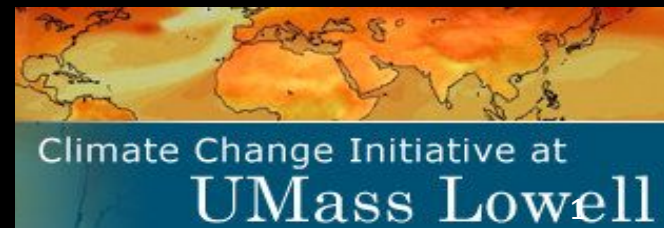
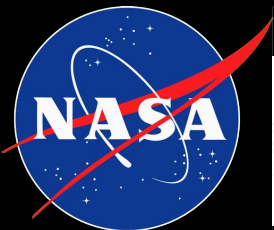


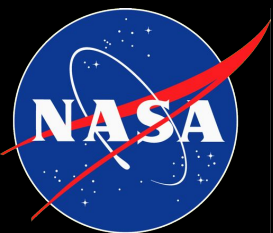
Climate Change Education: Student Media Production to Educate, Engage, and Inspire

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Associate Professor, UMass Lowell





Thanks to



And especially...

- Cecelia Hunt



- Elizabeth Adams



- Devan Hawkins



- Paul Yan



A sneak preview available at:

- http://cleanet.org/cced_media/YEP_Samples

Overview

- Goals
- Challenges
- Approaches
- Outcomes

Our shared goals

- Learners capable of:
 - Understanding (key processes) climate, Earth, energy systems
 - Retaining information effectively
 - Incorporating new information
 - Decision-making and creative **solutions** that are **commensurate** with the problem

Goals to get there

- Learners achieve **robust mental models** of climate, Earth, and human energy systems
- Mental model: internal representation of a system

Why mental models and climate change?

- Climate, Earth, and human energy systems epitomize complex, dynamic systems
 - Feedbacks
 - Non-linear processes
 - Time delays
 - Non-intuitive outcomes
 - Mitigation and adaptation **commensurate** with the problems require systems perspective

Mental models and cc education

- If fundamentally flawed, then
 - New information incorrectly assimilated
 - Poor retention
 - Decision-making and behavior dysfunctional

Examples of flawed mental models

- The Earth and atmosphere are vast systems on which human activities have negligible impact.
- In order to stabilize carbon dioxide concentrations in the atmosphere, we must stabilize carbon dioxide emissions.
- Climate change may be something we need to address in the future. If/when it emerges as a problem, we should do something about it then.

And, additional challenges

- Confluence
 - Controversy/ polarization
- Overwhelmed response
- >> If not overcome, these challenges negatively impact learning outcomes
 - (e.g., *The Psychology of Climate Change Communication*)

