Recent Developments in the Transformation of Statistics Courses

With Highlights on Study Skills Workshops and Lab TA Surveys

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Abstract

The transformation of undergraduate instruction in Statistics began in 2007. Highlighted here are two developments from the past year. Study skills workshops have been offered to students on STAT 200/241/251 to obtain information about study habits and to assist students in adopting effective approaches to studying. Details are provided, along with evidence on the apparent impact on student performance. Also, surveys have been created for TAs to complete after each lab activity on a course. The surveys provide valuable feedback to the instructor, and also encourage the TAs to reflect on their performance.

Newly Transformed Course

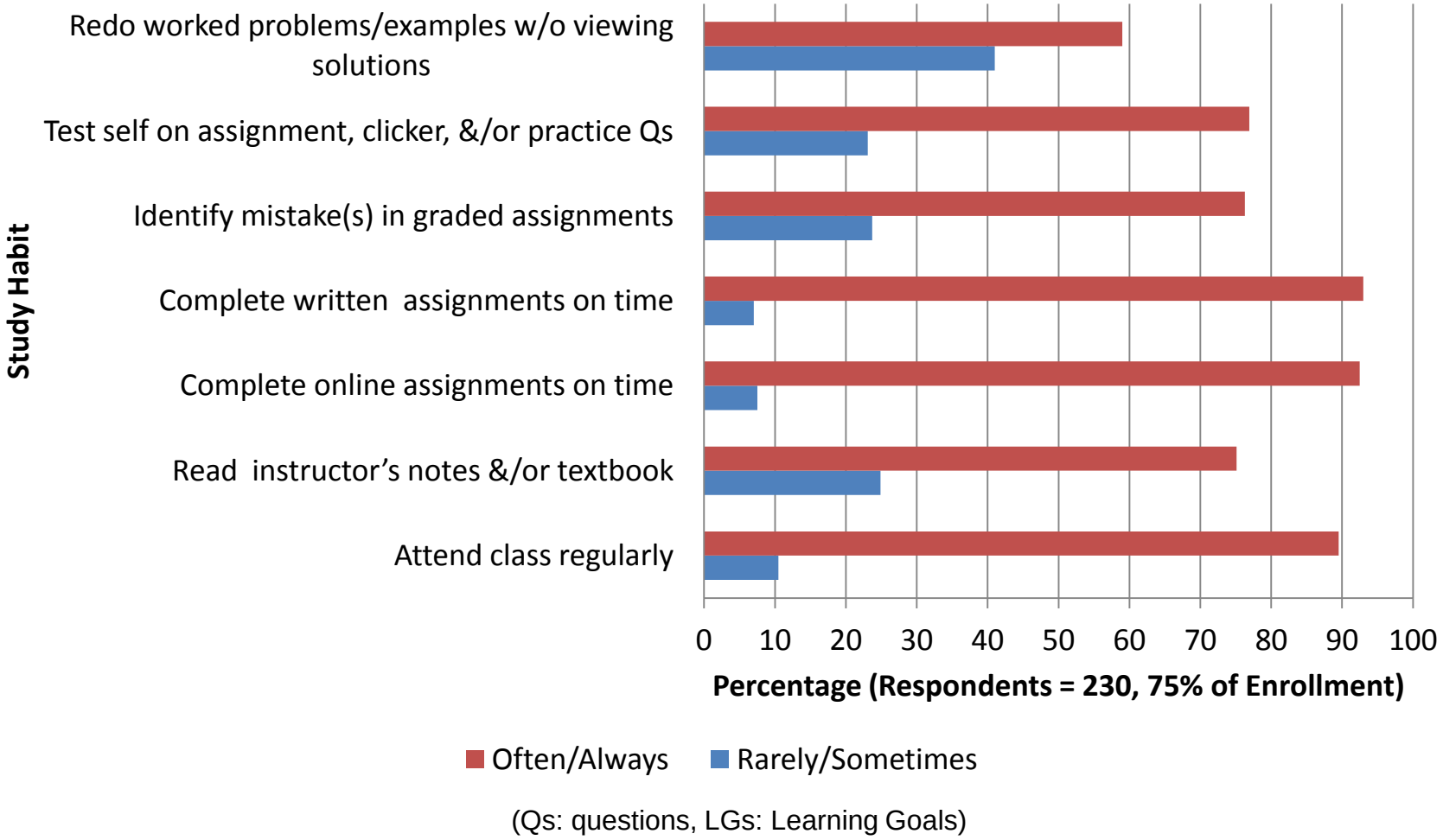
Course	STAT 443
Title	Time Series & Forecasting
Description & Audience	Upper Level course for Science students
Enrolment	Single section of ~100 per year
Offered	Term 2

