Consent for Participation & Purpose of Study

# Consent

Participation in this study is voluntary. You are free to stop participating and may withdraw your consent at any time. You are not obligated to submit the survey, and you may skip any questions in the survey you want. There are no foreseen risks or benefits to you as a participant. We will not identify you by name in any reports using information obtained in the survey, and your confidentiality as a participant in this study will remain secure.

# Contact Information

If you have any questions about the survey or this research project, you may contact me (elijah.meyer@montana.edu), Jennifer Green (jg@msu.edu), or Stacey Hancock (stacey.hancock@montana.edu). If you have additional questions about the rights of human subjects, you may contact the Chair of the Institutional Review Board, Mark Quinn ([mquinn@montana.edu](mailto:mquinn@montana.edu)).

# Study Description and Purpose

The purpose of this study is to develop an instrument to measure graduate student instructors’ (GSIs’) motivation to use active learning teaching techniques. We define GSIs as graduate students who are the sole or lead instructor of a statistics course or lead a recitation section. This instrument will measure four different types of motivation to use active learning on GSIs when teaching statistics. These motivations include intrinsic, integrated regulation, external regulation, and amotivation. These four types of motivation have been selected because they span our framework of motivation and are linked to a variety of behavioral outcomes in other areas of research.

The purpose of this survey is to gather experts’ feedback on the written items. Your feedback will help identify any opportunities to improve wording and help provide initial content evidence suggesting that these items are measuring their intended type of motivation.

Part 1: Item Review

# Directions – Item Review

Based on feedback from the last survey, two different types of active learning strategies were selected to be included on the instrument: group work and use of technology. Within each active learning strategy section, I have provided the written description of the technique that GSIs will read before responding to the corresponding items of motivation.

Within each active learning strategy section, I have also included multiple subsections. These include:

* Feedback questions
* Construct sections
* Items

Feedback question sections will share specific questions that will help guide the item review process. Construct sections represent the four types of motivation this study aims to measure: Intrinsic Motivation, Integrated Regulation, External Regulation and Amotivation. Items sections will have the items that aim to measure their respective motivation. For each type of motivation, please review the items that intend to measure that type of motivation. When reviewing them, please note that this **instrument is intended for GSIs who use active learning while teaching statistics.** With this population in mind, we ask you to consider the following:

## Wording

Are items written clearly?

* Double-barreled items –Do items have wording that introduces two ideas, yet are combined into one question?
* Idioms, unnecessary jargon, and acronyms -Do items have a group of words established by usage as having a meaning not deducible from those individual words, unnecessarily complicated language, or an abbreviation formed from the initial letters?
* Phrasing that is leading towards a specific answer –Does the item introduce information to the GSI that would lead them to answer in a particular way?
* Flagging misinterpretations –Is an item generally confusing to answer / does the item raise questions about how to answer?

## Construct Definitions

Do items relate to their respective construct definitions?

* Intrinsic Motivation – Performing an activity for oneself, in order to experience pleasure and satisfaction inherent in the activity.
* Integrated Regulation – Non-intrinsically motivated behavior has been completely internalized, there is no internal resistance, and there is a willingness to do the behavior because it is important and valuable to the self, albeit not enjoyable.
* External Regulation – Motivation behavior where that has not been internalized. A willingness to do a behavior to obtain something tangible that satisfies an eternal demand or avoids punishment.
* Amotivation – The absence of intention or clear motives to engage in the use of active learning. A lack of both intrinsic and extrinsic motivation.

Please type your comments regarding item wording in the *Wording Feedback* area provided at the end of each set of items. Items will be numbered so they are easier to reference in the feedback area. Please type your comments regarding items’ relationship with their corresponding construct definition in the *Relationship Feedback* area provided at the end of each set of items.

A working definition for each active learning strategy can be found at the start of their respective active learning strategy section. We ask you to please review and provide feedback on each working definition. Please write this feedback in the *Definition Feedback* area.

There are *General Comments* sections at the end each active learning strategy section. If applicable, please comment any other types of feedback you may have on the section of items.

Please feel free to print out, write, and scan feedback in instead of typing in this document if you prefer.

