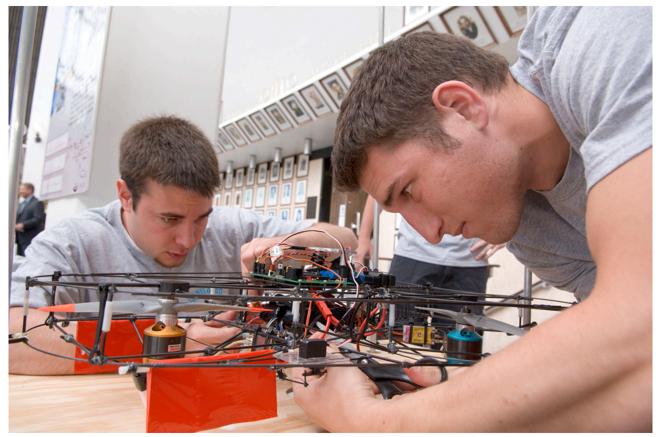
An Inventory of GVSU STEM Instructional Practices



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Introduction

The goal of the *Grand Valley Inventory of Instructional Practices* is to document the current use of evidence-based instructional practices in STEM at GVSU and to identify effective strategies to broaden adoption of these best practices. PIs Grissom, Menon, Talbert and Biros received NSF funding to support this effort in 2012 (DUE-1256384). See Appendix A for the project abstract.

Research Questions

- What is the GVSU faculty awareness of various instructional practices?
- What is the GVSU faculty adoption of various instructional practices?
- How do GVSU faculty learn about new instructional practices?
- Does faculty adoption vary based on characteristics such as discipline, gender, faculty rank or tenure status?
- What factors hinder broader adoption of these practices?

Summary of Findings

We conducted an extensive self-study to determine when and why students change majors and surveyed STEM faculty about their use of instructional practices and the teaching environment at GV. The self-study includes an analysis of institutional data, student surveys, faculty surveys and review of the literature. Key findings from the faculty survey include:

- Lecture and other instructor-centered activities remain the dominant classroom practice.
- Female instructors are more likely to have students engage in active learning during class and to attend FTLC workshops at GV
- Part-time instructors are less likely to be aware of active learning pedagogies and to participate in professional development compared to their tenure-track colleagues.
- The most common barrier for instructors to adopt new instructional practices is preparation time.
- GV faculty are most likely to learn about new instructional practices from GV colleagues.
- Instructors report that their academic units (85%) and GVSU (80%) encourage improvement of instructional practices.

Self-Study of STEM Majors

We conducted an extensive self-study to determine when and why students change majors. The self-study includes an analysis of institutional data, student surveys and review of the literature.

- STEM students are more likely to change majors than non-STEM students.
- Female students are significantly more likely than men to leave STEM.
- GV students leave STEM due to low grades and a lack of interest in the field.
- Most STEM attrition occurs during the first two years.

Institutional Data: Measuring STEM Gains and STEM Losses

We analyzed institutional data of 3,775 students who changed majors during the 2010-11 academic year. Students who changed from STEM to non-STEM majors are *STEM Losses* (10%). Those that changed from non-STEM to STEM majors are *STEM Gains* (6%). STEM Losses were likely to switch from engineering or computing to business, and from biology to a variety of health professions. STEM Gains were most likely to occur in Biology, Engineering and Computing.

GV Student Survey: Self-Reported Reasons for STEM Losses

We invited 2,100 students who changed majors during the 2010-11 academic year to complete an online survey (412 responses). Many results were consistent with the institutional data. More STEM Losses were observed than STEM Gains (12% versus 5%). Most STEM Losses decided to do so because of low grades or lack of interest in the field. Compared to our national institutional peers, fewer first-year students report experience with active and collaborative learning (41%) which have been shown to boost student interest (GVSU NSSE 10).

STEM Retention: The First Two Years Are Critical

We tracked the cohort of incoming freshmen in 2006 that initially declared a STEM major (n = 371). Each subsequent Fall term the cohort was reviewed to determine who remained in STEM, changed majors or left GV. At the start of the second year, 60% remained in STEM, 25% switched to a non-STEM major and 15% were not enrolled at GV. STEM losses continued during the second, third and fourth years. By the start of the seventh year, all students either graduated with a STEM degree (36%), a non-STEM degree (28%) or were no longer enrolled at GV (35%). **In summary, most STEM Losses occur during the first two years.**

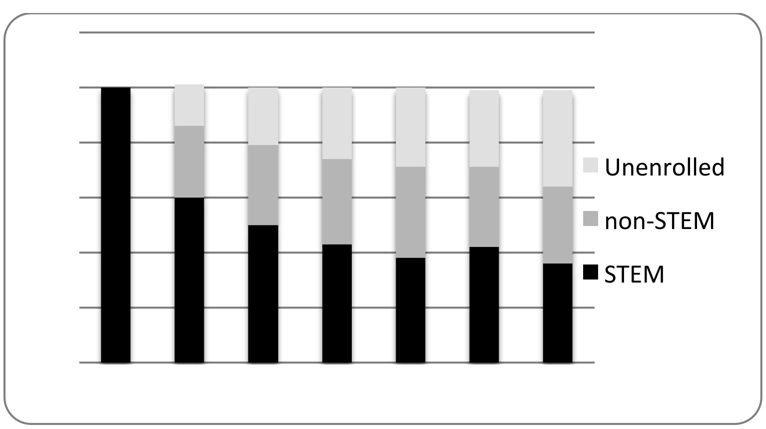

Figure 1. Persistence of the 2006 cohort of STEM majors (n = 324)

Faculty Survey

The survey was informed by similar efforts reported in engineering (Borrego *et al* 2010), physics (Henderson & Dancy, 2009) and geosciences (MacDonald *et al* 2005). Questions assess faculty awareness of specific practices and how faculty learn about new teaching practices. Demographic data were collected to identify potential correlations: discipline, faculty rank, gender and part-time status. Refer to the Appendix for the full survey.

We surveyed all STEM instructors (n = 300) in March 2013. Two hundred individuals responded (66%) including tenure-track and non-tenure-track faculty. Non-tenure-track instructors include visiting faculty, affiliate faculty, and part-time instructors. Disciplines included biology/cell and molecular, chemistry, computer science/information systems, engineering, geology, mathematics, physics and statistics.

Targeting non-tenure-track faculty is a key component of the project. Many of the STEM gateway courses are taught by non-tenure track faculty including adjunct, visitors and affiliates that may be less aware of innovative instructional practices compared to their tenure-track colleagues. Increasing the awareness and use of evidence-based practices by these faculty could have a significant effect on STEM education at GV.

Results By Instructional Practices

Survey questions probed the levels of faculty awareness and use of six evidence-based instructional practices: peer instruction, inquiry-based instruction (POGIL), peer-led team learning (PLTL), just-in-time teaching, flipped classrooms and the more generic collaborative learning. These instructional practices have been shown to better engage students, increase retention in STEM and to improve academic performance (Hake 98; Kuh 08; Eberlein *et al.* 08). Many of these practices are influenced by the science of learning (Bransford *et al.* 99; Ambrose *et al.* 10).

Gateway courses that integrate active learning and academic support show increased attendance and success rates (Mervis 10). A national 1997 study reported that some STEM Losses "would have stayed had the teaching been more stimulating and the curricula more imaginative." (Seymour & Hewitt 97). STEM gateway courses can be more inviting by promoting student collaboration in the classroom. Active learning has been shown to increase student engagement, attitude towards learning, retention and academic performance (Smith *et al.* 05; Michael 06).

Retention of women in STEM remains a problem compared to their male counterparts. This is true at GV as well as across the United States. These instructional practices benefit all STEM majors including women, minorities and first generation college students.

The survey provided a brief definition of each practice and asked instructors to identify their level of awareness or adoption:

1. I have never heard of this practice
2. I have heard the term but know little about it
3. I am familiar with the practice but have never used it
4. I have used this practice in the past but no longer do
5. I currently use this practice

Figure 2 summarizes faculty awareness (response option 3) and adoption (response options 4 and 5) for each practice. Collaborative learning is the most widely adopted practice (90%) while the flipped classroom is widely known (65%) but rarely adopted (15%). Inquiry-based approaches have been adopted by 50% of the instructors.

