Exploring the Impact of Michigan Learning Communities

Jennifer Maltby
Michigan Research Community

Michigan Learning Communities

Michigan Learning Communities

Common Mission:

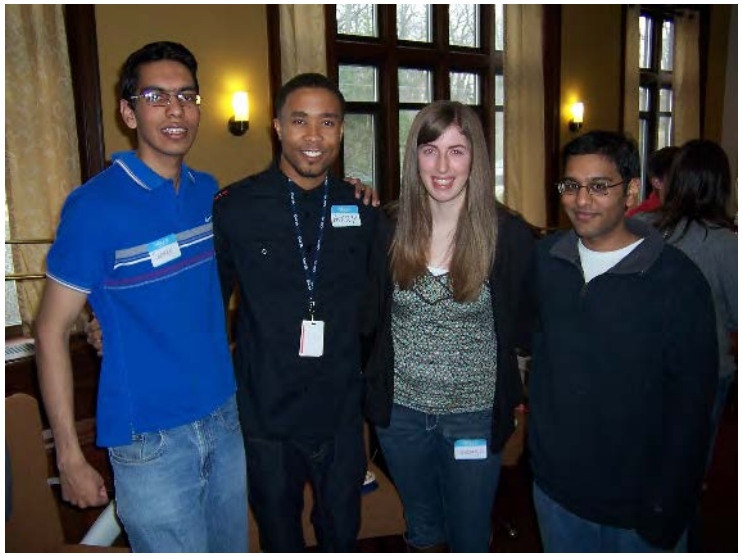
- Support transition to college
- Retain underrepresented students

Program Components:

- Experiential Learning
- Academic Course(s)
- Academic Support
- Co-curricular Programming

Michigan Research Community

Undergraduate Research

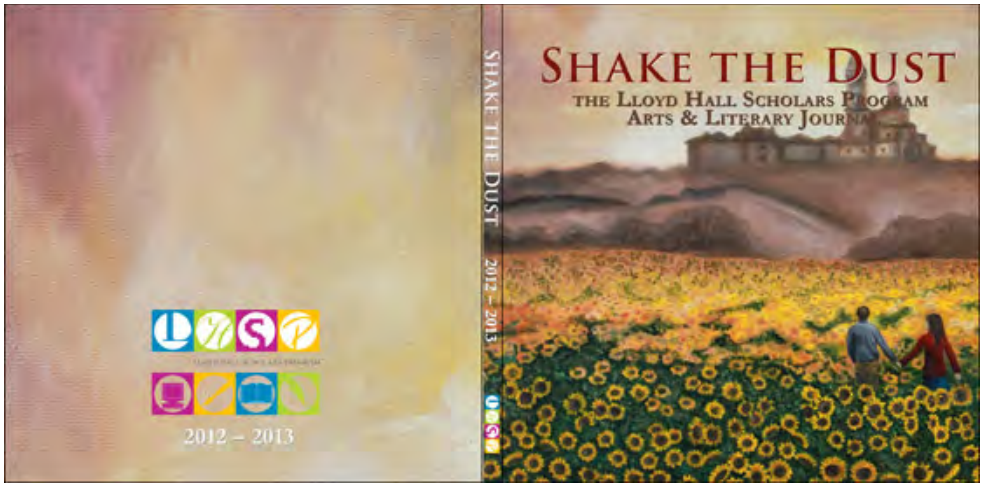


Health Sciences Scholars Program

Pre-health observation and advising

Lloyd Hall Scholars Program

Writing and the Arts



Admissions

Process:

- Students apply after matriculation
- Essays/short answer questions

Criteria:

- Fit for program
- Quality of application
- Most benefit
- Cohort composition

Assessment Overview

- Motivation
- Pilot study
  - CRLT funding
  - Subset of MLCs
  - 2012
- Full implementation
  - Six MLCs
  - 2013
- Limitations