# Active Learning Strategy 1 – Using Technology

Working definition of technology: Technological tools that assist in the analysis of data, communication, development, and exchange of knowledge in the student learning process. When using active learning, technology is about designing a lesson that allows students to acquire information through discovering material for themselves. This may include having students work with Tableau, CODAP, R, Tinkerplots, applets, etc. to discover concepts. This does not include passive technology, such as displaying a PowerPoint or using a calculator.

## Definition Feedback Questions

* Do you agree with the working definition of technology? If not, please explain.
* Do you find this definition specific enough to clearly describe these activities to a general graduate student teaching audience? If not, please explain.

*Definition Feedback:*

Maybe revise the end to “displaying a PowerPoint or using a calculator *for calculations*.” Some advanced calculators (like TI-Nspire) have more advanced features that could fit your definition, so I think what you’re really getting at is that calculating things is not in the spirit of active learning. Y

Not sure about the “exchange of knowledge” part. Is that not wrapped into “communication”? It’s not clear to me what that additional element adds. Y

This one sentence doesn’t clearly incorporate the role of technology: “When using active learning, technology is about designing a lesson that allows students to acquire information through discovering material for themselves.” A possible rewording: “When using active learning, technology use allows students to acquire information and discover statistical ideas through their interaction with the technology tool.” Just a thought if that helps! Y

## Construct 1: Intrinsic Motivation

Intrinsic Motivation – Performing an activity for oneself, in order to experience pleasure and satisfaction inherent in the activity.

### Feedback Questions: Wording

Please respond to the following questions after each item below in the *Wording Feedback* area.

* Are their concerns about the wording of the question (e.g., double-barreled, idioms, jargon, etc.)?
* Are their concerns about how items are phrased (e.g., leading items, items that may be misinterpreted, items that may not be appropriate for GSIs)?

### Feedback Questions: Relationship

Please respond to the following questions at the end of the items in the *Relationship Feedback area.*

* Do you believe each item reflect qualities of intrinsic motivation?
* Do you believe there are missing items?
* Are aspects of intrinsic motivation’s definition mis or underrepresented within the set of items?

### Items

Directions: Read each item carefully. Using the scale below, please circle the number that best describes the reason why you are currently engaged in this activity. Answer each item according to the following scale: 1: corresponds not all; 2: corresponds very little; 3: corresponds a little; 4: corresponds moderately; 5: corresponds enough; 6: corresponds a lot; 7: corresponds exactly. (The scale has been removed during the item review phase).

1. I find it enjoyable to discover new technologies that work in my classroom
2. I am happy when using technology to teach statistics
3. I find using technology satisfying when teaching statistics
4. I find it enjoyable to teach statistics using technology
5. I would describe using technology to teach as very interesting
6. I naturally think about using technology when preparing a lesson
7. I’m committed to continuously using technology to teach statistics in my classroom
8. I get excited when using technology to teach statistics

*Wording Feedback*

1: Instead of “I find it enjoyable to discover…” How about “I enjoy finding…” Y

7: Instead of “continuously,” how about “regularly” or “consistently”? Y

*Relationship Feedback*

One I’m not as confident about fitting this intrinsic motivation is 7. Is commitment intrinsic, or possibly better fitting the integrated regulation? (This is a really good suggestion)

I wonder about “happy” as well. Maybe something about feeling pleased or proud about lessons where I have successfully incorporated technology. (Check if this fits as a potential additional question)

Another wording idea could be “My favorite lessons to teach are ones that involve technology.” (This is also a really good suggestion)

Something that struck me is how these wordings sound instructor-centered. I’m wondering if you want to be specific about whether it’s an affect about planning a lesson, demo’ing tech in a lesson, or watching students use tech in a lesson. If you want a generic wording that could encompass all, maybe “incorporate” instead of “use” could be a more generic choice. Another option is to be more specific about the activity/setting discussed. Like the first item seems more like a planning thing. Would it be worthwhile to specify some items as about planning, or watching students use, or just incorporating tech in general? (This might make a lot of sense to have floating around in the background)

## Construct 2: Integrated Regulation

Integrated Regulation – Non-intrinsically motivated behavior has been completely internalized, there is no internal resistance, and there is a willingness to do the behavior because it is important and valuable to the self, albeit not enjoyable.

### Feedback Questions: Wording

Please respond to the following questions after each item below in the *Wording Feedback* area.