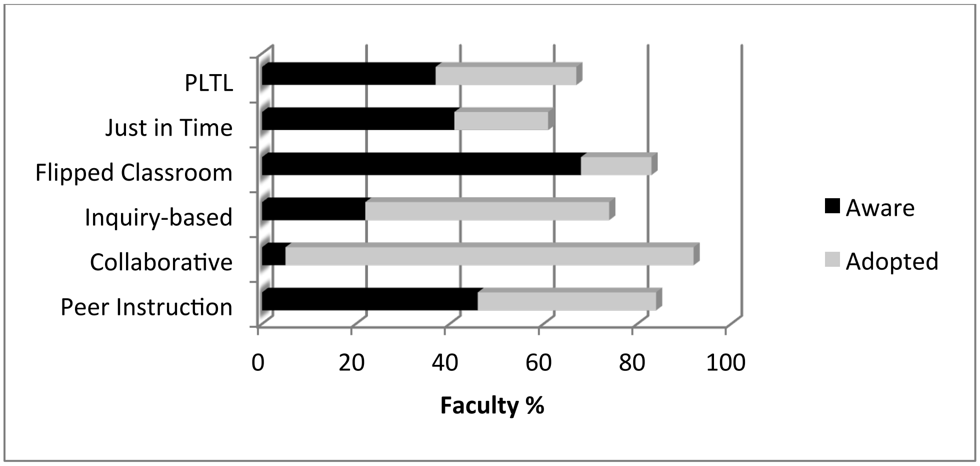

Figure 2. Faculty awareness and adoption of instructional practices

Peer-led Team Learning / Structured Learning Assistance (PLTL / SLA)

Peer-led Team Learning (Gosser *et al.* 10; Lewis 11) is an active learning technique that has been used to improve student learning in chemistry and other disciplines. Students work in groups with a peer-leader. This leader is a student that successfully completed the course and is trained to facilitate student-centered group work. These sessions are not review sessions, instead they are an opportunity for the students to complete activities that apply and extend their knowledge from lecture. The PLTL sessions can be done using POGIL activities with the student leader acting as the facilitator.

The survey provided the following brief definition:

Peer-Led Team Learning (PLTL) / Structured Learning Assistance (SLA) provides scheduled class time for group activities and exercises often led by upper-level students.

Figure 3 shows that Chemistry, Biology and Mathematics have the highest adoption rate while 35% of engineering faculty are aware of the approach but none have adopted it.

The most common reasons faculty reported for adopting Peer-led Team Learning (n = 33)

- Promotes student engagement (76%)
- Improves student learning / grades (85%)
- Enjoyable for the instructor (27%)
- Promotes increased attendance (36%)
- It is expected by administration (15%)

The most common reasons to stop using Peer-led Team Learning (n = 26)

- Not assigned to teach a SLA section (76%)
- Lack of resources to implement (23%)

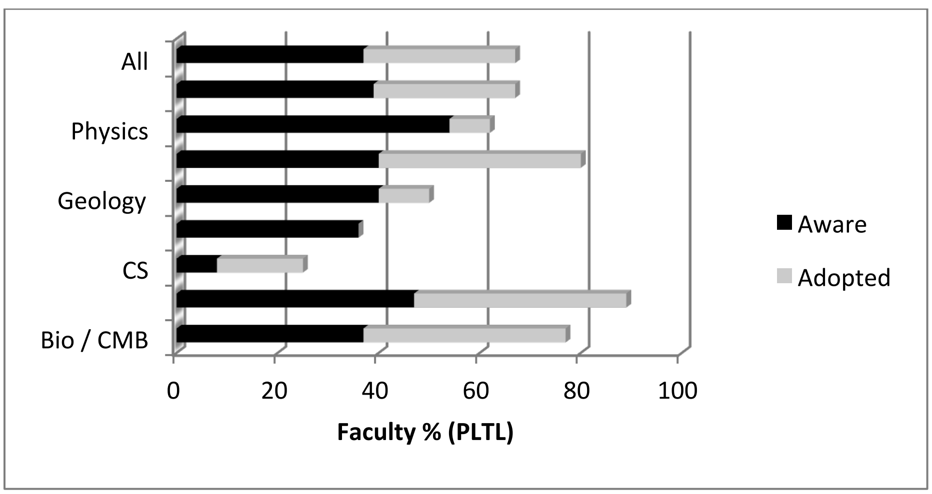

Figure 3. Faculty awareness and adoption of PLTL

Just-in-Time Teaching

The survey provided the following brief definition:

Just In Time Teaching involves students completing online quizzes BEFORE class. The instructor reviews student responses to identify common misconceptions and uses this information to determine what is covered during class.

Figure 4 reveals that approximately 40% of instructors are aware of the practice with physics faculty begin the highest adopters (40%).

The most common reasons faculty reported for adopting Just in Time Teaching (n = 19)

- Promotes student engagement (74%)
- Improves student learning / grades (58%)
- Saves instructor time (21%)
- Promotes increased attendance (16%)

The most common reasons to stop using Just in Time Teaching (n = 20)

- Too much preparation time for instructor (40%)
- Lack of evidence it is effective (35%)
- Students did not react positively (30%)
- Lack of resources to implement (20%)

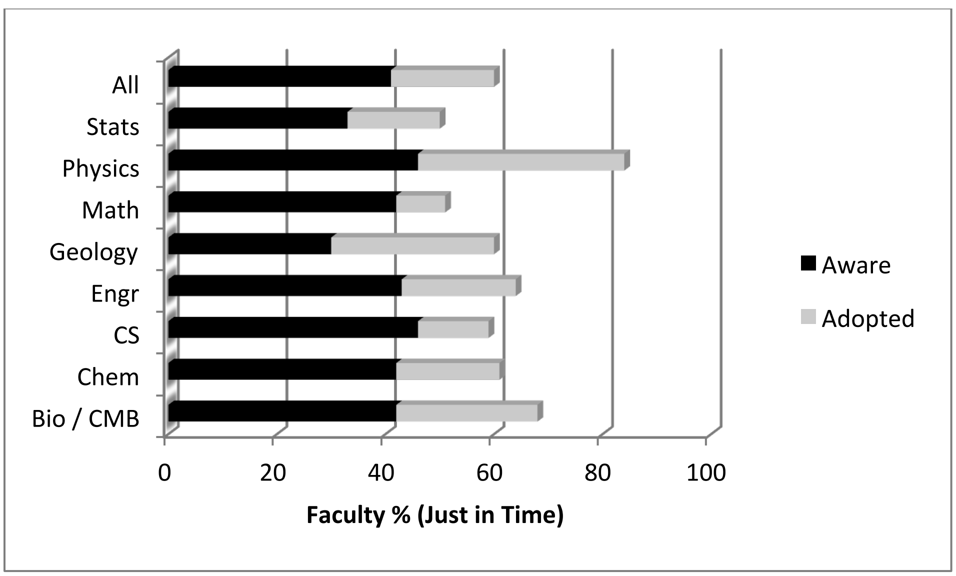

Figure 4. Faculty awareness and adoption of Just-in-Time Teaching

Flipped or Inverted Classroom

The concept of *Flipped Learning* (Bergmann & Sams 12, Sams & Bergmann 13) uses screen capture technology and other media tools to move the lecture portion of a course out of the classroom. Instructors post informational content materials online and expect students to view and interact with these materials prior to attending the classroom. Class time is then spent with students engaged in one or more of the active-learning strategies discussed above.

The survey provided the following brief definition:

A Flipped or Inverted Classroom involves students watching instructor lectures on video and other sources of content BEFORE class to free up time during class for group activities.

Figure 5 shows that the practice of a flipped classroom is relatively well known in all disciplines but few faculty have adopted it. The highest adoption rate of flipped classrooms is within mathematics (25%).

The most common reasons faculty reported for adopting a Flipped Classroom (n = 25)

- Promotes student engagement (68%)
- Improves student learning / grades (72%)
- Saves instructor time (40%)
- Enjoyable for the instructor (32%)
- Promotes increased attendance (24%)

There is an insufficient number of responses regarding the most common reasons to stop using a Flipped Classroom (n=4).