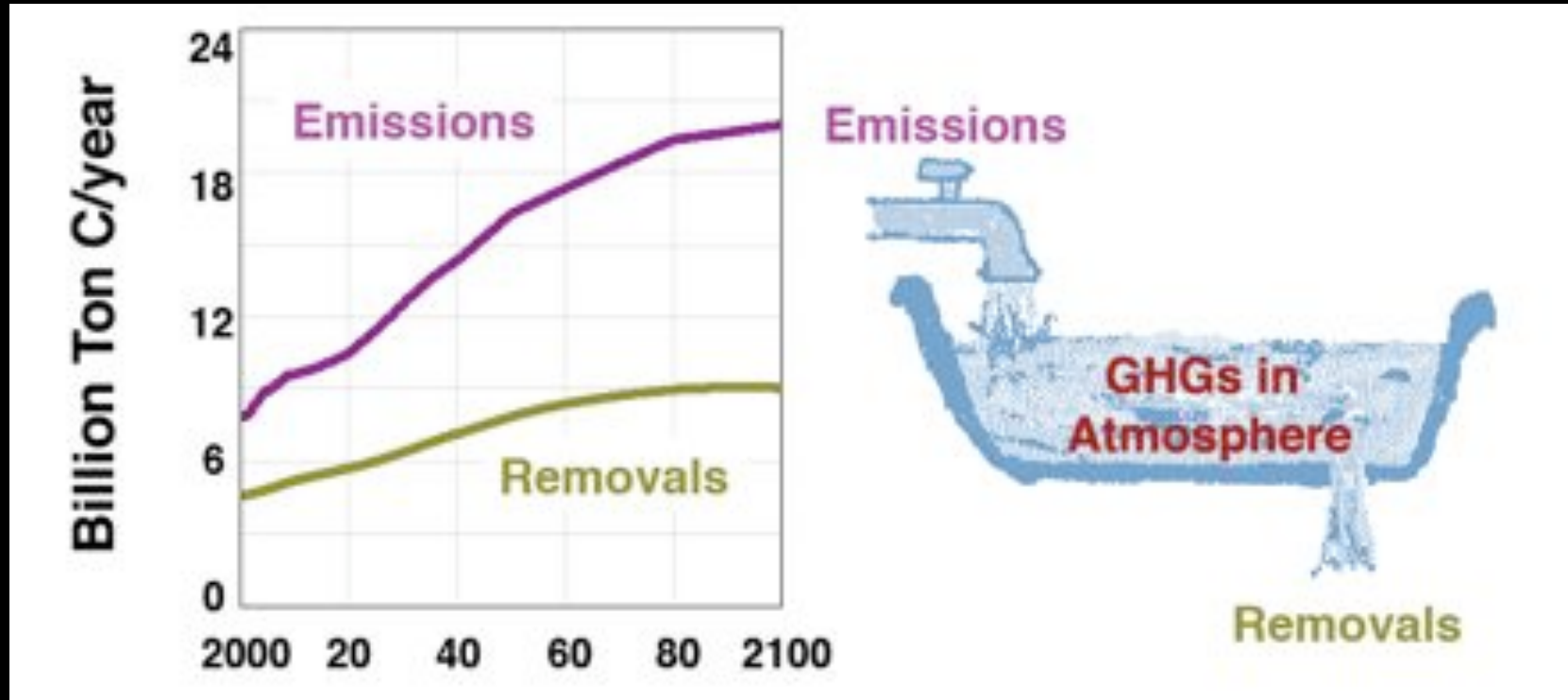
Our approach:

- Provide science foundation with systems approach
 - Provide clear picture of system
- Simulations and role-playing games
 - World Climate (Climate Interactive)
 - Others – stay tuned
- Engage and empower through student media production

Science content

- Systems thinking framework
- Science
 - Physical basis of greenhouse effect
 - Carbon cycle biogeochemistry
 - Climate models, *EdGCM*
 - Paleoclimate perspective on abrupt climate change
 - Impacts of climate change (human health, ecosystem services, biodiversity, SLR, ocean acidification)
- Solutions: economics, policy instruments, technology
- More online soon (contact me)

E.g., CO₂ as a stock-and-flow system



CO₂ emissions

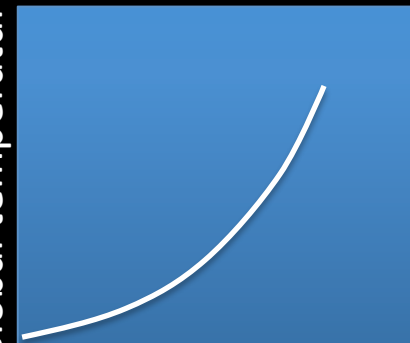
+

-

Global temperature

Global temperature

Time



Albedo

(+)

Arctic sea ice extent

+

-



CO₂ emissions

+

Arctic temperature

(+)