- All lecture and lab sessions use in-class activities on which students work in small groups. Class activities are supported by clicker questions.
- Regular lab sessions recently introduced.
- TAs complete an on-line feedback survey on their opinions about each lab session.

Study Habits of Introductory Statistics Students

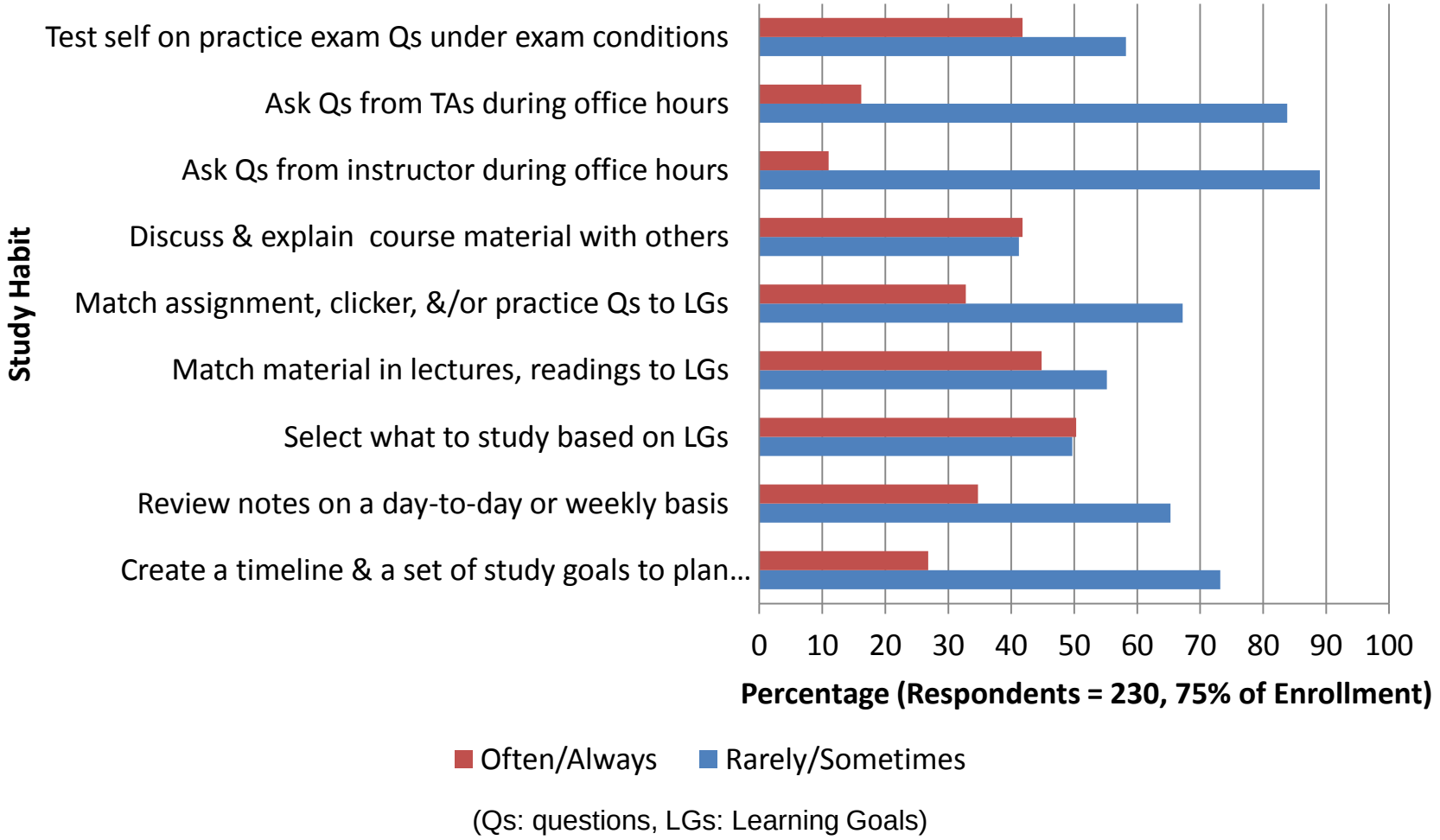
- Study Habit Survey
  - STAT 241/251: 2013/14 Term 1 (via mid-course evaluation survey)
  - STAT 200: 2013/14 Term 1 & 2 (via Study Skills Workshops)
- Indicated need for emphasizing effective study strategies