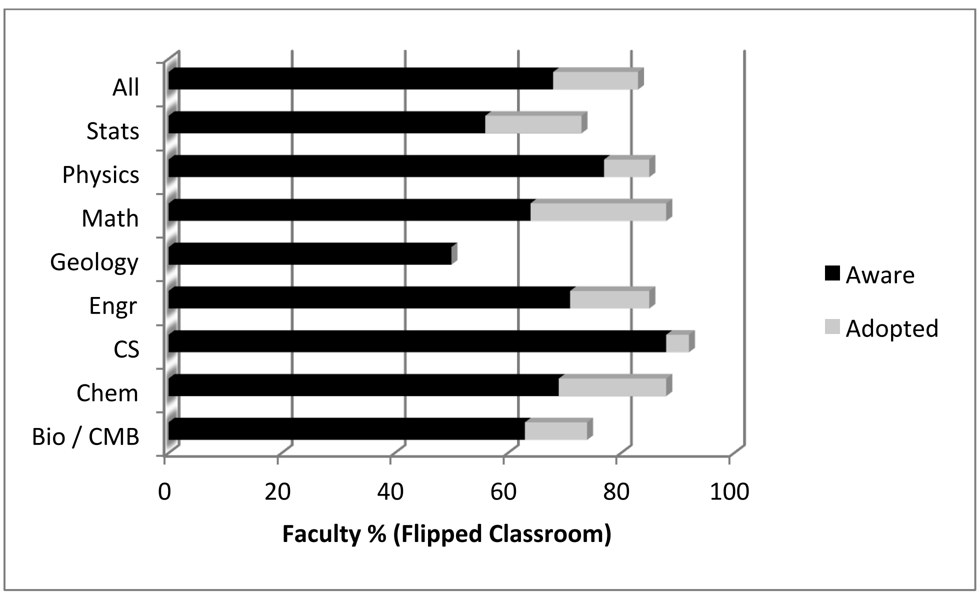

Figure 5. Faculty awareness and adoption of a Flipped Classroom

Inquiry-based Instruction (POGIL)

POGIL, Process Orientated Guided Inquiry Learning replaces lecture with group activities that guide students through the exploration, concept invention, and application stages of learning (Abraham & Renner 86; Farrell *et al.* 99; Spencer 99; Hanson 06). While the "standard implementation" of POGIL calls for the replacement of all lectures, the activities have been implemented in a more partial manner in chemistry courses with some success (Lewis & Lewis 05). The survey provided the following brief definition:

Inquiry-based Learning involves students solving carefully constructed problems with intermediate steps to encourage inquiry. One specific version of this practice is called POGIL, Process-Oriented Guided-Inquiry Learning.

Figure 6 indicates that inquiry-based instruction is relatively widely adopted. However, it is unlikely that many instructors have adopted the specific strategy of POGIL. Instead, faculty misunderstand the definition and are responding to the aspect of 'solving carefully constructed problems.' Benefits from POGIL are only achieved when the specific protocol is followed (Abraham & Renner 86; Farrell *et al.* 99; Spencer 99). The most common reasons faculty reported for adopting inquiry-based learning (n = 92)

- Promotes student engagement (97%)
- Improves student learning / grades (88%)
- Enjoyable for the instructor (48%)
- Promotes increased attendance (25%)

The most common reasons to stop using inquiry-based learning (n = 10)

- Takes too much class time (70%)
- Too much preparation time for instructor (40%)
- Students did not react positively (30%)
- Lack of resources to implement (20%)

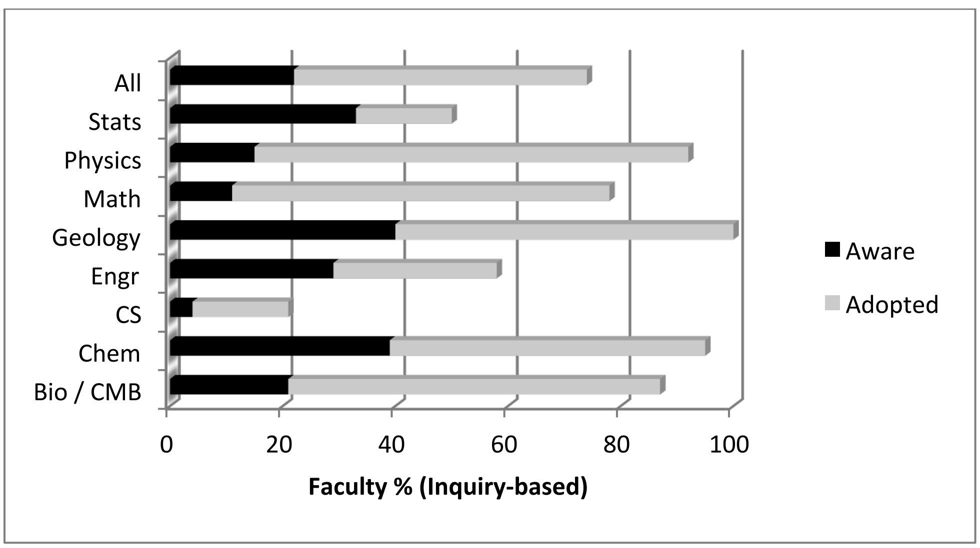

Figure 6. Faculty awareness and adoption of inquiry-based learning

Peer Instruction

Peer Instruction is an active-learning pedagogy in which most lecture time is replaced with students responding to multiple-choice questions displayed on the classroom screen (Crouch & Mazur 01). Responses are provided using handheld devices informally called clickers. As directed by the lecturer, students discuss their thinking with a neighbor, each attempting to convince the other that his or her own reasoning is correct. Changes in student responses from before to after the peer dialogue guide the instructor to decide whether to continue with the lecture or spend more time on the topic. Strong student satisfaction and learning gains have been shown using this approach in introductory computer science (Simon *et al.* 10) and chemistry lectures (MacArther & Jones 08).

The survey provided the following brief definition:

Peer Instruction typically includes asking students multiple-choice questions and recording responses with clickers or similar strategies.

Figure 7 shows that peer instruction is broadly adopted in physics (85%) but less so in statistics (15%). The most common reasons faculty reported for adopting peer instruction (n = 63)

- Promotes student engagement (98%)
- Improves student learning / grades (63%)
- Enjoyable for the instructor (33%)
- Promotes increased attendance (32%)

The most common reasons to stop using peer instruction (n = 12)

- Takes too much class time (25%)
- The cost of clickers (18%)

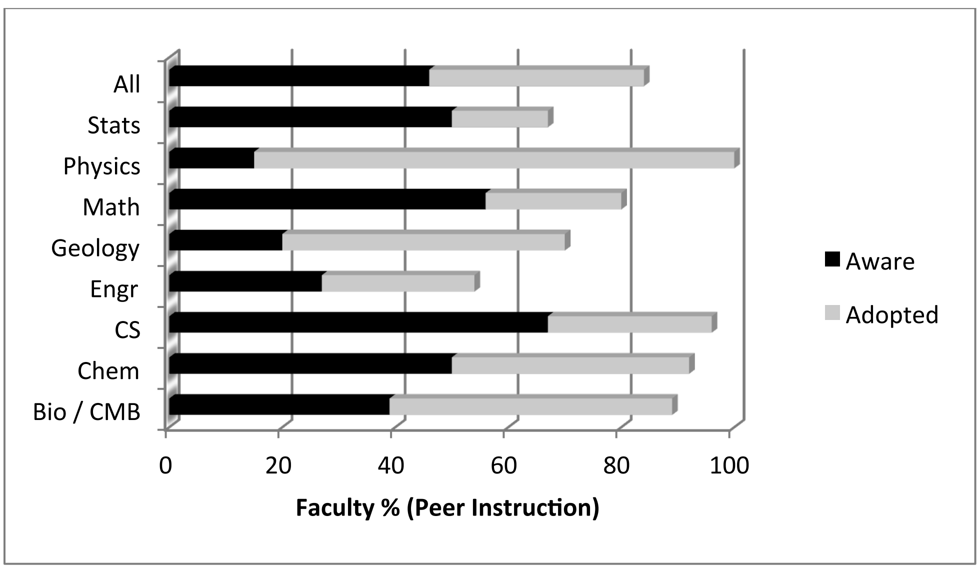

Figure 7. Faculty awareness and adoption of peer instruction

Collaborative Learning

Collaborating learning in small groups improves student performance and student interest (Prince, 2004; Smith *et al.*, 2005; Felder & Brent, 2007) The survey provided the following brief definition:

Collaborative Learning involves small groups or pairs of students solving problems in the classroom.

