

Supplemental Material

CBE- Life Sciences Education

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I. Example video worksheet

1. See video for question.

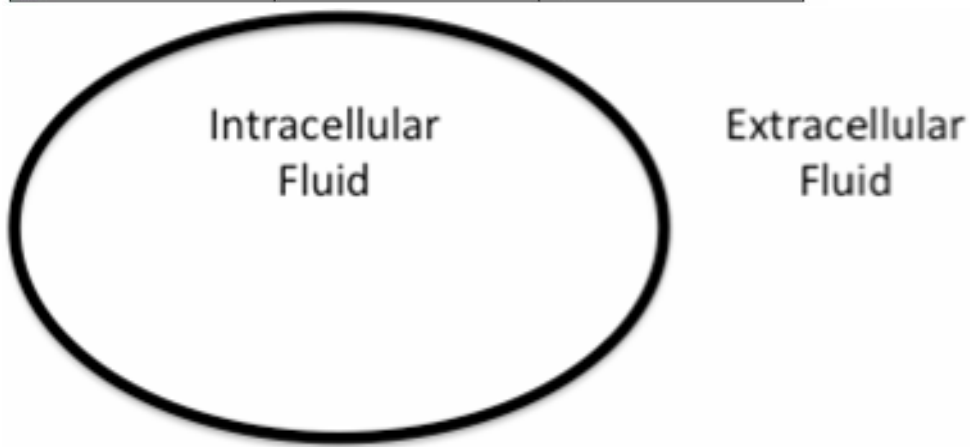
2. See video for question

Circle one: Yes No

Please explain your reasoning based on the video:

3. See video for question

| ION | INTRACELLULAR CONCENTRATION (mM) | EXTRACELLULAR CONCENTRATION (mM) |
|-----------------|-------------------------------------|-------------------------------------|
| Na ⁺ | 12 | 140 |
| K ⁺ | 150 | 5 |
| Cl ⁻ | 10 | 105 |



4. See video for question

- a. All the time
- b. Only when a large external change occurs
- c. Only when a large internal change occurs
- d. Only when a large external or internal change occurs
- e. Only when the brain is conscious of the change
- f. Only when the change will cause harm to the body

Explain why the answer is correct based on the video:

5. See video for question

- a. Release of insulin from the pancreas to decrease blood glucose in response to a meal that causes an increase in blood glucose
- b. Decrease in appetite after you eat a large meal
- c. Increased sweating when you are outside on a very hot day
- d. Stress hormones that turn off their own production through negative feedback
- e. Decrease in thirst when you have enough water in your body

Explain why the answer is correct based on the video:

II. Survey after first four weeks

The following questions will ask you about the videos that you watch in BIO XXX prior to Friday's class. The instructors of the course will never see your specific responses associated with your name, so we ask that you are as honest as possible with your responses. Your opinions will help us decide whether to use these videos in future versions of the course.

For each of the following statements, please indicate how true it is for you.

I thought watching the Friday videos was boring.

Watching the Friday videos did not hold my attention.

I would describe watching the Friday videos as interesting.

Was there a student interacting with [instructor] in any of the videos that you watched?

Yes

No

What is your name?

First Name _____

Last Name _____

III. Survey after eight weeks

During the past 8 weeks in BIO XXX you have watched Friday videos with only Dr. Xxxx or Dr. Xxxx with a student. Please answer the following question considering all of these Friday videos.

Please indicate the extent to which you appreciate the Friday videos in BIO XXX

- Strongly do not appreciate
- Do not appreciate
- Somewhat do not appreciate
- Somewhat appreciate
- Appreciate
- Strongly appreciate

Please explain your answer choice above.

Over the past 8 weeks, you watched Friday videos: A) with only Dr. Xxxx and B) with Dr. Xxxx and a student. For the next set of questions, we are going to ask you to compare these two types of Friday videos.

Which type of video do you prefer?

- I prefer the videos with only Dr. Xxxx
- I prefer the videos with Dr. Xxxx and a student
- I do not prefer one type of video more than the other

Please explain your answer choice above.

We are looking to learn more about the advantages and disadvantages of A) the Friday videos with only Dr. Xxxx and B) the Friday videos with Dr. Xxxx and a student.

Please describe any advantages of the Friday videos with Dr. Xxxx and a student

Please describe any disadvantages of the Friday videos with Dr. Xxxx and a student

Please describe any advantages of the Friday videos with only Dr. Xxxx

Please describe any disadvantages of the Friday videos with only Dr. Xxxx.

For the past 4 weeks, what type of Friday videos did you watch?

- I watched videos with only Dr. Xxxx
- I watched videos with Dr. Xxxx and a student

For the next set of questions, please **only consider these videos that you have watched over the past 4 weeks**.
For each of the following statements, please indicate how true it is for you.

Watching the Friday videos did not hold my attention.

I would describe watching the Friday videos as interesting.

Please rate the following outside of class assignments in terms of how valuable they were for your learning

| | Lowest value 1 | 2 | 3 | 4 | Highest value 5 |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Textbook reading | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Other type of reading (e.g., news articles) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| All Friday videos | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

IV. Coding rubric for student-reported reasons why they appreciate instructor-generated videos

| Code | Description |
|--|---|
| Improved student understanding of physiology | Student indicates videos improved their understanding, learning or retention of material; explained that it was easier or faster to learn when watching a video. They also could indicate that the video helped clarify the material or their understanding. Category includes reducing misconceptions, reinforcing or solidifying information. |
| Broadly positive comments | Student makes positive comments about the videos, including that the videos are helpful, good, informative, or that they liked the videos. The student must be talking about the videos broadly; if they only referenced one set of videos then this was not coded. Unique ideas are <i>not</i> coded within this section. |