Study Habits of Survey Respondents: STAT 241/251, 2013/14 Term 1

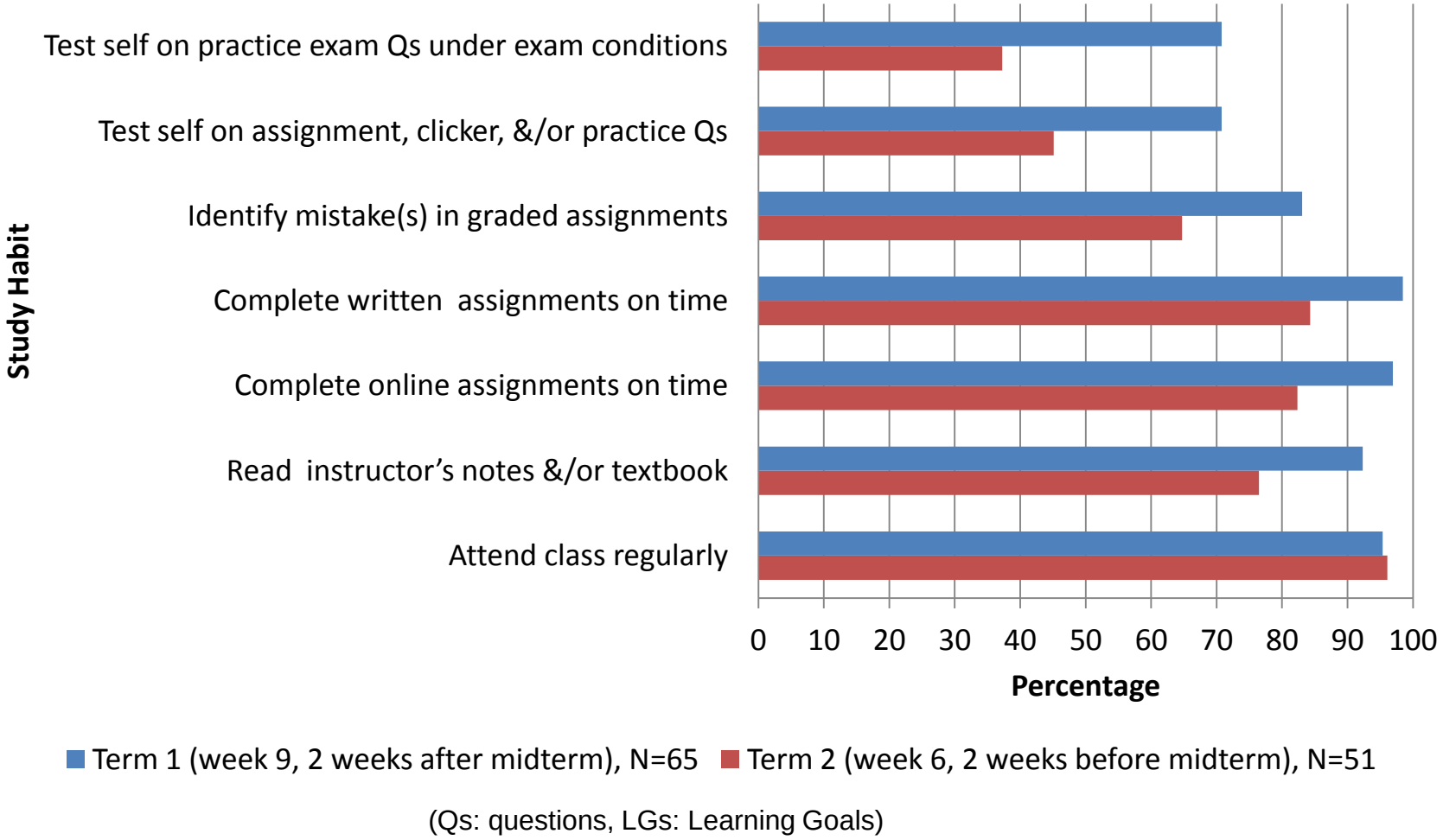


(Qs: questions, LGs: Learning Goals)

Study Habits of Survey Respondents: STAT 241/251, 2013/14 Term 1 (Contd…)

