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## Peer-Leader Activities in the Biology Classroom: Effects on Student Confidence in the Course and Knowledge of Discussion Topics

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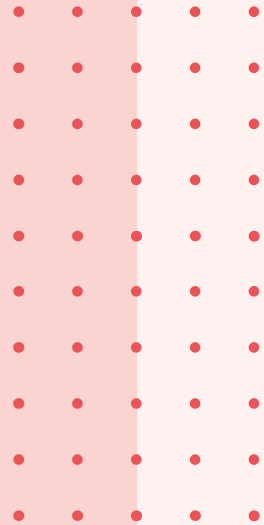
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# Peer-Leader Activities in the Biology Classroom: Effects on Student Confidence in the Course and Knowledge of Discussion Topics

Jadyn Peterson, Baylee Dye, and Laurie Minns  
University of Montana



# **Special Thanks To:**



**Laurie Minns, Ph.D**

**Baylee Dye**

**Raegan Hauschildt**

**Drake Leonard**

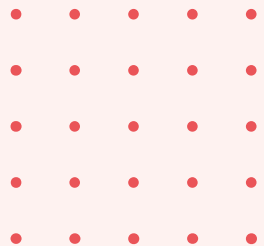
**Alexander Stuczynski**

# Students' Path Through STEM

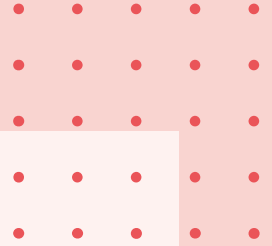


## Intent vs Reality

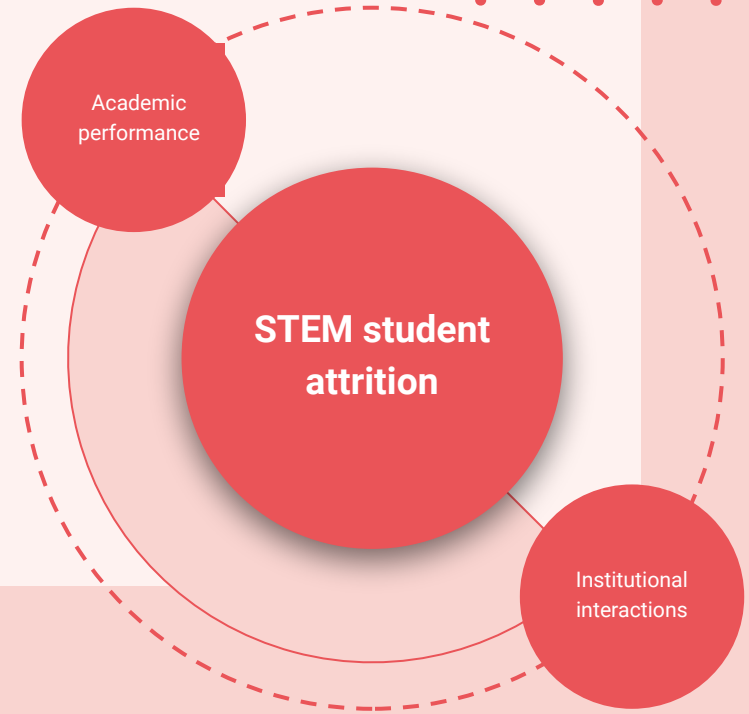
- ⅓ of all matriculated college students want to pursue STEM (STEM Education Data, 2014)
  - Reaching up to **40%** enrollment
- Only about **18%** of 2016 college graduates were in STEM fields (National Center for Education Statistics, 2017)



# A Persisting Issue...

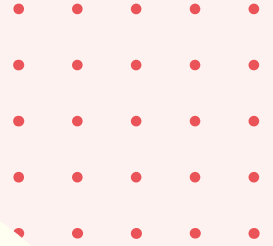


- Competitive and unsupportive classes; professors seem callous (Seymore & Hewitt, 1997)
- Receiving poor grades in STEM courses during the first year of college pushes students away (Chen & Soldner, 2013)

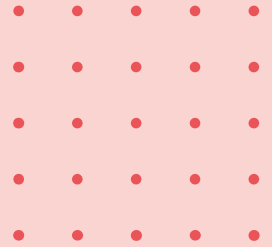


# Attitude & Environment

Students often gravitate towards areas of greater comfort and knowledge



# Active Learning Through Peer-led Activities



## No Judgement

Opportunity to ask questions and make mistakes  
(Zerger et al., 2006)



## Role Model

An example of success in the class and something to aspire to  
(Winterton et al., 2020)