Figure 8 shows that collaborative learning is broadly adopted by all instructors and in all disciplines. However, the question does not reveal to what extent the approach is used in the classroom. For example, does the instructor have students work in small groups once or twice per semester or on a regularly basis. Frequency of classroom activities is described in section 7.2.

The most common reasons faculty reported for adopting collaborative learning (n = 158)

- Promotes student engagement (97%)
- Improves student learning / grades (83%)
- Enjoyable for the instructor (44%)
- Promotes increased attendance (22%)

The most common reasons to stop using collaborative learning (n = 13)

- Takes too much class time (46%)
- Students did not react positively (15%)
- Lack of resources to support implementation (15%)
- Lack of evidence that it is effective (15%)

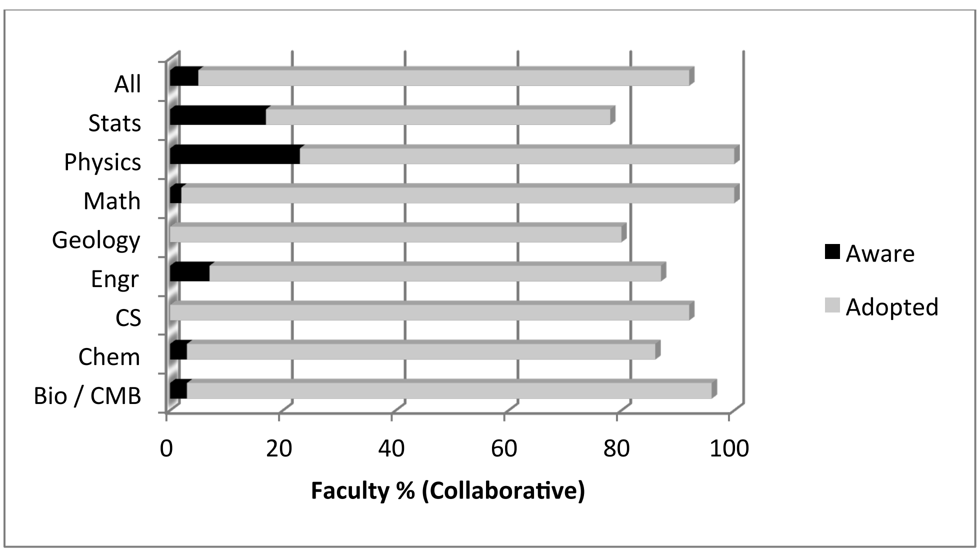

Figure 8. Faculty awareness and adoption of collaborative learning

Results By Discipline

Figures 9 – 16 show faculty awareness and adoption for each of the STEM disciplines. For example, Figure 9 shows that collaborative learning has been adopted by over 90% of Biology and CMB faculty. In contrast, 60% of biology instructors report awareness of a flipped classroom but only 15% have tried the approach.