Assessment Design

Online survey

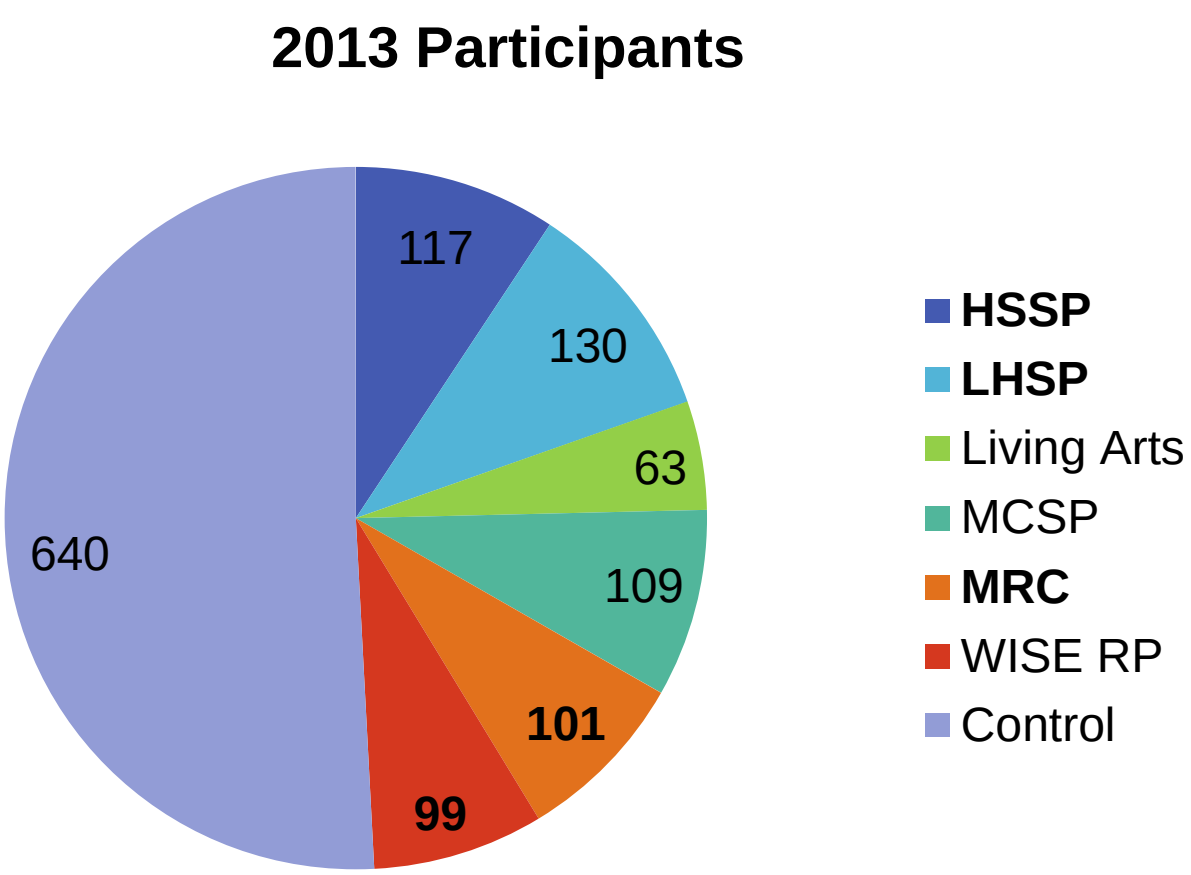
- Administered: April 2012 & 2013
- Incentive: $5 in Blue Bucks

Participants

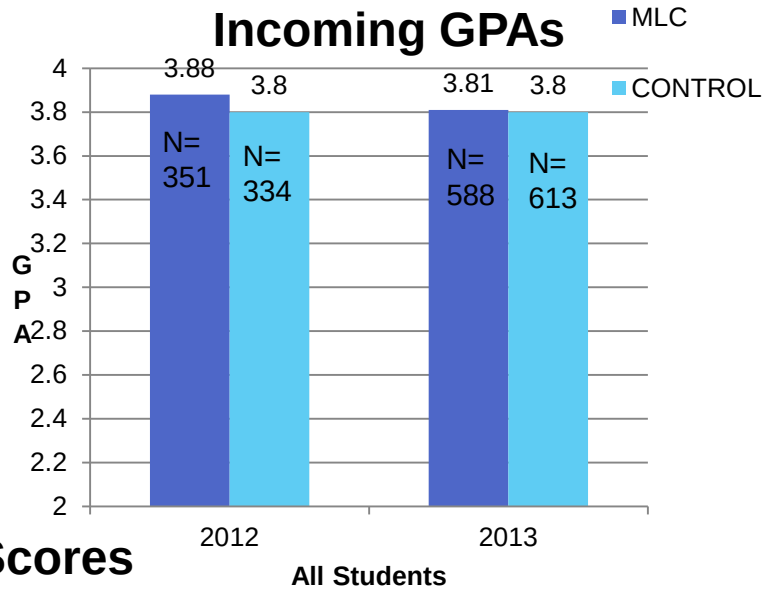
- Target Group: MLC students finishing first year
- Control Group: First-year students living in residence