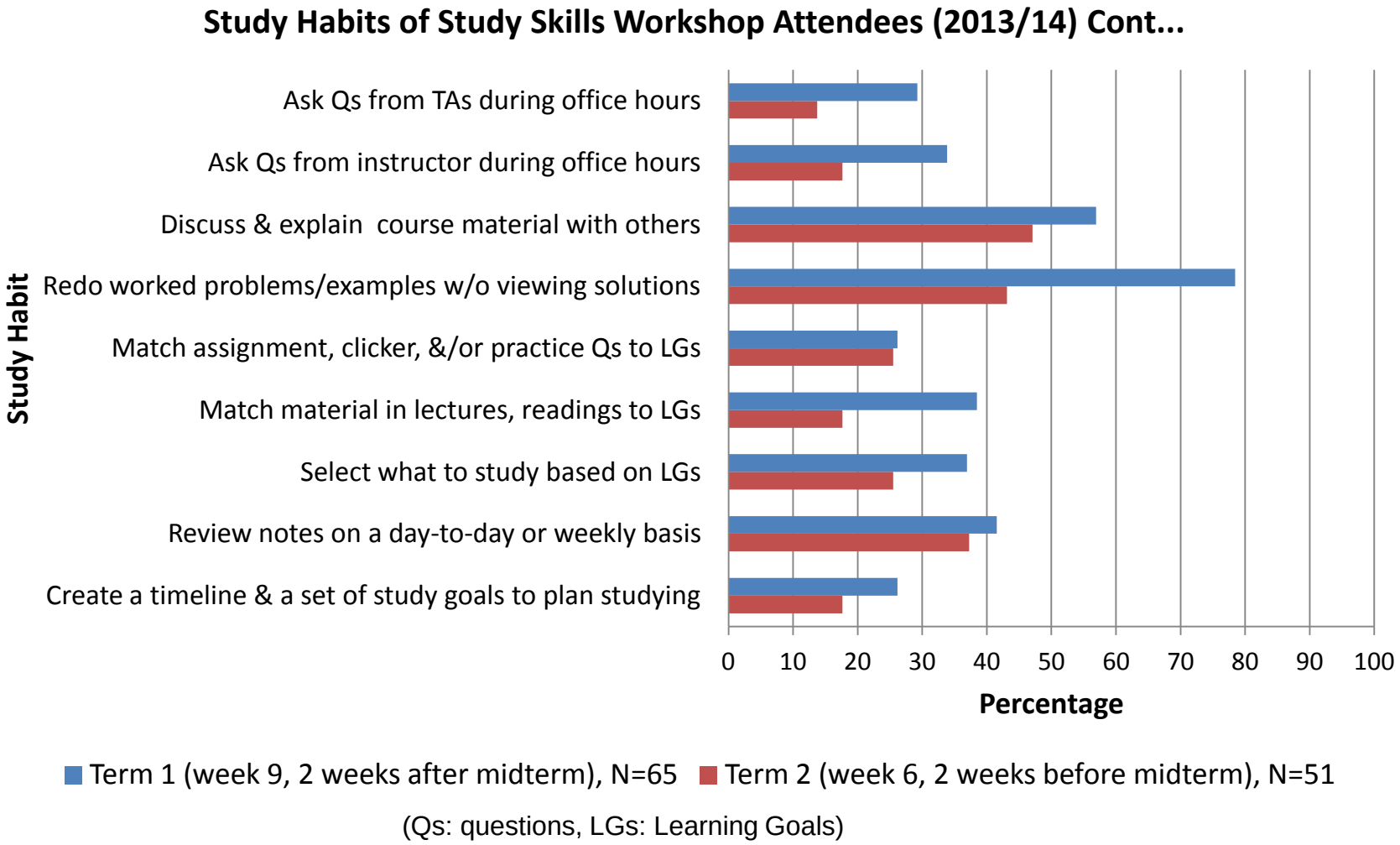


Study Habits of Study Skills Workshop Participants: STAT 200 (2013/14)



(Qs: questions, LGs: Learning Goals)

Study Habits of Study Skills Workshop Participants: STAT 200 (2013/14) Contd…



(Qs: questions, LGs: Learning Goals)

Study Skills Workshops

- Based on material created by
  - Chemistry, Life Science & Math STLF/Faculty teams
- Using activities & discussions
  - Individual activities
  - Small group discussions
  - Facilitator led whole group discussions
- Two models
  - After midterm & before midterm

Study Skills Workshops: Piloted Models – Pros & Cons

	Advantages	Disadvantages
After Midterm	- Students eager to improve their study strategies - Midterm exam questions available for use in activities (participants familiar with questions)	- Not enough time to apply new strategies participants learn - Short time to prepare some activity material - Difficulties with scheduling
Before Midterm	- Sufficient time to apply new strategies participants learn - Easy to schedule (during week without labs)	- Students not aware of need to improve their study strategies

Study Skills Workshops: Learning Outcomes