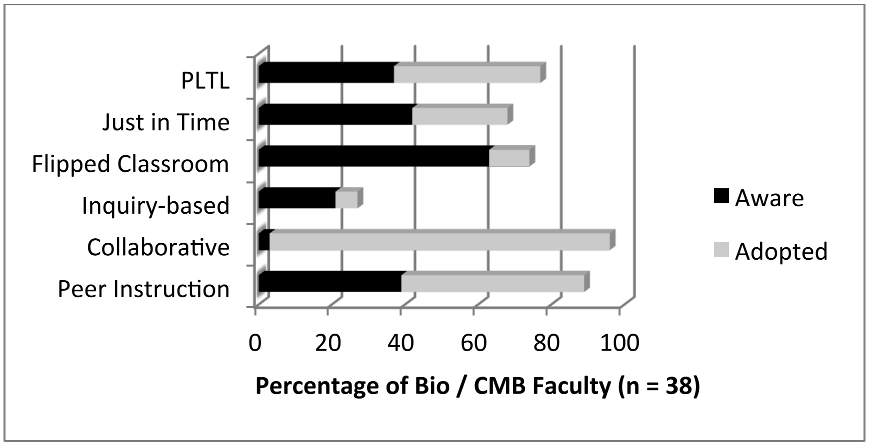

Figure 9. Faculty awareness and adoption for Biology and CMB

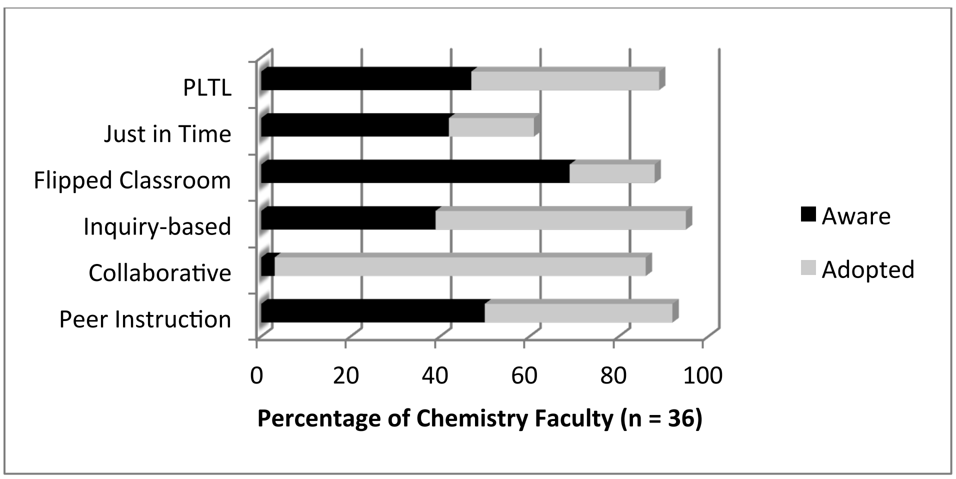

Figure 10. Faculty awareness and adoption for Chemistry

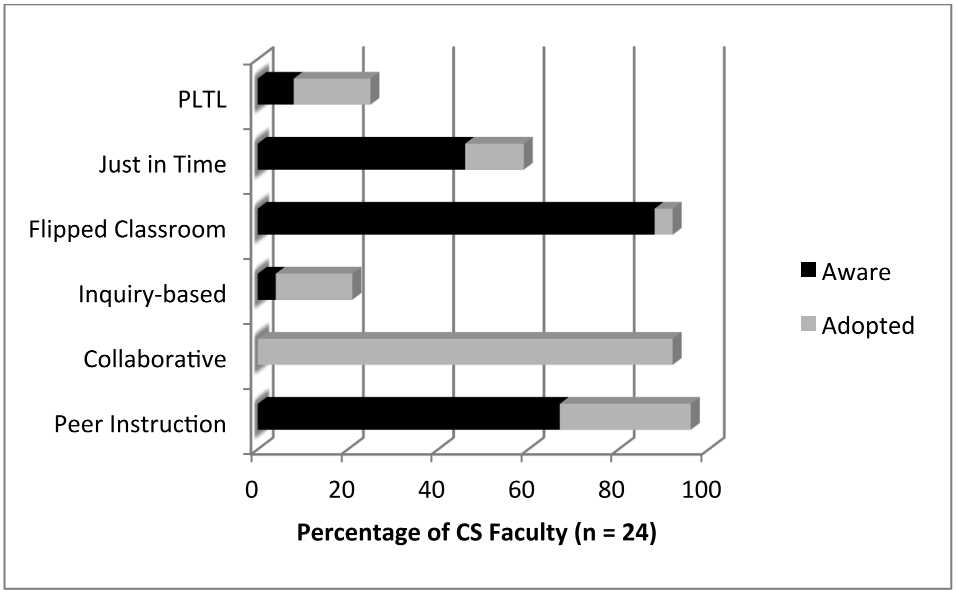

Figure 11. Faculty awareness and adoption for Computer Science

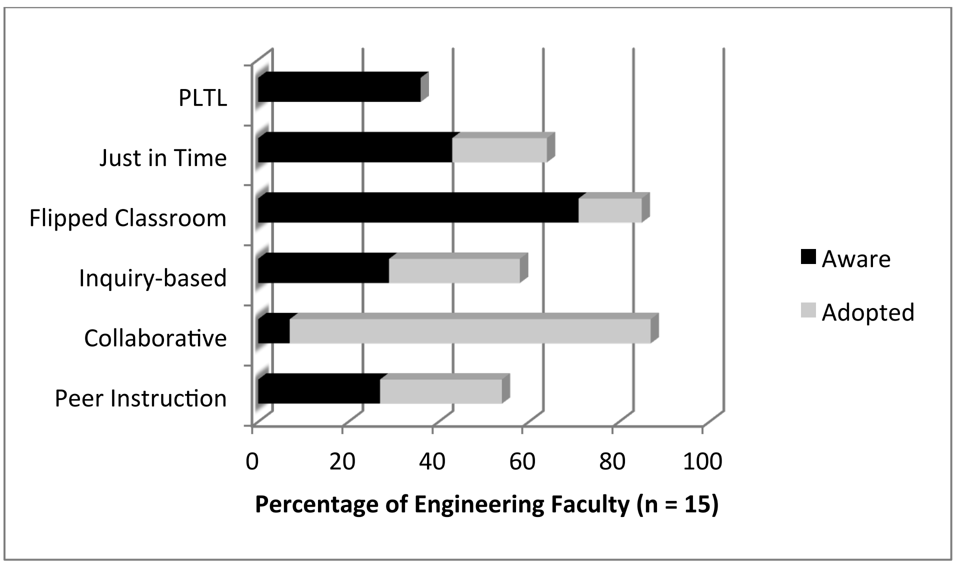

Figure 12. Faculty awareness and adoption for Engineering

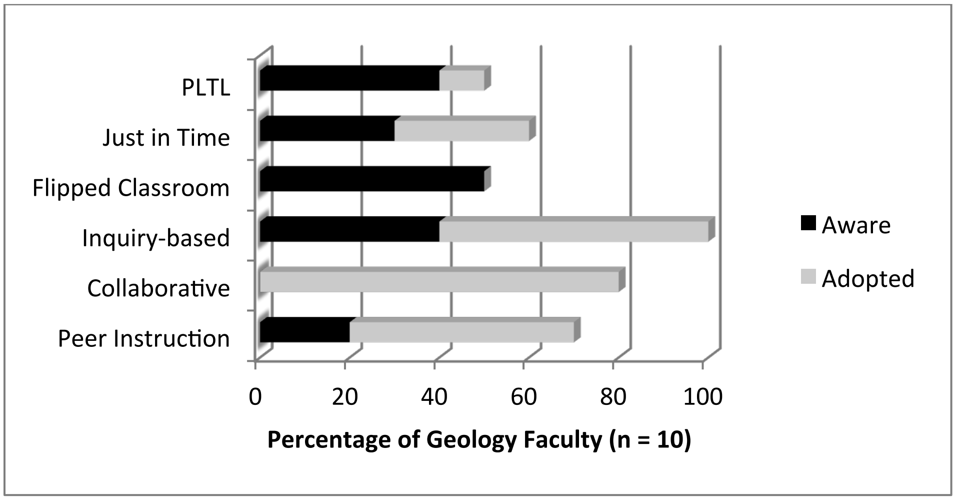

Figure 13. Faculty awareness and adoption for Geology

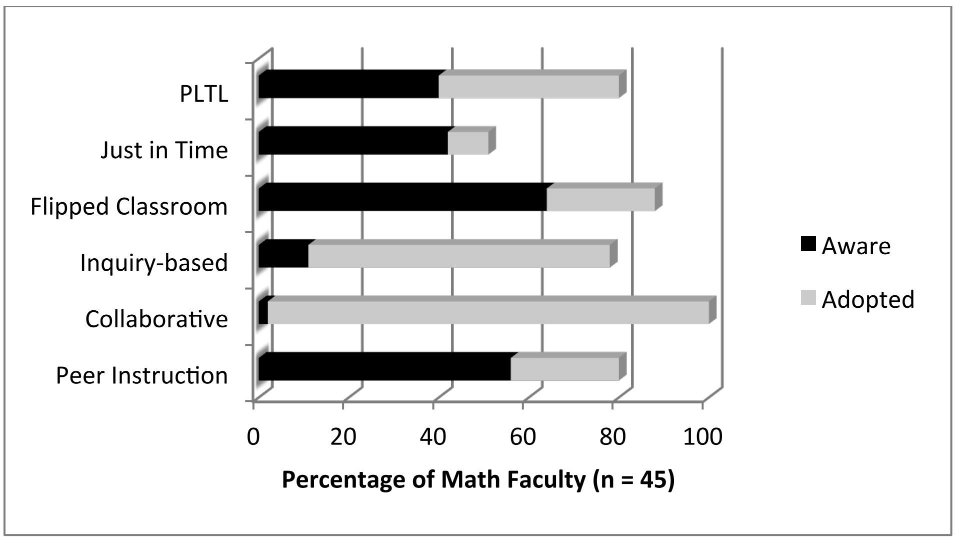

Figure 14. Faculty awareness and adoption for Mathematics

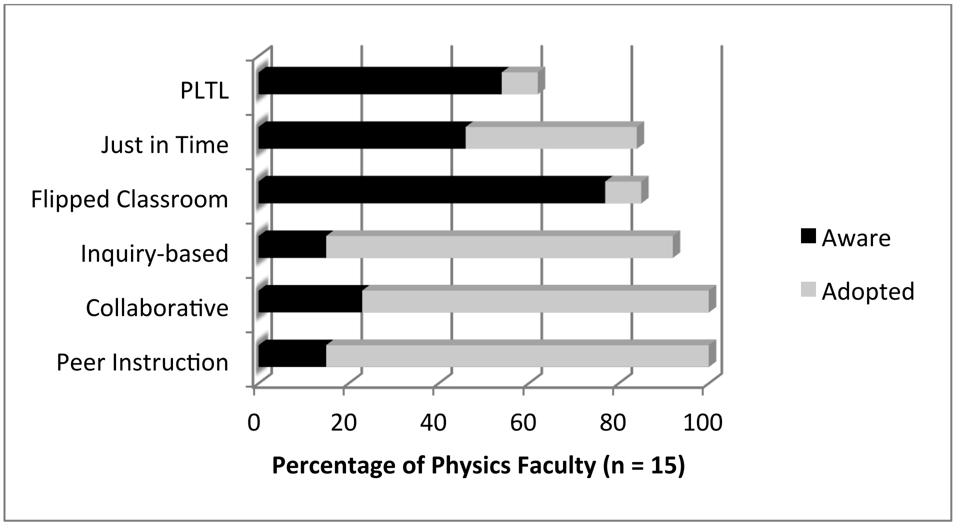

Figure 15. Faculty awareness and adoption for Physics

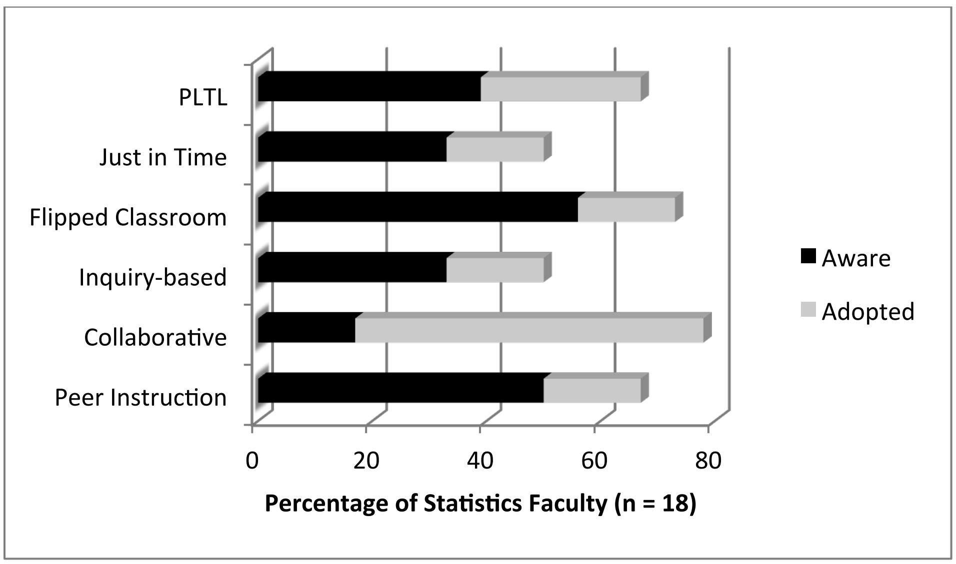

Figure 16. Faculty awareness and adoption for Statistics

Results by Demographics

We compared responses by gender and tenure status. Chi-square analysis identified responses with significant differences. Post hoc analysis identified which differences were significant ($p<0.05$).

By Gender

Women were 38% of the responding population and are more likely than men to:

- have their students use collaborative learning
- use inquiry-based learning
- be familiar with PLTL
- have their students work individually solving problems during class
- have students work in small groups during class
- have students answer multiple-choice questions during class
- attend teacher workshops at GVSU

By Tenure Status

Participants identified their professional rank: adjunct, affiliate, instructor, assistant professor, associate professor and full professor. Adjunct instructors are part-time and are paid for each course that they teach. Affiliates are full-time employees that have a teaching responsibility of fifteen credit hours. Adjuncts and affiliates are not tenure-track (34%), assistant professors are generally tenure-track but not yet tenured (14%) and associates and full professors are generally tenured faculty (52%). Significant differences between adjuncts/affiliates and tenure track faculty were observed. **Adjuncts and affiliates are <u>less likely</u> to:**

- be aware of inquiry-based instruction
- be aware of or use flipped classroom
- have students work in small groups
- lead class discussions
- attend GVSU teaching workshops
- and much less likely to attend external workshops

There were few significant differences between tenure-track and tenured faculty. **Tenured faculty are <u>less likely</u> to:**

- attend GVSU teaching workshops.
- be aware of the flipped classroom
- have students work in groups

Results by Faculty Perceptions

Instructors were asked about their work environment, classroom activities, faculty development, motivation to adopt new practices as well as perceived barriers to adopting new practices.

Supportive Environment for Instruction

GV is a supportive environment with respect to teaching excellence. Instructors report that:

- their academic units (85%) encourage improvement of instructional practices
- GVSU (80%) encourages improvement of instructional practices

Common Classroom Activities

Participants were asked to consider a specific course that they regularly teach and describe what students do in the classroom. A standard fifty-minute class meeting can include a number of student activities from passively listening during lecture to engaging in small group problem solving. Instructors indicated how often each activity occurred in their classroom: every day, most days, several times per term, a few times per term and never. Almost 85% of instructors claimed that their students listened to a lecture most days or every day. We consider activities to be *dominant* if they are performed at least most days. By this definition, the **most dominant class activities at GV are**:

- lecture (84%)
- instructor-led class discussions (63%)
- instructor demonstrations (59%)
- small group work (59%)
- individual problem solving (43%)
- responding to multiple-choice questions (14%)
- student presentations (3%)

Faculty Development

The most common ways faculty members learn about new practices are:

- talking with GVSU colleagues (91%)
- reading (59%)
- attending workshops at GVSU (47%)
- talking with colleagues outside GVSU (47%)
- attending teaching workshops away from campus (44%)
- and attending discipline-specific conferences (44%)

Barriers to Adoption

Over half of the participants reported that they have been considering a new practice but have yet to try it. The most commonly reported barriers are:

- too much preparation time for the instructor (61%)
- too much class time is required (31%)
- limited information about how to get started (28%)
- and lack of resources to support implementation (26%)

Recommendations

Survey results indicate that GV faculty are receptive to new instructional practices and many faculty have already adopted these practices. However, the most dominant classroom activity remains lecturing.