CH₄

+

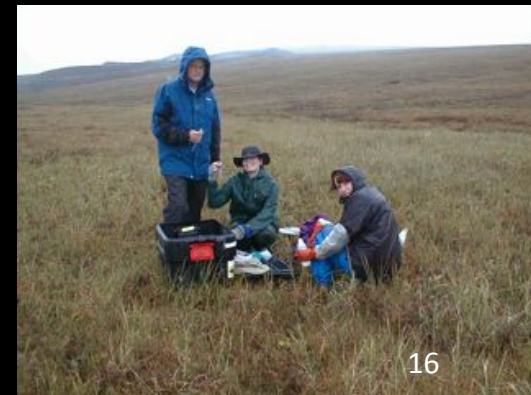
Relative abundance of
vascular plants in
peatlands

Acetate > methane
'switch'

+

Methane

Time



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Simulation games and mental models

- “Mere transmission of information is not sufficient”
 - Weber and Sterman 2011
- Learning through the same iterative process as the scientific method:
 - Form hypothesis, test through interaction with simulation, form new hypothesis, re-test, etc.
- “When experimentation is impossible, when the consequences of our decisions unfold over decades and centuries... simulation becomes the main – perhaps the only – way we can discover *for ourselves* how complex systems work....” Sterman 2011



World Climate:

**Negotiating a Global Climate Agreement using the
C-ROADS Climate Policy Simulation**



For more information

- See Climate Interactive's website:
 - <http://climateinteractive.org/>
- Video about the process and student experience:
 - http://cleanet.org/cced_media/YEP_Samples
- Evaluation:
 - *"The World Climate Exercise was seen as a powerful experience, and no one had any negative things to say about it. They particularly appreciated the experience of approaching the issue from a point of view other than their own."*

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Video production as an educational tool

Pre-Production

Research

Learning by 'teaching'

Team building, social learning

Planning

Outline/Storyboard

Draft script

Social/Group skills

Time management skills

Critical thinking

Information literacy

Research skills

Writing skills

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Production

Learn audio/video skills
Capture B-Roll
Shoot footage
Further research
Script development and editing
Ethical issues (copyright)
Begin editing

Technology (ICT) literacy
21st Century skills
Media literacy
Information literacy
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Post-Production

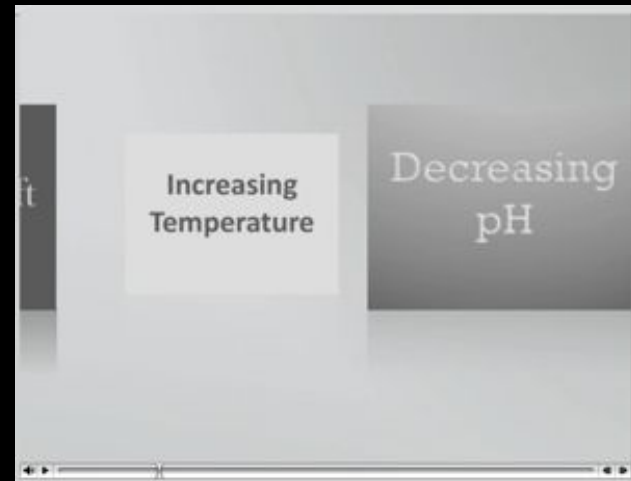
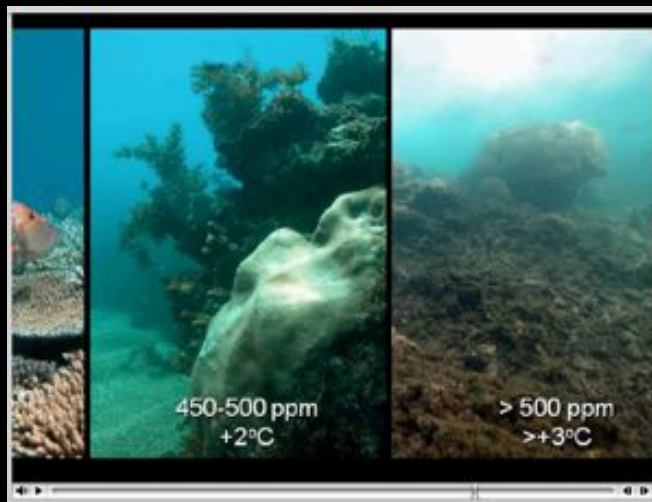
Final script
Editing
Capture more B roll
Record narration
Mix music
Output: DVD, Flash, iPod, etc.