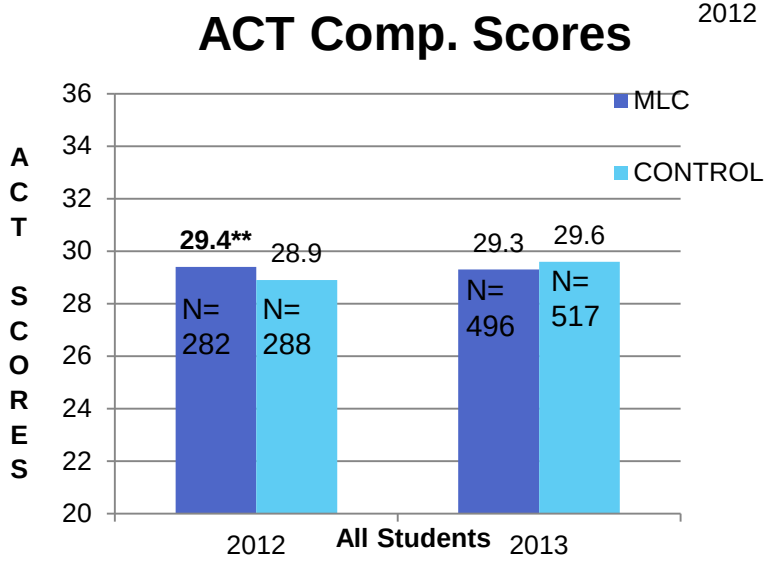
Combined with data from UM Data Warehouse