We reviewed the STEM education literature to identify the most effective strategies to promote faculty adoption of new instructional practices. These recommendations extend current GV practice by incorporating best practices and addressing faculty barriers to adopting new instructional practices. Given that the most common barrier is the instructor preparation time, GV should strive to make new practices relatively easy and painless to adopt new practices.

Faculty must receive ongoing support rather than a single workshop. GV should continue to offer year-long faculty learning communities (FLC) with the goal of increasing the use of evidence-based instructional practices. Faculty will transition from awareness of a practice to exploration and then to full adoption.

Successful communities have a common frame of reference. FLCs should be discipline specific and emphasize a particular instructional practice such as peer instruction (Cox 01).

Instructors must feel their efforts will be acknowledged and rewarded. Many FLC members will be non-tenure-track or pre-tenure. It is vital that these vulnerable faculty have a safe environment to explore new practices since initial student reaction to innovative teaching is sometimes negative (Allen *et at.* 01). FLC participation should be acknowledged during annual performance reviews.

People respond to incentives. Social incentives include the opportunity to work with colleagues striving for a common goal. Modest financial incentives could include a $1,000 stipend to participate in the entire community and travel support for a teaching conference or workshop. These travel funds will be helpful for part-time instructors who currently receive little professional development.

Faculty must be supported in how to get started. Before the start of the Fall term, FLC members could attend a two-day workshop. This intensive orientation introduces best practices for adopting instructional practices and implementing a scholarship of teaching and leaning project. Participants would engage in expert-led presentations, active-learning sessions, and discipline-specific breakouts. An external guest speaker will kick off the workshop.

Local culture must be considered. FLCs should establish their own goals appropriate for their discipline and department culture. In addition, they should determine the appropriate assessment measures. The intent is to treat each discipline as an independent SoTL project with an emphasis on assessing student learning gains and interest in their disciplines.

FLC Facilitator training is essential. Pew FTLC has facilitated several learning communities during the past four years using published best practices (Cox & Richlin 04).

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Appendix A

NSF Proposal Abstract

GVSU Inventory of Instructional Practices

Grand Valley State University, a comprehensive master's university, is conducting an internal inventory of the current awareness and use of evidence-based instructional practices. The project includes three primary activities: 1) an extensive faculty survey, 2) targeted faculty interviews and 3) pilot programs to increase adoption of evidence-based practices.

The faculty survey is informed by similar efforts reported in engineering, physics and geosciences undergraduate education. Questions assess faculty awareness of specific practices and how they learn about new teaching strategies. Demographic data are collected to identify potential correlations: discipline, faculty rank, gender and part-time status. Face to face interviews include administrators, tenure-track faculty and part-time instructors that teach key STEM gateway courses.

Targeting part-time instructors is a key component of the project because they may be less aware of evidence-based practices compared to their tenure-track colleagues. Student engagement pedagogies have been shown effective at improving retention of all undergraduates but especially women and first-generation college students. Increasing the awareness and adoption of these practices by university instructors could have a significant effect on STEM education.

Appendix B

Faculty Survey

The survey was distributed via Survey Monkey. The following document shows all information provided to the participants.

Project Information

PURPOSE: The study is designed to document GVSU faculty awareness and use of classroom-based instructional practices. Broader goals are to identify barriers to adoption of these approaches and to improve student learning.

COMPENSATION: You will have the option to include your name in a raffle to win a scholarly book about teaching and learning. Five books will be given away.

TIME COMMITMENT: This should take you no longer than 10 minutes.

REASON FOR INVITATION: You are invited to participate because you teach courses at GVSU in the area of science, technology, engineering or mathematics (STEM).

RISKS: We do not think there is any risk to you for participating in this study but you should feel free to stop participating at any time.

PRIVACY and CONFIDENTIALITY: Your comments will not be shared with anyone other than the research team without your consent. All information will be kept confidential to the fullest extent allowed by law.