- Review study strategies workshop participants typically use to study for exams
- Assess participants' study strategies via a discussion
- Identify effective study strategies that students can use to prepare for the next exam in their Statistics course
- Review *Learning Outcomes* in their Statistics course
- Identify *Learning Outcomes* tested in (sample) midterm problems in their Statistics course
- Plan how participants would study for the next exam in their Statistics course

Study Skills Workshops: Student Perceptions …

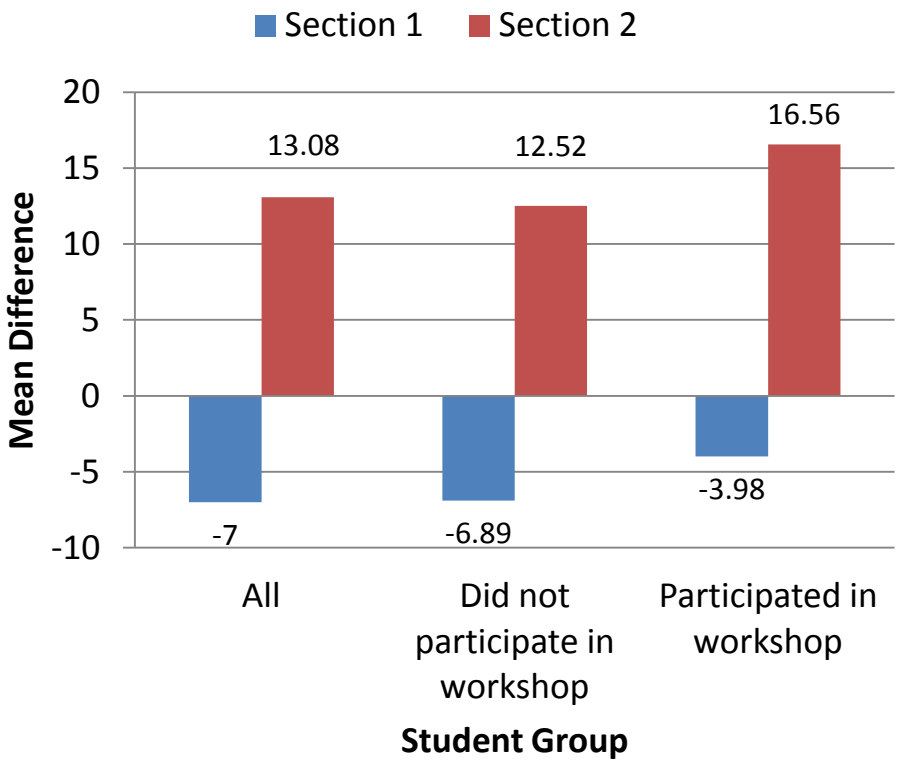
- STAT 241/251:
  - *"Working out what we did [to study] last midterm and why it didn't work"*
  - *"Working with the group and getting different perspectives"*
  - *"Going through Learning Outcomes."*
- STAT 200:
  - *"Matching learning goals to midterm questions helped identify where it went wrong and what to study"*
  - *"Assessing the study habits I have and realizing what I need to alter for my studying to be effective and how I can use information provided (like learning goals) to my advantage"*
  - *"Working with other students and seeing other ways of studying"*