Dissemination

Technology (ICT) literacy
21st Century skills
Media literacy
Writing/revision skills/reflection
Critical thinking
Engage others
Share/contribute
Community service learning

Examples of formats

- Video mashup
 - No cameras/footage – editing software
 - Can be information dense
 - Assignments: science and visual resources, narrative, rough cut, final screening, peer review



Public Service Announcement (PSA)

- One minute, straightforward message
- Pitch, script, pre-, production, and post-



Game show

- Students can both ask questions and answer them
- Can be light, yet effectively address science questions
- Can be done without cameras



Man-on-the-street/expert interviews

- Students come up with questions
- Combine with expert interview
- See News Report Video

News-Report-Project_8-2-11.mov

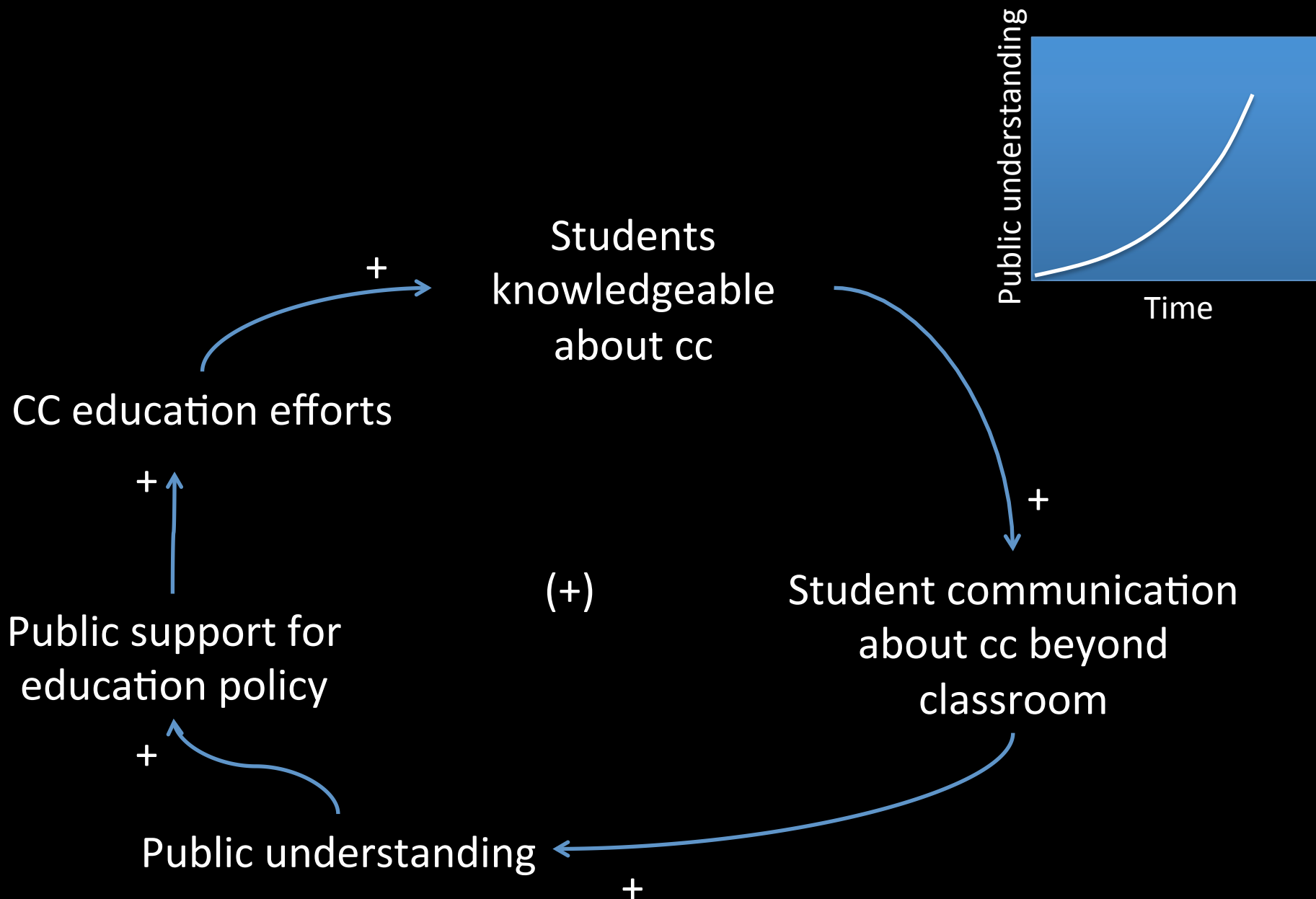


Integrating media production into YOUR classroom (?)

- Coming soon...
 - Online media toolkit
 - Professional development workshops and curriculum tools
- In the meantime
 - If possible, collaborate with your media center
 - Use formats that require little expertise/time commitment

Learning outcomes

- Solutions and confluence
 - How to balance need to engage learners with solutions, while maintaining focus on science and avoiding controversial issues?
 - Media production:
 - Leave ‘confluence’ to students