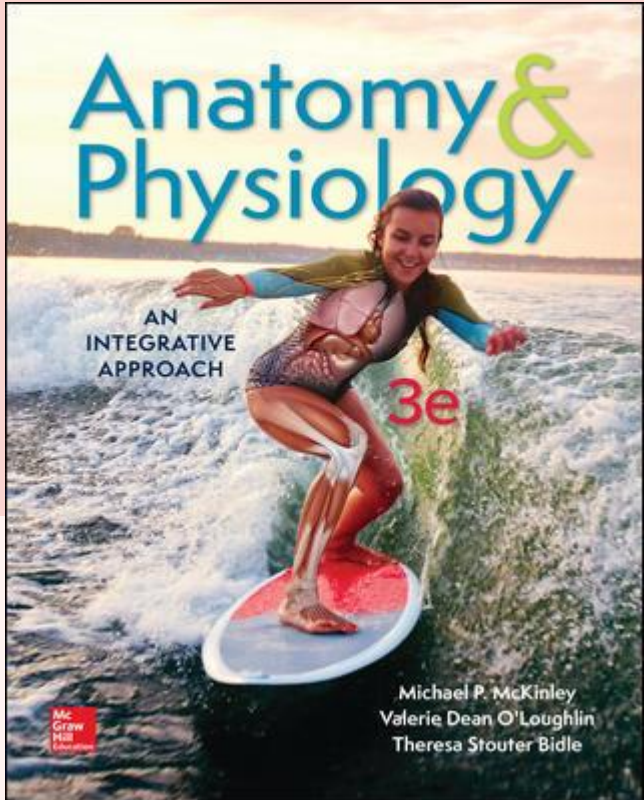


## Relatability

Someone who's been in their position and has recent experience

# Anatomy & Physiology for Health Professions II

**BIOH 370**







# **Do Peer Activities Promote Knowledge Retention of the Learning Topics by Improving Perceptions of the Course?**

The overarching research question

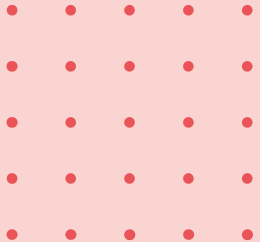
# A Further Breakdown

01.

What effects do peer activities have on students' perceptions of the course?

Are the students who indicated an improved sense of belonging more likely to correctly answer the peer-activity questions when reintroduced on the midterm?

02.



**This study was reviewed by the University of Montana Institutional Review Board (#186-19) and given exempt status. Only results from students who consented to FERPA were included.**



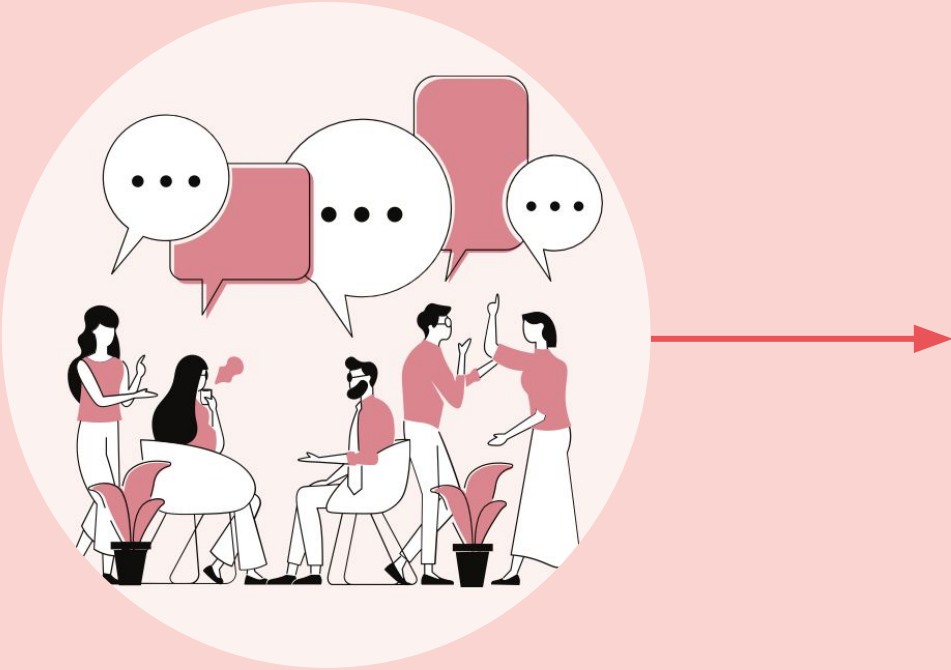
*Department of Education*

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# Peer Activity



In-class group work on the most recently covered lecture topic led by the peer leader.