Study Skills Workshops: Outcomes

STAT 200 2013/14 Term 1 Data
(separate midterms, common final exam)

	Section 1	Section 2
# of students	285	264
# of workshop participants	31	38
Mean midterm score	71%	54%
Mean final exam score	64%	67%

Difference in Pre/Post Exam Scores
(Difference = Final Exam Score – Midterm Score)



Weekly Lab TA Surveys

- Goals
  - Identify current problems TAs may be facing
  - Identify current problems the students may be facing
  - Keep a record of student difficulties, to share with future Lab TAs as they prepare for labs
  - Share ideas on running labs smoothly among current Lab TAs

Weekly Lab TA Surveys …

- Survey questions:
  - Examples of questions that TAs were commonly asked by the students during the lab
  - Difficulties experienced by TAs during the lab
  - Suggestions for improving lab material (such as exercises, worksheets, pre-reading, etc.)
  - Estimate of students arriving late, completing exercises on time, having done the pre-reading, being engaged, etc.

Weekly Lab TA Surveys: Instructor Perceptions

- *"I took the feedback to improve the lab activities and pre-reading to allow a better learning experience for my students. For example, for difficulties that students encountered in the lab activities as reported by the TAs, I met with the head TA (who is in charge of the labs) at the end of the term to discuss how to address these difficulties in future semesters, and the TAs make changes to the labs afterward."*
  - An instructor teaching a large multi section course with many TAs
- *"Because the instructor is not present in labs, TA surveys are an excellent to know what's going on in the labs."*
  - An instructor teaching a large class with many TAs

(Note: Feedback gathering in progress)

Weekly Lab TA Surveys: Instructor Perceptions

- *“Surveys were useful in identifying "too difficult" or "too long" labs, which will be valuable in revision of the lab exercises for the next round of the course.”*
  - An instructor creating labs for the course
- *“ … we made use of last year's surveys when planning the labs this year. This might be their greatest use -- a sort of "institutional memory process" for the TAs.”*
  - An instructor mainly using existing labs
- Both instructors found the questions on the survey about % of students arriving late, completing exercises early, etc. non-informative.

(Note: Feedback gathering in progress)

Weekly Lab TA Surveys: TA Perceptions

- *"In fact, answering every week to questions like "what did you do well" or "what will you improve in the next lab" made my think more in depth about the whole TA experience. In particular, it gave me the opportunity to recognize my strengths and my weaknesses, and try to improve the latter: writing them down made me realize more what I did in the lab (you do not want to make the same mistakes over and over). Of course the TA training also helped me to learn what to do and what not to do; however, I found the training more theoretical while the surveys easier to apply for my situation."*

  – A first time TA of a 3xx level course

(Note: Feedback gathering in progress)

Weekly Lab TA Surveys: TA Perceptions

- *"This is particularly important as in some courses the head-TAs do not run any labs, so getting this feedback from the other fellow TAs is very helpful."*
  - Experienced TA from a 2XX & 3XX course
- *"It's (also) a good way to provide negative opinions to profs. TA may feel awkward to provide negative feedback to profs in person. Therefore, TA survey is an excellent non face to face channel to deliver negative messages."*
  - Experienced TA from a 2XX & 4XX course
- Some experienced TAs who had to complete the surveys in consecutive terms for the same course commented on the limited effect of their feedback. (Note: Feedback gathering in progress)

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