POTENTIAL BENEFITS TO YOU: You may become aware of new instructional practices or identify GVSU faculty who share your interest in specific practices.

INVESTIGATORS: Scott Grissom (PI), Shannon Biros, Shaily Menon and Robert Talbert are GVSU faculty members.

QUESTIONS: If you have any questions about your rights as a research participant, please contact the Research Protections Office at Grand Valley State University, Grand Rapids, MI Phone: 616-331-3197 e-mail: hrrc@gvsu.edu

RESEARCH APPROVAL: This exempt research protocol has been approved by the Human Research Review Committee at Grand Valley State University. File No. 430771.

Voluntary Consent Statement

I understand that the online survey includes questions about instructional practices I use in my classroom.

I understand that my participation is totally voluntary and that declining to participate will involve no penalties. If I do not agree to take the survey, my answers and participation will not be recorded.

I understand I may direct any questions regarding the survey or my rights as a participant to Professor Scott Grissom, Grand Valley State University (grissom@gvsu.edu).

* 1. Do you agree to take the survey and acknowledge your rights as described above?

- ○ Yes, I will take the survey.
- ○ No. I prefer not to take the survey.

Classroom-based Instructional Practices

For the following series of questions you will be asked about your awareness and use of various instructional practices:

- Peer Instruction
- Collaborative Learning
- Inquiry-based Learning
- Flipped or Inverted Classroom
- Just In Time Teaching
- Peer-Led Team Learning (PLTL) / Structured Learning Assistance (SLA)

Peer Instruction

Peer Instruction typically includes asking students multiple-choice questions and recording responses with clickers or similar strategies.

* 2. What is your familiarity with Peer Instruction? (defined above)

- ◯ I currently use this practice
- ◯ I have used this practice in the past but no longer do
- ◯ I am familiar with the practice but have never used it
- ◯ I have heard the term but know little about it
- ◯ I have never heard of this practice

Peer Instruction

* 3. How long have you used Peer Instruction?

- ◯ One semester or less
- ◯ 1 year
- ◯ 2 - 4 years
- ◯ 5 or more years

* 4. What is your primary motivation to use Peer Instruction? (select all that apply)

- [ ] Promotes student engagement
- [ ] Enjoyable for the instructor
- [ ] Promotes increased attendance
- [ ] Improves student learning / grades
- [ ] Increases retention in the major
- [ ] Saves instructor time
- [ ] It is expected by my colleagues
- [ ] It is expected by my administration
- [ ] Other (please specify)

Peer Instruction

* 5. Why do you no longer use Peer Instruction? (select all that apply)

- [ ] Lack of evidence that is was useful
- [ ] Too much preparation for the instructor
- [ ] Takes too much class time
- [ ] Students did not react positively
- [ ] My colleagues did not value it
- [ ] My administration did not value it
- [ ] Lack of resources to support implementation
- [ ] Other (please specify)

Collaborative Learning

Collaborative Learning involves small groups or pairs of students solving problems in the classroom. (defined above)

* 6. What is your familiarity with Collaborative Learning?

- I currently use this practice
- I have used this practice in the past but no longer do
- I am familiar with the practice but have never used it
- I have heard the term but know little about it
- I have never heard of this practice

Collaborative Learning

* 7. How long have you used Collaborative Learning?

- One semester or less
- 1 year
- 2 - 4 years
- 5 or more years

* 8. What is your primary motivation to use Collaborative Learning? (select all that apply)

- [ ] Promotes student engagement
- [ ] Enjoyable for the instructor
- [ ] Promotes increased attendance
- [ ] Improves student learning / grades
- [ ] Increases retention in the major
- [ ] Saves instructor time
- [ ] It is expected by my colleagues
- [ ] It is expected by my administration
- [ ] Other (please specify)

Collaborative Learning

* 9. Why do you no longer use Collaborative Learning? (select all that apply)

- [ ] Lack of evidence that is was useful
- [ ] Too much preparation for the instructor
- [ ] Takes too much class time
- [ ] Students did not react positively
- [ ] My colleagues did not value it
- [ ] My administration did not value it
- [ ] Lack of resources to support implementation
- [ ] Other (please specify)

Inquiry-based Learning

Inquiry-based Learning involves students solving carefully constructed problems with intermediate steps to encourage inquiry. One specific version of this practice is called POGIL, Process-Oriented Guided-Inquiry Learning. (defined above)

* 10. What is your familiarity with Inquiry-based Learning?

- ( ) I currently use this practice
- ( ) I have used this practice in the past but no longer do
- ( ) I am familiar with the practice but have never used it
- ( ) I have heard the term but know little about it
- ( ) I have never heard of this practice

Inquiry-based Learning

* 11. How long have you used Inquiry-based Learning?

- ( ) One semester or less
- ( ) 1 year
- ( ) 2 - 4 years
- ( ) 5 or more years

* 12. What is your primary motivation to use Inquiry-based Learning? (select all that apply)

- [ ] Promotes student engagement
- [ ] Enjoyable for the instructor
- [ ] Promotes increased attendance
- [ ] Improves student learning / grades
- [ ] Increases retention in the major
- [ ] Saves instructor time
- [ ] It is expected by my colleagues
- [ ] It is expected by my administration
- [ ] Other (please specify)

Inquiry-based Learning

* 13. Why do you no longer use Inquiry-based Learning? (select all that apply)

- [ ] Lack of evidence that is was useful
- [ ] Too much preparation for the instructor
- [ ] Takes too much class time
- [ ] Students did not react positively
- [ ] My colleagues did not value it
- [ ] My administration did not value it
- [ ] Lack of resources to support implementation
- [ ] Other (please specify)

Flipped or Inverted Classroom

A Flipped or Inverted Classroom involves students watching instructor lectures on video and other sources of content BEFORE class to free up time during class for group activities. (defined above)

* 14. What is your familiarity with a Flipped or Inverted Classroom?

- ◯ I currently use this practice
- ◯ I have used this practice in the past but no longer do
- ◯ I am familiar with the practice but have never used it
- ◯ I have heard the term but know little about it
- ◯ I have never heard of this practice

Flipped or Inverted Classroom

* 15. How long have you used a Flipped or Inverted Classroom?

- ◯ One semester or less
- ◯ 1 year
- ◯ 2 - 4 years
- ◯ 5 or more years

* 16. What is your primary motivation to use a Flipped or Inverted Classroom? (select all that apply)

- ☐ Promotes student engagement
- ☐ Enjoyable for the instructor
- ☐ Promotes increased attendance
- ☐ Improves student learning / grades
- ☐ Increases retention in the major
- ☐ Saves instructor time
- ☐ It is expected by my colleagues
- ☐ It is expected by my administration
- ☐ Other (please specify)

Flipped or Inverted Classroom

* 17. Why do you no longer use a Flipped or Inverted Classroom? (select all that apply)

- [ ] Lack of evidence that is was useful
- [ ] Too much preparation for the instructor
- [ ] Takes too much class time
- [ ] Students did not react positively
- [ ] My colleagues did not value it
- [ ] My administration did not value it
- [ ] Lack of resources to support implementation
- [ ] Other (please specify)

Just In Time Teaching

Just In Time Teaching involves students completing online quizzes BEFORE class. The instructor reviews student responses to identify common misconceptions and uses this information to determine what is covered during class. (defined above)

* 18. What is your familiarity with Just In Time Teaching?

- ○ I currently use this practice
- ○ I have used this practice in the past but no longer do
- ○ I am familiar with the practice but have never used it
- ○ I have heard the term but know little about it
- ○ I have never heard of this practice

Just In Time Teaching

* 19. How long have you used Just In Time Teaching?