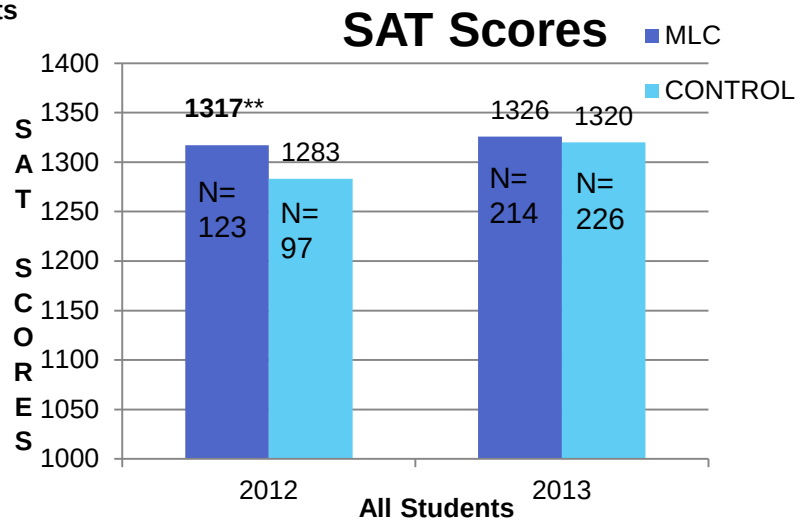
The Basics


2013 Participants
117
130
63
109
101
99
640
HSSP
LHSP
Living Arts
MCSP
MRC
WISE RP
Control

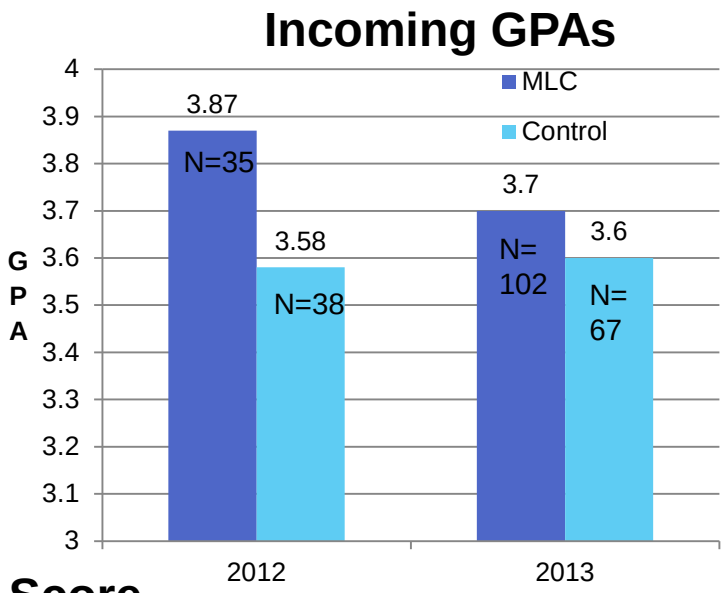
Entering the University: All Students

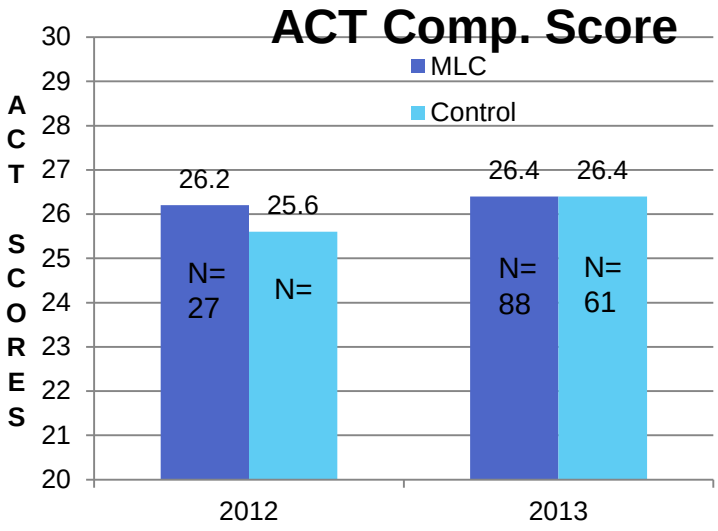


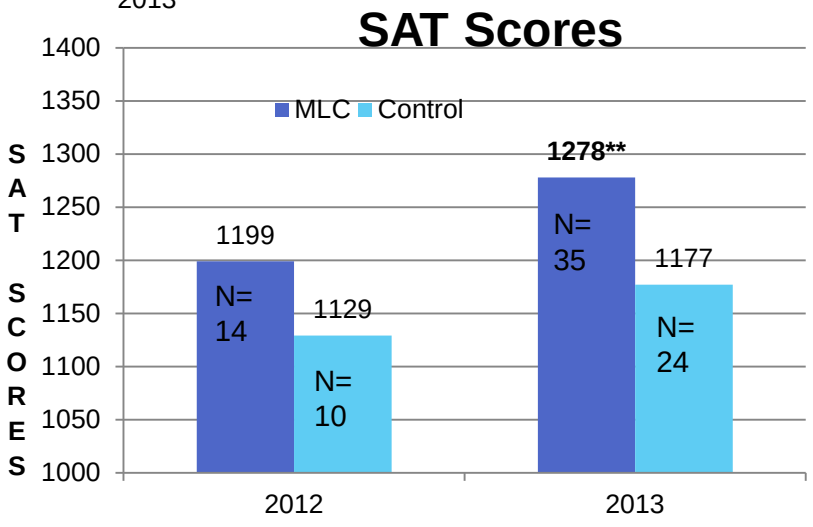




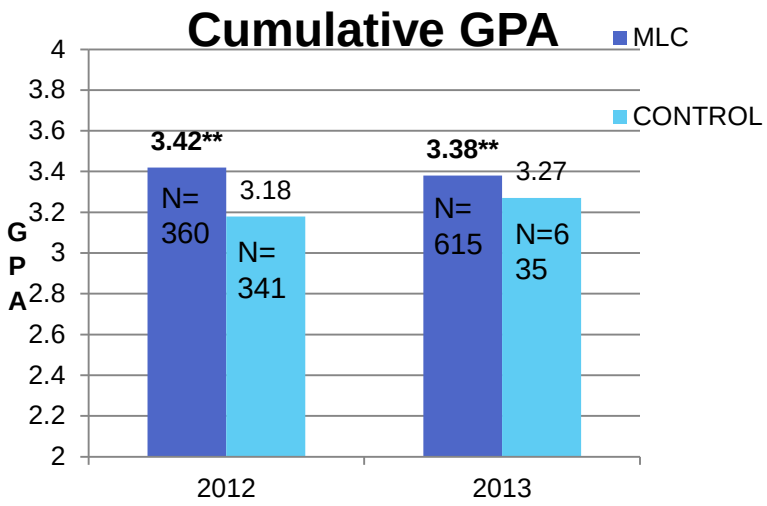
Entering the University: Underrepresented Minority Students