* Are their concerns about the wording of the question (e.g., double-barreled, idioms, jargon, etc.)?
* Are their concerns about how items are phrased (e.g., leading items, items that may be misinterpreted, items that may not be appropriate for GSIs)?

### Feedback Questions: Relationship

Please respond to the following questions at the end of the items in the *Relationship Feedback area.*

* Do you believe each item reflect qualities of integrated regulation?
* Do you believe there are missing items?
* Are aspects of integrated regulation’s definition mis or underrepresented within the set of items?

### Items

1. I believe using technology is necessary when teaching statistics
2. Using technology is consistent with my values as an instructor
3. Using technology is part of the way I have chosen to teach statistics
4. Using technology is a part of who I am as a statistics instructor
5. Using technology is important for me as a statistics instructor
6. Using technology is a better way to teach statistics than through strictly lecture
7. I find the use of technology extremely valuable when teaching

*Wording Feedback*

Wording seems good!

*Relationship Feedback*

2, 3, and 4 seem very similar to me. I’m wondering if you could keep just one or maybe two of them?

In reading the integrated regulation idea, I’m wondering if it’s too focused on self. Isn’t it also “I use technology because I think it helps students learn better” or “…because this is an important component of engaging with data/statistical concepts.” Etc.? A couple other ideas:

* Incorporating technology helps students learn statistics better
* Incorporating technology is necessary for students to analyze data appropriately
* Incorporating technology enhances students’ understanding of statistical concepts

Going back to the first group and my comments there—should it say “Incorporating technology…” instead so that it is less instructor-centered? Or mixing it up as another option (some specifically about planning and/or instructor use, and some about student use)

On number 6, you compare it to “strictly lecture,” but what about *activities* that don’t involve technology? Maybe a more generic comparison that doesn’t pit it against lecture only: “My teaching of statistics is improved by incorporating technology regularly.”

## Construct 3: External Regulation

External Regulation – Motivation behavior where that has not been internalized. A willingness to do a behavior to obtain something tangible that satisfies an eternal demand or avoids punishment.

### Feedback Questions: Wording

Please respond to the following questions after each item below in the *Wording Feedback* area.

* Are their concerns about the wording of the question (e.g., double-barreled, idioms, jargon, etc.)?
* Are their concerns about how items are phrased (e.g., leading items, items that may be misinterpreted, items that may not be appropriate for GSIs)?

### Feedback Questions: Relationship

Please respond to the following questions at the end of the items in the *Relationship Feedback area.*

* Do you believe each item reflect qualities of external regulation?
* Do you believe there are missing items?
* Are aspects of external regulation’s definition mis or underrepresented within the set of items?

### Items

1. I use technology because it is recommended to me by another
2. I use technology because it feels like this is the way I have to teach statistics
3. I use technology because I would get in trouble by others if I didn’t teach using it
4. I use technology because I believe students would be upset with me if I didn’t teach using it
5. I use technology because I think it will help me earn a teaching award
6. I use technology because it will help me gain an external benefit
7. I use technology because I am praised for doing so
8. I use technology only when I am being observed by a another
9. I use technology because others think of me as a better instructor

*Wording Feedback*

2: Instead of “this is the way I *have* to teach statistics,” maybe it should be “this is the way I am *expected* to teach statistics.”

6 is probably the weakest of these to me. It seems too vague.

*Relationship Feedback*

I really love the variety of ideas and wordings you used! Very well done.

## Construct 4: Amotivation Items

Amotivation – The absence of intention or clear motives to engage in the use of active learning. A lack of both intrinsic and extrinsic motivation.

### Feedback Questions: Wording

Please respond to the following questions after each item below in the *Wording Feedback* area.

* Are their concerns about the wording of the question (e.g., double-barreled, idioms, jargon, etc.)?
* Are their concerns about how items are phrased (e.g., leading items, items that may be misinterpreted, items that may not be appropriate for GSIs)?

### Feedback Questions: Relationship

Please respond to the following questions at the end of the items in the *Relationship Feedback area.*

* Do you believe each item reflect qualities of amotivation?
* Do you believe there are missing items?
* Are aspects of amotivation’s definition mis or underrepresented within the set of items?