- ○ One semester or less
- ○ 1 year
- ○ 2 - 4 years
- ○ 5 or more years

* 20. What is your primary motivation to use Just In Time Teaching? (select all that apply)

- [ ] Promotes student engagement
- [ ] Enjoyable for the instructor
- [ ] Promotes increased attendance
- [ ] Improves student learning / grades
- [ ] Increases retention in the major
- [ ] Saves instructor time
- [ ] It is expected by my colleagues
- [ ] It is expected by my administration
- [ ] Other (please specify)

Just In Time Teaching

* 21. Why do you no longer use Just In Time Teaching? (select all that apply)

- [ ] Lack of evidence that is was useful
- [ ] Too much preparation for the instructor
- [ ] Takes too much class time
- [ ] Students did not react positively
- [ ] My colleagues did not value it
- [ ] My administration did not value it
- [ ] Lack of resources to support implementation
- [ ] Other (please specify)

Peer-Led Team Learning (PLTL) / Structured Learning Assistance (SLA)

Peer-Led Team Learning (PLTL) / Structured Learning Assistance (SLA) provides scheduled class time for group activities and exercises often led by upper-level students. (defined above)

* 22. What is your familiarity with PLTL / SLA?

- ◯ I currently use this practice
- ◯ I have used this practice in the past but no longer do
- ◯ I am familiar with the practice but have never used it
- ◯ I have heard the term but know little about it
- ◯ I have never heard of this practice

Peer-Led Team Learning (PLTL) / Structured Learning Assistance (SLA)

* 23. How long have you used PLTL / SLA?

- ◯ One semester or less
- ◯ 1 year
- ◯ 2 - 4 years
- ◯ 5 or more years

* 24. What is your primary motivation to use PLTL / SLA? (select all that apply)

- ☐ Promotes student engagement
- ☐ Enjoyable for the instructor
- ☐ Promotes increased attendance
- ☐ Improves student learning / grades
- ☐ Increases retention in the major
- ☐ Saves instructor time
- ☐ It is expected by my colleagues
- ☐ It is expected by my administration
- ☐ Other (please specify)

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Peer-Led Team Learning (PLTL) / Structured Learning Assistance (SLA)

* 25. Why do you no longer use PLTL / SLA? (select all that apply)

- [ ] Lack of evidence that is was useful
- [ ] Too much preparation for the instructor
- [ ] Takes too much class time
- [ ] Students did not react positively
- [ ] My colleagues did not value it
- [ ] My administration did not value it
- [ ] Lack of resources to support implementation
- [ ] Other (please specify)

Other Instructional Practices

As a reminder, these are the practices you just considered.

- Peer Instruction
- Collaborative Learning
- Inquiry-based Learning
- Flipped or Inverted Classroom
- Just In Time Teaching
- Peer-Led Team Learning (PLTL) / Structured Learning Assistance (SLA)

26. Describe any classroom-based instructional practices that you are aware of (beyond the six listed above).

About Your Course

For the following questions, identify ONE COURSE that you teach by considering the following criteria. Although it may not be possible to choose a course that meets all the criteria, choose one that meets as many as possible.

1) You are teaching the course this academic year
2) The course is taken by lower-level students (freshman / sophomore)
3) The course is taken by science, math or engineering majors

* 27. Provide the course prefix and number (e,g, BIO 120 or MTH 465)

* 28. Typical Course Enrollment

- ○ 1 - 12 students
- ○ 13 - 24 students
- ○ 25 - 40 students
- ○ 41 - 70 students
- ○ over 70 students

* 29. Primary Student Audience

- ○ Lower-level undergraduate (freshman / sophomore)
- ○ Upper-level undergraduate (junior / senior)
- ○ Graduate level

30. Course Components according to GVSU catalog (check all that apply)

- ☐ Lecture
- ☐ Discussion / Recitation
- ☐ Lab

* 31. How frequently do students perform the following activities in your classroom?

	Never	A Few Times Each Semester	Several Times Each Semester	Most Class Meetings	Every Class Meeting
Watch, listen or take notes during a lecture	○	○	○	○	○
Watch instructor solve problems or perform demonstrations	○	○	○	○	○
Work on a problem individually	○	○	○	○	○
Work on a problem in pairs or small groups	○	○	○	○	○
Answer mulitple-choice questions	○	○	○	○	○
Participate in class discussions	○	○	○	○	○
Make student presentations	○	○	○	○	○

32. Describe any additional instructional practices used in this course.

* 33. Do you have a second course you would like to describe?

○ Yes, I want to describe a second course (repeat the last few questions)

○ No, continue with the survey.

About Your 2nd Course

For the following questions, identify ONE COURSE that you teach by considering the following criteria. Although it may not be possible to choose a course that meets all the criteria, choose one that meets as many as possible.

1) You are teaching the course this academic year
2) The course is taken by lower-level students (freshman / sophomore)
3) The course is taken by science, math or engineering majors

* 34. Provide the course prefix and number (e,g, BIO 120 or MTH 465)

* 35. Select the typical course enrollment

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* 36. Primary student audience

- ( ) Lower-level undergraduate (freshman / sophomore)
- ( ) Upper-level undergraduate (junior / senior)
- ( ) Graduate level

* 37. Course components according to GVSU catalog (select all that apply)

- [ ] Lecture
- [ ] Discussion / Recitation
- [ ] Lab

* 38. How frequently do students perform the following activities in your classroom?

	Never	A Few Times Each Semester	Several Times Each Semester	Most Class Meetings	Every Class Meeting
Watch, listen or take notes during a lecture	( )	( )	( )	( )	( )
Watch instructor solve problems or perform demonstrations	( )	( )	( )	( )	( )
Work on a problem individually	( )	( )	( )	( )	( )
Work on a problem in pairs or small groups	( )	( )	( )	( )	( )
Answer mulitple-choice questions	( )	( )	( )	( )	( )
Participate in class discussions	( )	( )	( )	( )	( )
Make student presentations	( )	( )	( )	( )	( )

39. Describe any additional instructional practices used in this course.

About You and Your Teaching

* 40. Describe the attitude of your academic unit and GVSU about improving your instructional practices.

	Very Discouraging	Somewhat Discouraging	Neither Discouraging or Encouraging	Somewhat Encouraging	Very Encouraging
Your Unit	○	○	○	○	○
GVSU	○	○	○	○	○

* 41. Describe the frequency you talk with colleagues about teaching.

	Never	Once or twice per semester	Several times per semester	Weekly	Almost every day
Colleagues at GVSU	○	○	○	○	○
Colleagues away from GVSU	○	○	○	○	○

* 42. How do you become aware of new instructional practices? (select all that apply)

- [ ] Talking with GVSU colleagues
- [ ] Talking with colleagues away from GVSU
- [ ] Attending teaching conferences / workshops at GVSU
- [ ] Attending teaching conferences away from GVSU
- [ ] Attending conferences / meetings related to my discipline
- [ ] Reading books, journals and similar publications
- [ ] Reading online sources of information such as websites, discussion groups and e-newsletters
- [ ] I'm not sure
- [ ] Other (please specify)

* 43. Are you interested in trying new instructional practices?

- ○ Yes, I have been considering a new practice
- ○ Maybe, but I do not have anything in mind
- ○ Not particularly, I am satisfied with my current practice(s)

Adopting New Practices

* 44. What discourages you from trying the practice you have been considering? (select all that apply)

- [ ] Lack of evidence to support its value
- [ ] Too much preparation time required
- [ ] Takes too much class time
- [ ] Student may not react positively
- [ ] My administration would not value it
- [ ] My colleagues would not value it
- [ ] Lack of resources to support implementation
- [ ] Limited information on how to get started
- [ ] I'm not sure
- [ ] Other (please specify)

About You

* 45. During the past TWO YEARS, how many education workshops / conferences have you attended?

	None	1 - 2	3 - 4	5 or more
At GVSU	○	○	○	○
Away from GVSU	○	○	○	○

* 46. Select your academic discipline.

-

* 47. Select your professional rank

-

* 48. Select your tenure status

-

* 49. Select the number of years you have been a faculty member (entire career)

-

50. What is your gender?

- Female
- Male

Thank You

Your responses will remain confidential and may help us improve the quality of instruction at GVSU. Your name will be entered in a raffle to win one of five books about teaching. Winners will be notified via e-mail after the survey closes.

51. You may choose any of the following: (select all that apply)

- [ ] Enter my name in the raffle to a win a scholarly book about teaching and learning
- [ ] Share my name and teaching practices with FTLC for professional development opportunities
- [ ] Notify me with the project results

52. Additional comments (if any)

Your responses will not be submitted until you click 'Submit Survey'.