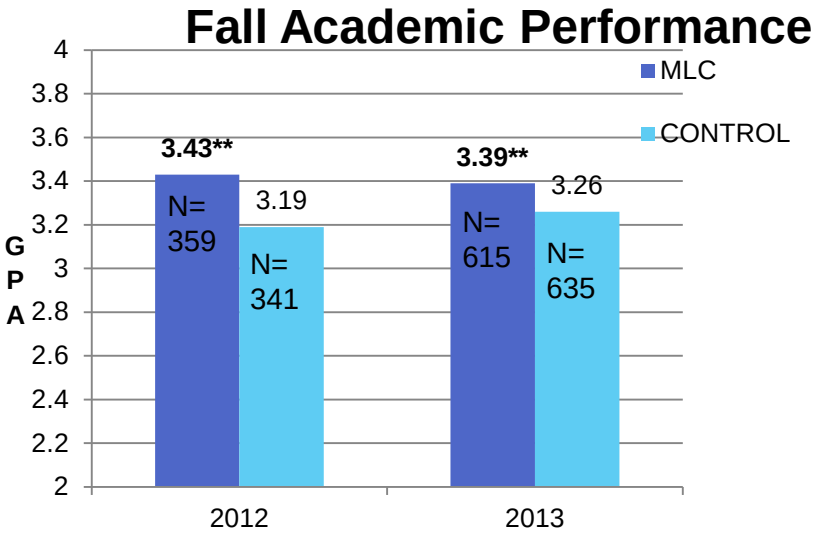


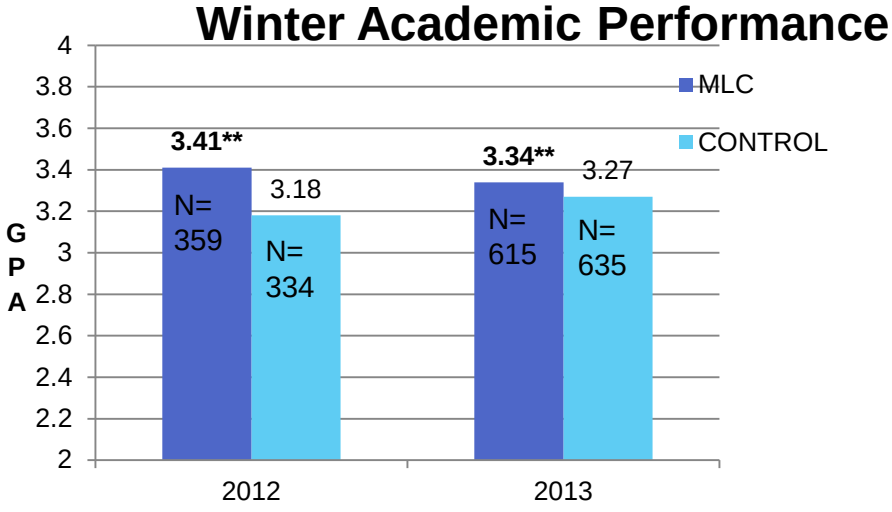




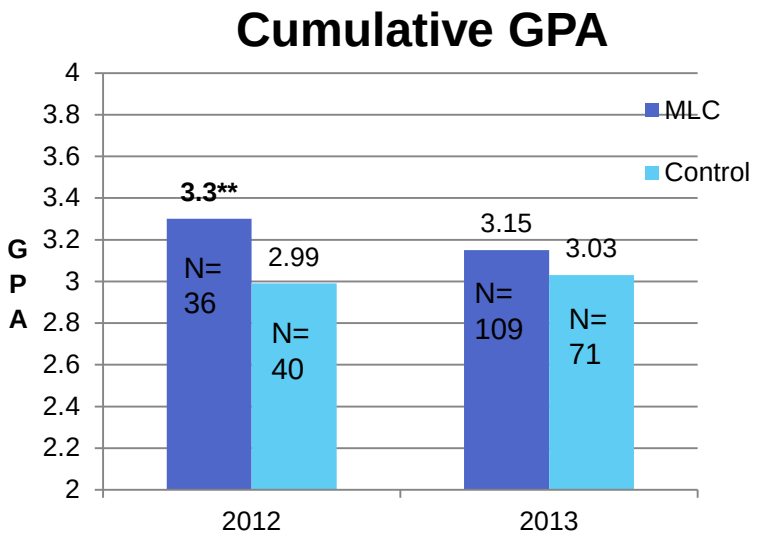
Academic Performance Overview: All Students