### Items

1. I don’t see any value in using technology in the classroom
2. I’m not sure using technology helps my students learn the material better
3. I don’t see any value using technology brings me as the instructor
4. I often question if I should use technology to teach statistics
5. Technology’s place in teaching statistics is unclear to me
6. I believe using technology wastes class time
7. I do not wish to continue to learn about how to use technology in the classroom when teaching statistics
8. I don’t know why you would use technology to teach statistics
9. I don’t know why I use technology to teach.
10. I don’t see me using it in the future

*Wording Feedback*

2: This wording seems “weak.” How about “Incorporating technology into my lessons doesn’t improve student learning.”

3 confuses me a bit. What does it mean to bring value to the instructor? I think this overlaps with 1, but is focused on what the instructor gets out of it, but I don’t understand what that could be or mean. Like, do I get rewarded for doing it? One suggestion: “I don’t have motivation to incorporate technology in my teaching.”

5: “The role of technology in teaching statistics is unclear to me.”

6: This could get mixed responses because in most situations, tech does waste at least some time to set up. The question is whether the cost to time is worth the benefits added. So maybe…”Incorporating technology into my lesson ends up wasting more time than it is worth.”

7: “I do not wish to continue *learning* about…”

8 & 9: I don’t get the distinction between “why you would use” and “why I use” here. I think I’d go with “why I should use” as a wording and not use a second item here.

10: “I don’t see *myself* using it in the future.”

*Relationship Feedback*

None—the relationship seems appropriate to me!

## General Comments

No additional comments

# Active Learning Strategy 2 – Group Work

Group work refers to: Method of instruction that gets students to work together in groups of two or more. Group work involves strategies that involve students to communicate with peers, share their ideas more equally across group members, and engage students to think critically about the topic(s) with their peers. This includes think-pair-share, group presentations, or other small group work activities that have the characteristics described above.

Question for Feedback:

## Definition Feedback Questions

* Do you agree with the working definition of **technology** (group work?)? If not, please explain.
* Do you find this definition specific enough to clearly describe these activities to a general graduate student teaching audience? If not, please explain.

*Definition Feedback*

This works for me!

## Construct 1: Intrinsic Motivation

Intrinsic Motivation – Performing an activity for oneself, in order to experience pleasure and satisfaction inherent in the activity.

### Feedback Questions: Wording

Please respond to the following questions after each item below in the *Wording Feedback* area.

* Are their concerns about the wording of the question (e.g., double-barreled, idioms, jargon, etc.)?
* Are their concerns about how items are phrased (e.g., leading items, items that may be misinterpreted, items that may not be appropriate for GSIs)?

### Feedback Questions: Relationship

Please respond to the following questions at the end of the items in the *Relationship Feedback area.*

* Do you believe each item reflect qualities of intrinsic motivation?
* Do you believe there are missing items?
* Are aspects of intrinsic motivation’s definition mis or underrepresented within the set of items?

### Items

1. I find it enjoyable to discover new ways to use group work in my classroom
2. I am happy when using group work to teach statistics
3. I find using group work satisfying when teaching statistics
4. I find it enjoyable to teach statistics using group work
5. I would describe using group work to teach as very interesting
6. I naturally think about using group work when preparing a lesson
7. I’m committed to continuously using group work to teach statistics in my classroom
8. I get excited when using group work to teach statistics

*Wording Feedback*

Same comments as with technology (1 and 7)

*Relationship Feedback*

First three lines here are repeats of tech

One I’m not as confident about fitting this intrinsic motivation is 7. Is commitment intrinsic, or possibly better fitting the integrated regulation?

I wonder about “happy” as well. Maybe something about feeling pleased or proud about lessons where I have successfully incorporated group work

Another wording idea could be “My favorite lessons to teach are ones that involve group work.”

Also, the issue about using vs. incorporating doesn’t seem to apply for me here. Like, I think it could be written either way and be fine. There wouldn’t be confusion about the instructor using group work as an individual since it implies, well, group work!

## Construct 2: Integrated Regulation

Integrated Regulation – Non-intrinsically motivated behavior has been completely internalized, there is no internal resistance, and there is a willingness to do the behavior because it is

### Feedback Questions: Wording

Please respond to the following questions after each item below in the *Wording Feedback* area.