 - Provide science content, enable them to go outside science
 - Empower students to become part of the solution



Student comments: Learning through social interaction

“Not only is there more originality in the video production workshop but there is also more social cohesion which almost always leads to a deeper understanding of the material usually covered in class.”



“...the cooperation within the group ... really helped the project along and allowed us to share whatever skills we have. This project required a lot more group activity than a usual class. In group projects (like papers or presentations), usually one or two people end up doing the majority of the work.



In the video project, the entire group had to be there every day and participate in every step of the process. The production was a learning experience for everyone involved.”

Student comments: learning by teaching



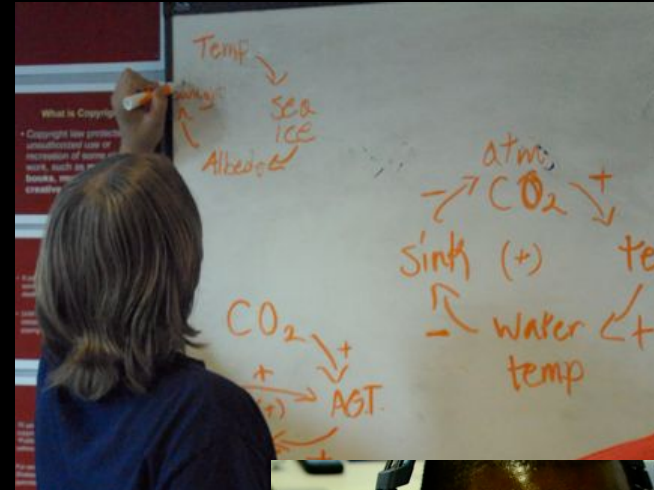
"....by challenging the class to communicate ... (something) as complicated as climate change, in a short film format, we were forced to show that we had a true understanding of the subject."

Creating a video about climate change is much more of a challenge than repeating facts back on a test. By making films we were forced to engage actively in the subject, rather than just passively learning about it."