V. Coding rubric for advantages and disadvantages of Instructor Only videos

| Code | Description |
|---|---|
| Advantages | |
| Presents information in a straightforward or direct way | Student indicates that presentation of information is straightforward, direct, straight to the point, organized, concise, efficient, easy to follow, or clear. |
| The video is short | Student indicates that the Instructor Only Video is shorter or goes by faster than the Instructor-Tutee videos. |
| Improves observing student understanding of content | Student indicates that the information is easier to remember, learn, or understand. Alternatively, student indicates that the video clarified their understanding of a topic or that they were able to understand the material more quickly. |
| The information presented is correct | Student indicates that all information presented is correct or that no incorrect information, mistakes, or misconceptions are presented. |
| Disadvantages | |
| Is missing a student's perspective | Student indicates that there is only an expert or single perspective; student perspective or thought process is missing. Because a student's perspective is missing, questions from the student are not answered, or misconceptions, mistakes, or incorrect thought processes are not corrected |

VI. Coding rubric for advantages and disadvantages of Instructor-Tutee videos

| Code | Description |
|---|--|
| Advantages | |
| Student perspective | Student indicates that the video includes thinking, perspective, or thought process from a student, at a student level, or at a level lower than an expert [Excludes multiple or different perspectives]. Includes student misconceptions or mistakes. |
| Tutee is relatable | Student indicates tutee had a similar thought process, question, or mistake. Tutee is described as relatable. Student can put themselves in the place of the tutee. Student describes not feeling like the only one who didn't understand, etc. Student can connect with tutee. |
| Instructor tutors tutee | Student learns from instructor correcting tutee misconceptions or mistakes. Also includes instructor scaffolding, such as instructor guiding tutee through question, explaining why a video student's answer is incorrect, or adding to video student's answer. |
| Multiple perspectives | Student indicates videos had multiple, different, or another perspective/point of view/thought processes [Excludes mentioning a student perspective] |
| Disadvantages | |
| The video is slow or long | Student indicates Instructor-Tutee video is too slow, time is wasted, or that video drags. |
| Student is confused | Student indicates the Instructor-Tutee Video or tutee is confusing. This includes if the student is unsure of the correct answer or explanation, even if it is provided. |
| The tutee provides incorrect information | Student indicates the tutee provides incorrect or inaccurate information. This also includes when a tutee provides a misconception about an idea. |
| Presents information in an indirect or disorganized way | Student indicates that the delivery of information is disorganized or that information is presented in a roundabout, misleading, complicated or indirect way. Student finds explanation hard to follow. This includes when the student indicates needing to go back and change their worksheet after the tutee explanation |

VII. Breakdown of student demographics in randomly assigned groups Group A and Group B. There were no significant differences in demographic groups between Group A and Group B.

| Demographic | | Group A | Group B |
|---------------------------|--|----------------|----------------|
| Gender | Male | 38.2% | 33.0% |
| | Female | 61.8% | 57.3% |
| Race/Ethnicity | Underrepresented minority students (Includes African American, American Indian, and Latino/a students) | 25.0% | 22.1% |
| | Non-Underrepresented Minority (Includes White and Asian students) | 75.0% | 77.9% |
| Average prior college GPA | | 3.43 | 3.34 |

VIII. Results from Z-tests for reasons why students broadly appreciate instructor-generated videos

| Category | Z-score | p-value | Proportion of students with a GPA < 3.49 that mentioned category | Proportion of students with a GPA \geq 3.49 that mentioned category |
|---|---------|-----------------|--|---|
| Improved student understanding of physiology | 3.0369 | 0.00236* | 0.484 | 0.275 |
| Broadly positive comments | -0.9499 | 0.34212 | 0.253 | 0.314 |

***Significant after Bonferroni correction**

IX. Results from Z-tests for student-reported advantages and disadvantages of Instructor Only videos

| Category | Z-score | p-value | Proportion of students with a GPA < 3.49 that mentioned category | Proportion of students with a GPA ≥ 3.49 that mentioned category |
|---|---------|----------------------|--|--|
| Advantages | | | | |
| Presents information in a straightforward or direct way | -0.7869 | 0.42952 | 0.45 | 0.505 |
| The video is short | -0.2816 | 0.77948 | 0.19 | 0.206 |
| Improves observing student understanding of content | 1.5991 | 0.1096 | 0.18 | 0.103 |
| The information presented is correct | -1.0746 | 0.28462 | 0.1 | 0.15 |
| Disadvantages | | | | |
| Is missing a student's perspective | -2.0775 | 0.03752 [#] | 0.13 | 0.243 |

[#]Not significant after the Bonferroni correction was applied.

X. Results from Z-tests for advantages and disadvantages of Instructor-Tutee Videos

| Category | Z-score | p-value | Proportion of students with a GPA < 3.49 that mentioned category | Proportion of students with a GPA ≥ 3.49 that mentioned category |
|---|---------|----------------------|--|--|
| Advantages | | | | |
| Student perspective | -0.448 | 0.65272 | 0.28 | 0.308 |
| Tutee is relatable | -0.4089 | 0.6818 | 0.21 | 0.234 |
| Instructor tutors tutee | 1.1473 | 0.25014 | 0.2 | 0.14 |
| Multiple perspectives | 1.4796 | 0.13888 | 0.15 | 0.084 |
| Disadvantages | | | | |
| The video is slow or long | -2.4874 | 0.01278 [#] | 0.24 | 0.402 |
| Student is confused | -2.3466 | 0.01878 [#] | 0.2 | 0.346 |
| The tutee provides incorrect information | -1.9281 | 0.0536 | 0.2 | 0.318 |
| Presents information in an indirect or disorganized way | 0.5905 | 0.5552 | 0.21 | 0.178 |

[#]Not significant after Bonferroni correction was applied.