* Are their concerns about the wording of the question (e.g., double-barreled, idioms, jargon, etc.)?
* Are their concerns about how items are phrased (e.g., leading items, items that may be misinterpreted, items that may not be appropriate for GSIs)?

### Feedback Questions: Relationship

Please respond to the following questions at the end of the items in the *Relationship Feedback area.*

* Do you believe each item reflect qualities of integrated regulation?
* Do you believe there are missing items?
* Are aspects of integrated regulation’s definition mis or underrepresented within the set of items?

### Items

1. I believe using group work is necessary when teaching statistics
2. Using group work is consistent with my values as an instructor
3. Using group work is part of the way I have chosen to teach statistics
4. Using group work is a part of who I am as a statistics instructor
5. Using group work is important for me as a statistics instructor
6. Using group work is a better way to teach statistics than through strictly lecture
7. I find the use of group work extremely valuable when teaching

*Wording Feedback*

I really like all of these for group work as well!

Same as with tech—2, 3, and 4 might be a little redundant

*Relationship Feedback*

Same with tech—could use more variety with how the instructor sees value. Can it also include ideas of seeing value to students and to the curriculum, rather than just as a value to self?

On number 6, you compare it to “strictly lecture,” I’m wondering if again, you need a different comparison. “My teaching of statistics is improved by incorporating group work regularly.”

## Construct 3: External Regulation

External Regulation – Motivation behavior where that has not been internalized. A willingness to do a behavior to obtain something tangible that satisfies an eternal demand or avoids punishment.

### Feedback Questions: Wording

Please respond to the following questions after each item below in the *Wording Feedback* area.

* Are their concerns about the wording of the question (e.g., double-barreled, idioms, jargon, etc.)?
* Are their concerns about how items are phrased (e.g., leading items, items that may be misinterpreted, items that may not be appropriate for GSIs)?

### Feedback Questions: Relationship

Please respond to the following questions at the end of the items in the *Relationship Feedback area.*

* Do you believe each item reflect qualities of external regulation?
* Do you believe there are missing items?
* Are aspects of external regulation’s definition mis or underrepresented within the set of items?

### Items

1. I use group work because it is recommended to me by another
2. I use group work because it feels like this is the way I have to teach statistics
3. I use group work because I would get in trouble by others if I didn’t teach using it
4. I use group work because I believe students would be upset with me if I didn’t teach using it
5. I use group work because I think it will help me earn a teaching award
6. I use group work because it will help me gain an external benefit
7. I use group work because I am praised for doing so
8. I use group work only when I am being observed by a another
9. I use group work because others think of me as a better instructor

*Wording Feedback*

Same comments as tech…

2: Instead of “this is the way I *have* to teach statistics,” maybe it should be “this is the way I am *expected* to teach statistics.”

6 is probably the weakest of these to me. It seems too vague.

*Relationship Feedback*

Again, great variety on this one!

## Construct 4: Amotivation Items

Amotivation – The absence of intention or clear motives to engage in the use of active learning. A lack of both intrinsic and extrinsic motivation.

### Feedback Questions: Wording

Please respond to the following questions after each item below in the *Wording Feedback* area.

* Are their concerns about the wording of the question (e.g., double-barreled, idioms, jargon, etc.)?
* Are their concerns about how items are phrased (e.g., leading items, items that may be misinterpreted, items that may not be appropriate for GSIs)?

### Feedback Questions: Relationship

Please respond to the following questions at the end of the items in the *Relationship Feedback area.*

* Do you believe each item reflect qualities of amotivation?
* Do you believe there are missing items?
* Are aspects of amotivation’s definition mis or underrepresented within the set of items?

### Items

1. I don’t see any value in using group work in the classroom
2. I’m not sure using group work helps my students learn the material better
3. I don’t see any value using group work brings me as the instructor
4. I often question if I should use group work to teach statistics
5. Group work’s place in teaching statistics is unclear to me
6. I believe using group work wastes class time
7. I do not wish to continue to learn about how to use group work in the classroom when teaching statistics
8. I don’t know why you would use group work to teach statistics
9. I don’t know why I use group work to teach.
10. I don’t see me using it in the future

2: This wording seems “weak.” How about “Incorporating group work into my lessons doesn’t improve student learning.”

