



# Color-Coding Strategy to Improve Student Written Argumentation



## Category

Writing assignments  
Artfully steering around the use of generative AI

## Instructors

[Amie Patchen](#), Lecturer  
[Kim Scholl](#), Writing and Academic Support Specialist

## Department

Public and Ecosystem Health  
College of Veterinary Medicine

## Course

VTPEH 6107: One Health/  
Planetary Health

## Discipline

Public Health

## Course-level

First-Year Masters students

## Course size

50 students

## Implemented

Fall 2023

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Students color-coding written argumentation supports the development of writing skills while also limiting opportunities for using generative AI.

## Brief Summary

A simple but powerful intervention asks students to color-code their written text to indicate how claims are supported with evidence. Each claim is assigned a color and students use the same color to mark the corresponding evidence; for example, a student could highlight a claim about increasing mosquito populations in a blue color, and then also mark the supporting evidence about mosquitoes in blue. This strategy limits the potential use of generative AI in student writing while providing a new way for students

to visualize and map out the argumentation and organization of a piece of academic writing.

Example of color coding the different claims in one sentence

**Color-coded evidence outline**

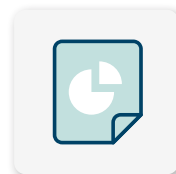
Claim: The increase in average temperatures in the Northeast United States over the past decades has contributed to changes in tick range and behavior, leading to an increase in Lyme disease.

You need evidence to support the following things:

- That temperatures in the NE US have increased (data from location, with citation)
- That warmer temps can contribute to changes in tick range and behavior (any relevant location, with citation)
- That tick range and behavior has changed in the Northeast US (data from location, with citation)
- That changes to range and behavior can increase Lyme disease (any relevant location, with citation)
- That Lyme disease cases have increased in the Northeast US (data from location, with citation)

Public Health

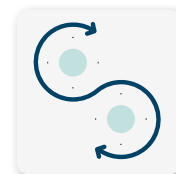
## Learning Outcomes



Constructing  
Evidence-based  
Arguments



Academic and  
Persuasive  
Writing Skills



Systems  
Thinking



Deductive  
Reasoning

## Context

Master of Public Health students must develop skills to construct and communicate evidence-based written arguments using a “claim-evidence-reasoning” framework. Students who use generative AI during this learning process bypass critical learning experiences and risk spreading bias and false information. This strategy explicitly sought to minimize the use of generative AI, while developing skills in written argumentation.

## Implementation

*“We give students paper copies and colored markers or crayons and ask them to work with a partner to identify the separate pieces of the claim and list the necessary evidence.”* Amie Patchen, instructor

Color-coding was used in three assignments, and also during instruction and in-class activities throughout the semester. Implementation follows an “I do, we do, you do” method, where instructors demonstrate the concept before the class works together as a group on sample texts. Finally, instructors ask students to color-code their written essays in ways that visually align arguments with their supporting evidence. Workshopping in small groups encourages students to both provide and receive feedback from one another.



“...the color-coding reduced grading time and provided instructors an opportunity to focus on more formative and substantive feedback...”

## How to Implement This in Your Class

Classes that incorporate academic writing and evidence-supported argumentation across the disciplines can incorporate color-coding strategies into their teaching practice. Some options include bringing colored highlighters or pencils to class and asking students to color-code a published text as a way to analyze the argumentation. You could also ask them to bring a draft of their assignment to class and color-code it themselves or as part of peer feedback. A next step could be to ask them to color-code an assignment submitted online by highlighting and changing the color of the text.

Using this color-coding strategy on its own may not be fully accessible to learners who have a form of color blindness or low vision. Instructors could use other ways of coding the claims instead of or in addition to this strategy; for example, using the same number/symbol for the claim and evidence.

Palm oil plantation expansion into natural forests increases interactions between humans, mosquitos, and malaria-carrying macaques, leading to an increase in zoonotic malaria infections. From 1989-2013 land used for palm oil plantations in Malaysia increased by 63.3%, with 39.6% of the expansion occurring in land that was previously forested.<sup>1</sup> The forest in Malaysia is home to macaques, a natural reservoir of the malaria parasite *Plasmodium knowlesi*,<sup>2</sup> and *Anopheles latens* mosquitos, a vector that can transmit *P. knowlesi* from macaques to humans.<sup>3</sup> Deforestation and forest fragmentation due to plantation expansion disrupt the macaque habitat, bringing macaques closer to the forest edge and humans deeper into the forest, thereby increasing proximity between humans, macaques, and the forest mosquitos.<sup>3</sup>

Example of text that has been color-coded to match claims to the supporting evidence

## Reflection and Future Directions

For students, color-coding their essays to match arguments with evidence and clear reasoning allowed them to quickly visualize and analyze their work: Did they support their claims with evidence? Is their essay organized clearly?

“It has substantially improved students’ written work and helped develop their ability to fully support their claims with evidence.” Patchen said.

For faculty, the color-coding reduced grading time and provided instructors an opportunity to focus on more formative and substantive feedback, while allowing them to easily identify students who were struggling.

Future work may focus on how learners can incorporate generative AI while also developing these critical and necessary foundational skills. For example, generative AI may help students reframe their work for other audiences or help with the refinement of language. Color-coding could also be used to evaluate text produced by generative AI.