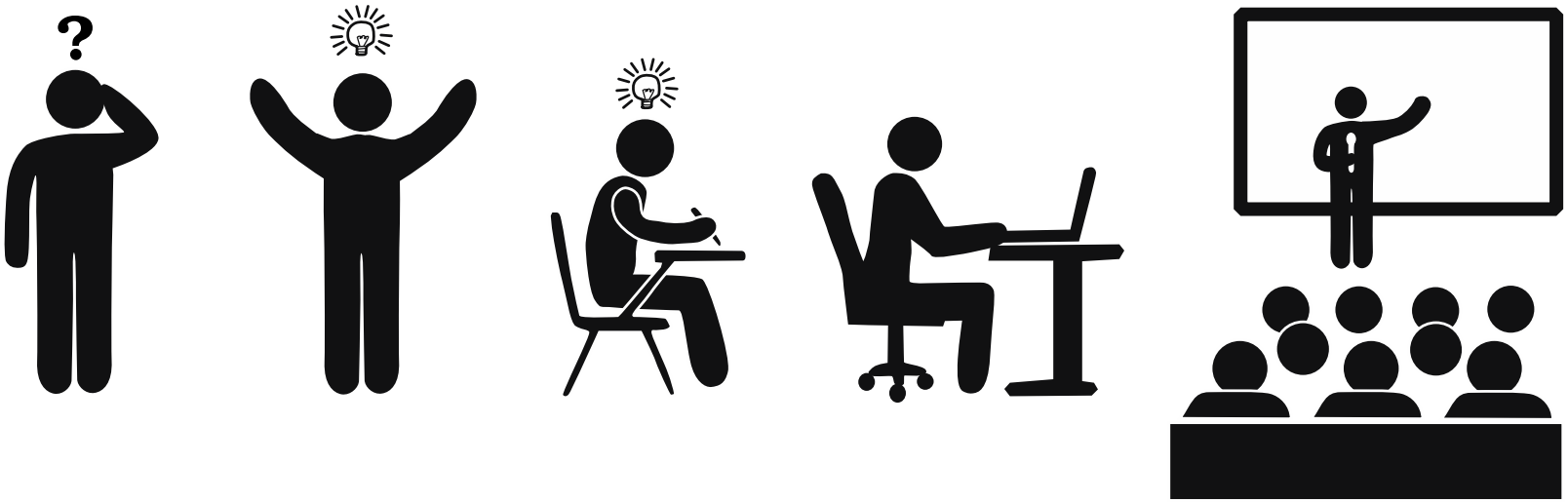


Oral



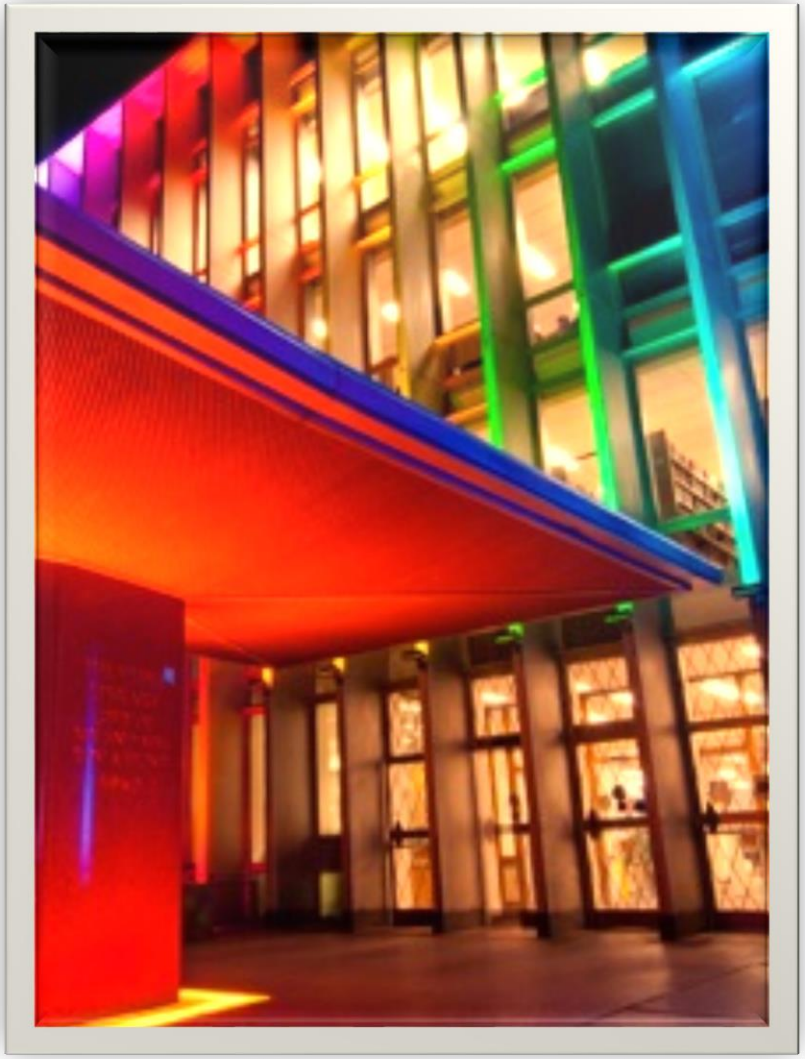
Visual

A GCC tutor can assist you at any point: brainstorming, writing, revising and rehearsing



GCC tutors are trained to work with grad and undergrad students in the sciences and humanities

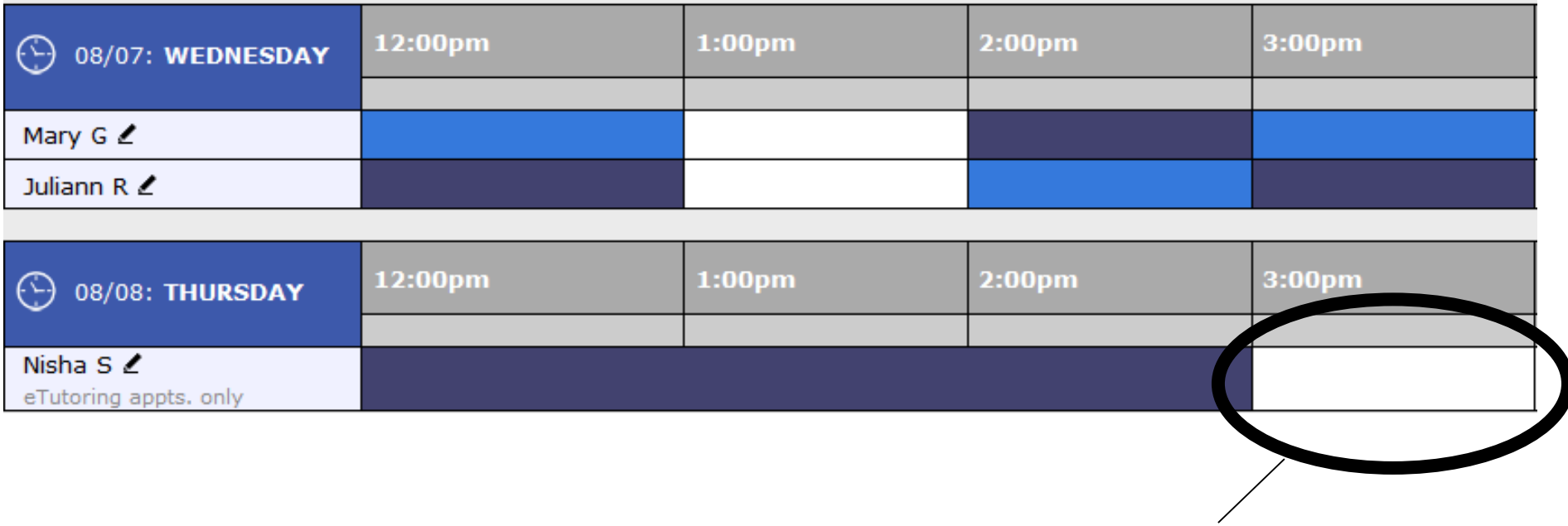
The GCC is located on the first floor of Hunt Library



Summer Hours:
Monday-Thursday 10:00-5:00

*subject to change

You can check availability and schedule your appointment at **cmu.edu/gcc**



White slots = available

Time: REPEAT APPT.	Wednesday, June 03: 12:00pm to 1:00pm
Client:	Shanmugaraj, Nisha (nls@andrew.cmu.edu)
Is this your first visit to the GCC?	-- please select -- *
Describe your assignment:	*
Describe your *communication goals* (please be specific):	*
What is the stage of your draft?	-- please select --
What sections of the text would you like to focus on?	
When is your project due?	*
Other comments, i.e., group project (25 word limit):	
What is your status at the university?	-- please select -- *
What is your	

Make an appointment at the Global Communication Center

Email

gcc-cmu@andrew.cmu.edu

Website

www.cmu.edu/gcc

Your turn: apply the novelty moves to your current work or a recent project

1. For the next few minutes, brainstorm about how these moves apply to your work (approx. one sentence per move – write them down!)

2. In groups of 2-3, have each person give an “elevator pitch” of their work, using these moves.

   Group members: listen to and critique these pitches, offering insight into what was clear and what was confusing.