3 confuses me a bit. What does it mean to bring value to the instructor? I think this overlaps with 1, but is focused on what the instructor gets out of it, but I don’t understand what that could be or mean. Like, do I get rewarded for doing it? One suggestion: “I don’t have motivation to incorporate group in my teaching.”

5: “The role of group work in teaching statistics is unclear to me.”

6: “Incorporating group work into my lesson ends up wasting more time than it is worth.”

7: “I do not wish to continue *learning* about…”

8 & 9: I don’t get the distinction between “why you would use” and “why I use” here. I think I’d go with “why I should use” as a wording and not use a second item here.

10: “I don’t see *myself* using it in the future.”

*Relationship Feedback*

None—the relationship seems appropriate to me!

## General Comments

No additional comments

Part 2: Background Questions Review

# Directions – Background Question Review

Background questions will be given at the beginning of the instrument to collect background data on each GSI filling out the survey. We please ask you to review these background items and consider the following:

* Are the background questions written clearly?
* Are the background questions appropriate for GSIs?
* Are GSIs unable to answer certain background questions?
* Are there any additional background questions you suggest we consider collecting data on?

Please write feedback in the *Background Questions Feedback* area at the end of the background questions.

## Background Questions

1. Are you currently enrolled as a graduate student?
2. Please list the name of the university you are currently enrolled in.
3. Please list the degree program you are enrolled in. Ex. Doctorate in Statistics
4. Please list the subject area you are studying. Ex. Statistics
5. Please enter the number of years you have completed in your current graduate degree program. Round up (e.g., if you have completed 3.25 years, please enter 4).
6. Are you currently involved in teaching a statistics course, or leading a recitation section?
7. Please list the number of semesters you have taught or lead a recitation section while being enrolled as a graduate student.
8. Please list the number of semesters you have taught a statistics course or lead a recitation section while being enrolled as a graduate student.
9. Prior to becoming a graduate student at your current institution, did you have experience as a full-time teacher in an elementary, secondary classroom, or college university?
10. Do you engage in conversations about teaching with other graduate students? If so, how often?
11. Describe the type of classroom you teach in. Ex. Lecture hall. Technology Enhanced Classroom. Number of students. Ect.
12. Please read the following definition of using technology in your classroom:

Technological tools that assist in the analysis of data, communication, development, and exchange of knowledge in the student learning process. When using active learning, technology is about designing a lesson that allows students to acquire information through discovering material for themselves. This may include having students work with Tableau, CODAP, R, Tinkerplots, applets, etc. to discover concepts. This does not include passive technology, such as displaying a PowerPoint or using a calculator.

Based on this definition, describe how you use technology when teaching statistics. If you do not use technology when teaching statistics, please write “N/A.”

1. Please read the following definition of using group work in your classroom:

Method of instruction that gets students to work together in groups of two or more. Group work involves strategies that involve students to communicate with peers, share their ideas more equally across group members, and engage students to think critically about the topic(s) with their peers. This includes think-pair-share, group presentations, or other small group work activities that have the characteristics described above.

Based on this definition, describe how you use group work when teaching statistics.

*Background Question Feedback*

Should 3 just ask “what is the degree type you are pursuing? Examples: PhD, M.S., etc.”

And then 4 ask “What is the subject are you are getting your degree in? Examples: Statistics, Applied Mathematics, etc.”

7: Some schools call them discussion sections, so maybe say “recitation/discussion section.” (though I imagine most would guess what you mean if you just said “recitation”

7: Maybe say at the end: “(If leading recitation/discussion this semester, please include that in your count).”

8: Same comment as previous about counting current if applicable.

11: “Etc”

## Survey Feedback

Thank you for taking the time to review the items on this survey. Your participation is highly valued, and we sincerely appreciate the time and effort you’ve invested into this project. We would like to invite you to comment on the structure of this review. Specifically, please comment on the following:

* Were the review instructions clear?
* Did you have any lingering questions during or after the review process.
* In what ways could this review be improved prior to the next wave of experts?

Please write feedback in the *Survey Feedback* area.

*Survey Feedback*

I believe it was clear. I’m wondering if a web survey platform could be slightly better than a word document for gathering feedback—it would better prompt where to fill in. But I think I got everything!

Should the background questions have multiple choice answers? Or just some of them? Maybe add those (or add indication of what input box the GSIs will have)