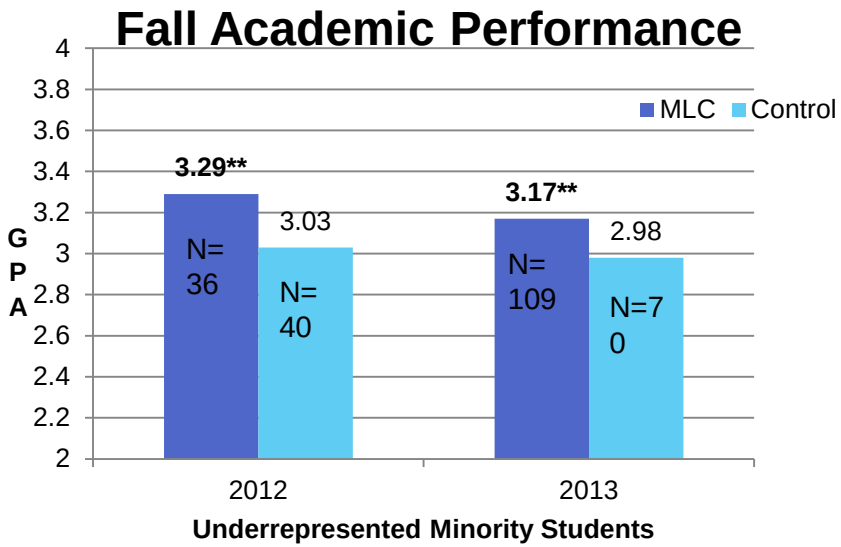


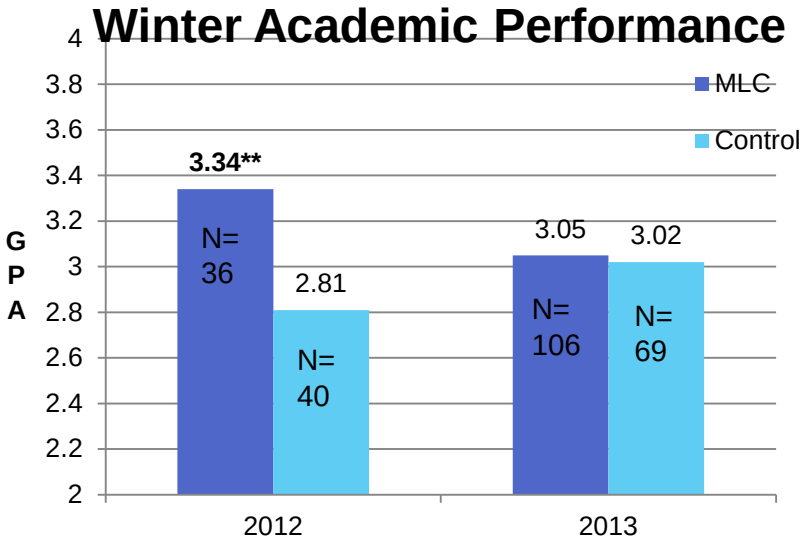




Academic Performance: Underrepresented Minority Students







Learning Outcomes