Wednesday, January 29, 2020

## BIOH 370 - Peer Leader Activity #1

### Endocrine System and Precocious Puberty

- Learning Outcomes:
  1. Articulate the role that GnRH plays in regulating puberty
  2. Understand how hormone structure dictate's function
  3. Develop an appreciation for hormones/drug interactions
- Class Outline
  - 11:00-11:20
    - Go Over At-Home Assignment
      - Please ensure that every one answered the last question as the assignment will largely build off of this.
      - Clarify the ages regarding onset of puberty **HINT**
      - Discuss effects of FSH and LH as they relate to GnRH
      - Discuss any potential questions group may have
    - 11:20-11:40
      - Start In-Class Assignment (Imaging Provided)
        - Don't worry too much about the imaging, it's really just a review of basic anatomy and a comparison to tumors that cause acromegaly — the main idea here is that hyper-secretion of GnRH causes precocious puberty
        - Spend a decent amount of time on the Leuprolide-GnRH problem... This isn't hard, but it does require that students remember how GPCRs and enzyme inhibitors work. This was covered in the Endocrine System chapter.
      - 11:30-11:50
        - We'll come together to write out the exam questions. This problem-set was fairly in-depth, so I will do my best to make the desired outcomes clear.

Evaluation of new Teaching Strategies in UM Undergraduate Biology  
Courses

Part I (prior to in-class activity)

Please rank each statement the following choices on the following scale on the scantron provided before beginning the in-class discussion:

1) How much time did you spend preparing for the in-class activity?

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
No preparation	1-15 minutes	16-30 minutes	31-45 minutes	46 minutes or longer

2) You are prepared discuss the learning topic with your class during the in-class activity.

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
Strongly Disagree	Disagree	No opinion	Agree	Strongly Agree

3) The material provided to you prior to the in-class activity was interesting.

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
Strongly Disagree	Disagree	No opinion	Agree	Strongly Agree

4) You are looking forward to learning more about the topic during the in-class activity.

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
Strongly Disagree	Disagree	No opinion	Agree	Strongly Agree

5) The material provided to you prior to the in-class activity was related to current course content and learning objectives.

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
Strongly Disagree	Disagree	No opinion	Agree	Strongly Agree

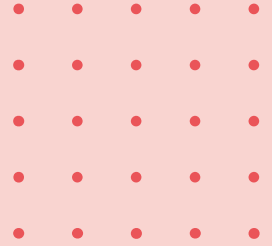
6) You feel comfortable asking questions in lecture.

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
Strongly Disagree	Disagree	No opinion	Agree	Strongly Agree

