**Background**

This project compares traditional and flipped labs in GEOG 5140 Methods in a GIS course. Flipped courses are different from courses that rely on the traditional lecture-homework paradigm and are focused on problem solving and in-class discussion.

**Questionnaire Surveys**

Two surveys were conducted in the spring semester of 2013. In the first survey, we asked questions related to students’ majors, their backgrounds, gender and why they were interested in GIS courses. It also included following questions about the attitudes toward flipping teaching:

Survey 1:
- Q1: Did you take a flipped course/lab before?
- Q2: Would you like a flipped course/lab? (yes/no/no comments)
- Q3: Your GIS skills (1-5 likert scale, 1: never heard of GIS, 5: very proficient with GIS)
- Q4: Did you take any GIS courses before?

After the first five labs, we conducted the second survey which included the following questions:

Survey 2:
- Q1: How comfortable are you with the online tutorial videos? (1-5 likert scale, 1: very uncomfortable, 5: very comfortable)
- Q2: How many hours did you spend on watching the online tutorial video for one assignment?
- Q3: Did you like flipped labs? (1-5 likert scale, 1: very dissatisfactory, 5: very satisfactory)
- Q4: What did you like least about flipped labs?
- Q5: What did you like least about flipped labs?
- Q6: What are your suggestions?

**Background & Gender Effects**

Table 3 highlights that students with medium level GIS skills tended to be more satisfied with flipped labs. As illustrated in Table 4, master students spent less time on watching videos; in addition, males spent more time on watching videos but they tended to have lower level of satisfaction (see Table 5).

**Students’ Feedbacks**

Q1: What did you like most about the lab?
- Easy to access and follow along
- No worries to get lost
- Flexible schedule
- You can see the buttons you press
- Rewatch and repeat
- I can go at my own speed
- Additional support
- No need to be in lab physically
- If I missed the lab I still have an understanding

Q2: What did you like least about the lab?
- Length of videos
- Too much clicking around
- Could be more succinct
- Low Resolution on Canvas

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