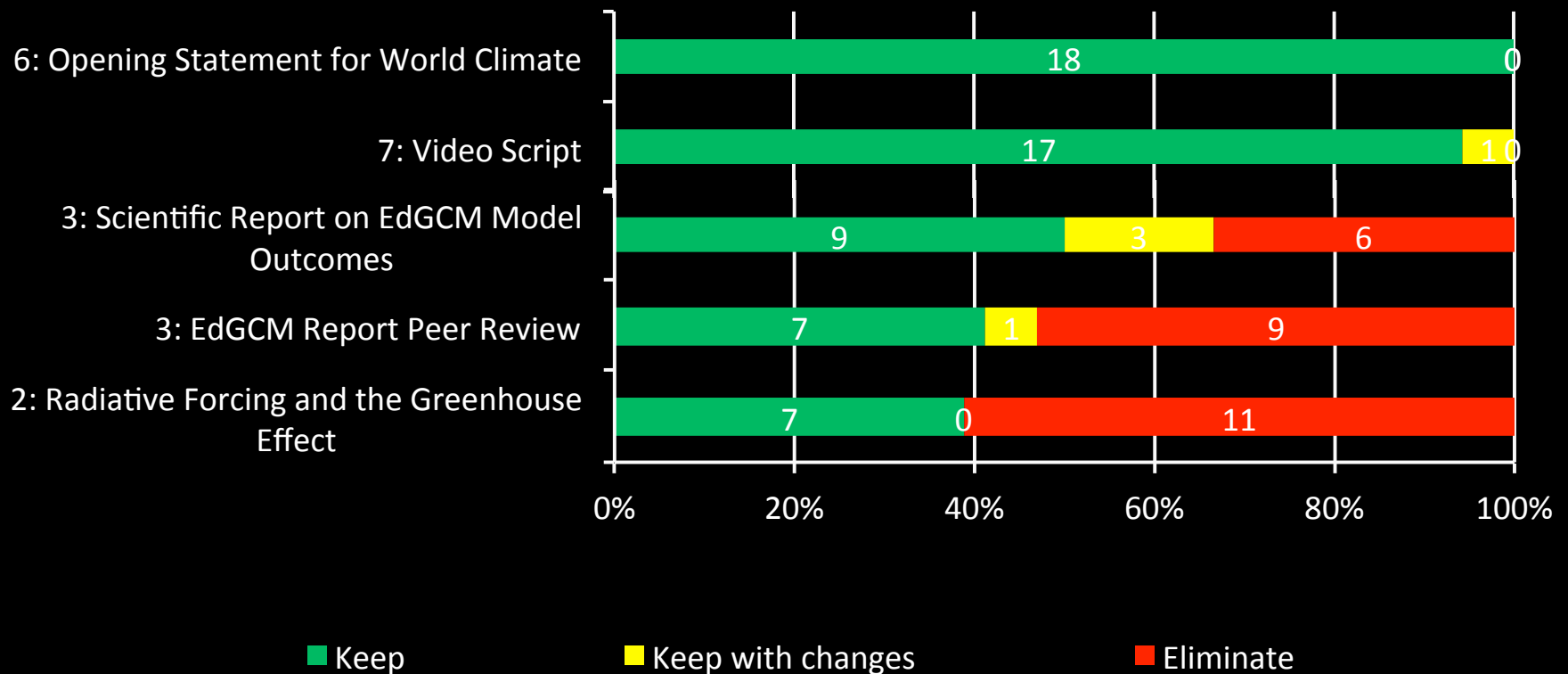
Student comments: active learning and solutions

"The actual experience of trying to create a means to communicate to the public made us realize how hard it actually is to communicate this message. In a lecture we would not have had that hands on experience and would most likely have gotten nothing out of it. The realization of the difficulty ... is what made it stick in our minds and made us strive to bridge these gaps in our videos. The experience was enjoyable and also educational, which is the best way to learn and not just forget what you learned down the line."



It is an experience we will always remember and will keep us wondering how to improve the issue and eventually lead to more solutions."

When asked about which assignments to keep and which to eliminate, all respondents wanted to keep the World Climate exercise and the video assignment.



Thank you!

- Questions?
- Juliette_RooneyVarga@uml.edu