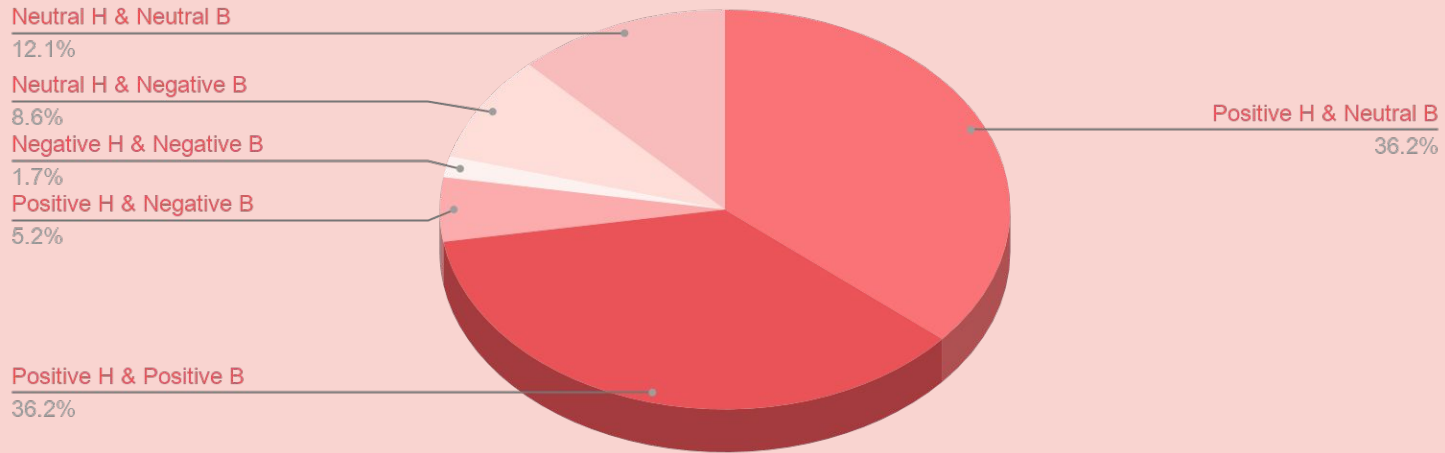
**Excerpt of Pre-Activity Survey**

**What effects do peer activities  
have on students' perceptions  
of the course?**

# Feeling Heard by the Peer Leader



## Perceptions of Students



H ~ Feeling heard by their peer leader  
B ~ Sense of belonging after the activity



**79%**

Improved understanding of the learning topic

**76%**

Improved sense of the types of exam questions



**26%**

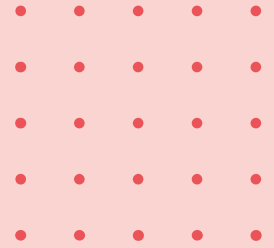
Learned better study strategies



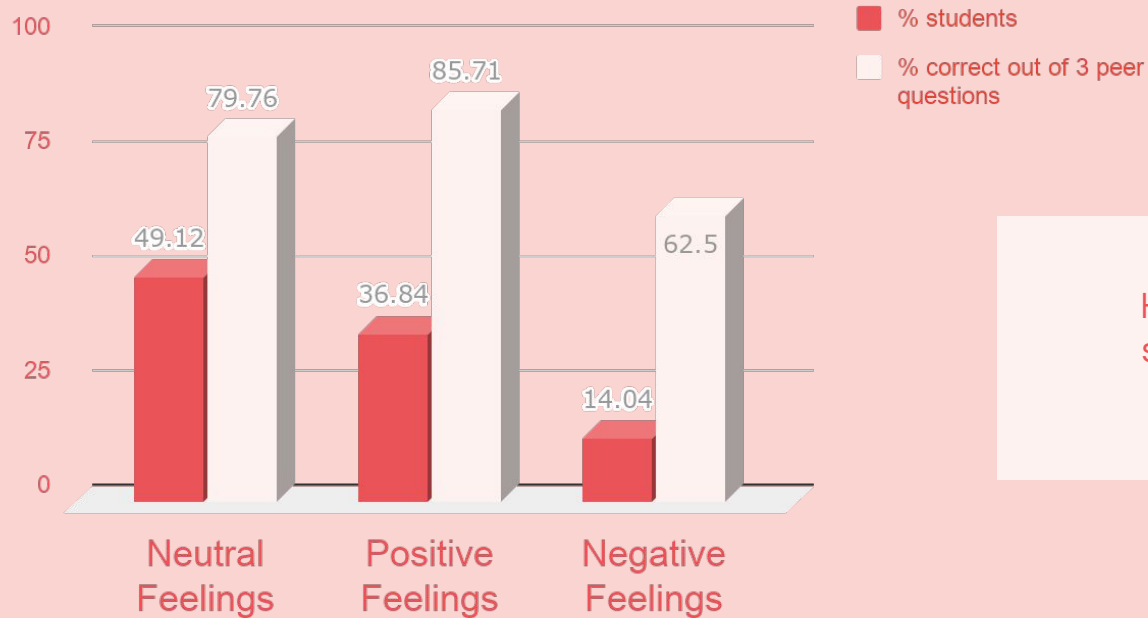


**Are the students who indicated an improved sense of belonging more likely to correctly answer the peer-activity questions when reintroduced on the midterm?**

# Comparing Perception to Learning Outcome



## Sense of Belonging vs Average Score



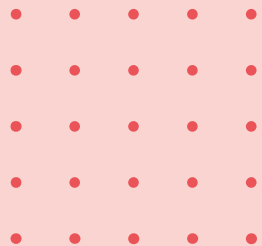
**37%**

Had an improved overall sense of belonging after completing the activity



## Feel Heard by Peer Leader

The peer activities offer support that the student cannot find in the lecture alone.



## Improved Perceptions

These additional methods of support lead to an overall improvement in the students' confidence in the course and in their performance.

## Higher Scores

A high level of confidence and positive perceptions lead to retention of knowledge and therefore higher exam scores.

# **Acknowledgements**



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**Raegan Hauschildt - Team Learning during Covid-19**

**Drake Leonard & Alexander Stuczynski - Transition to Remote Learning**

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