1. Critical Thinking Skills

Analyze and critically evaluate ideas

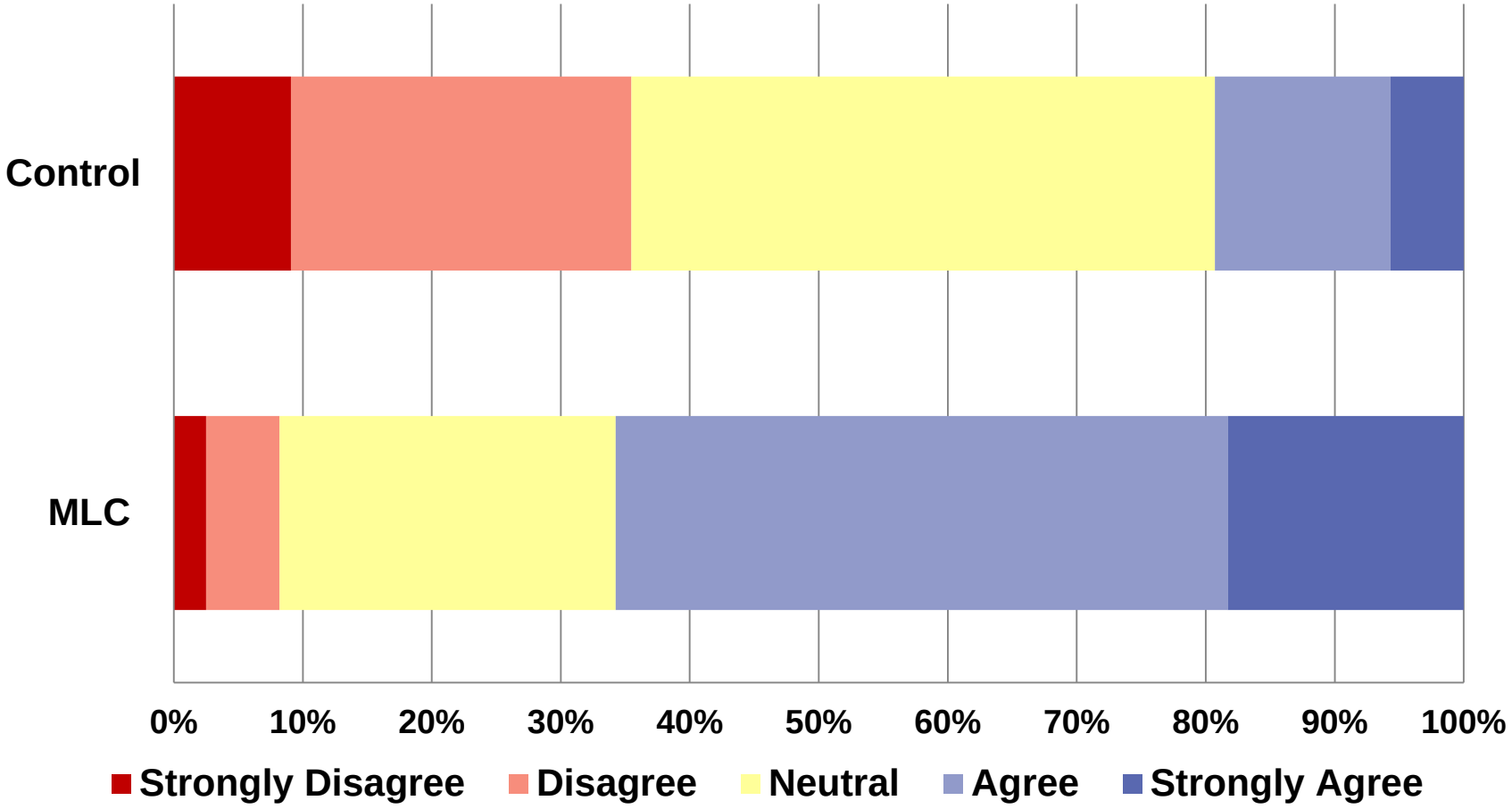
2. Intellectual Engagement

Communicating with faculty

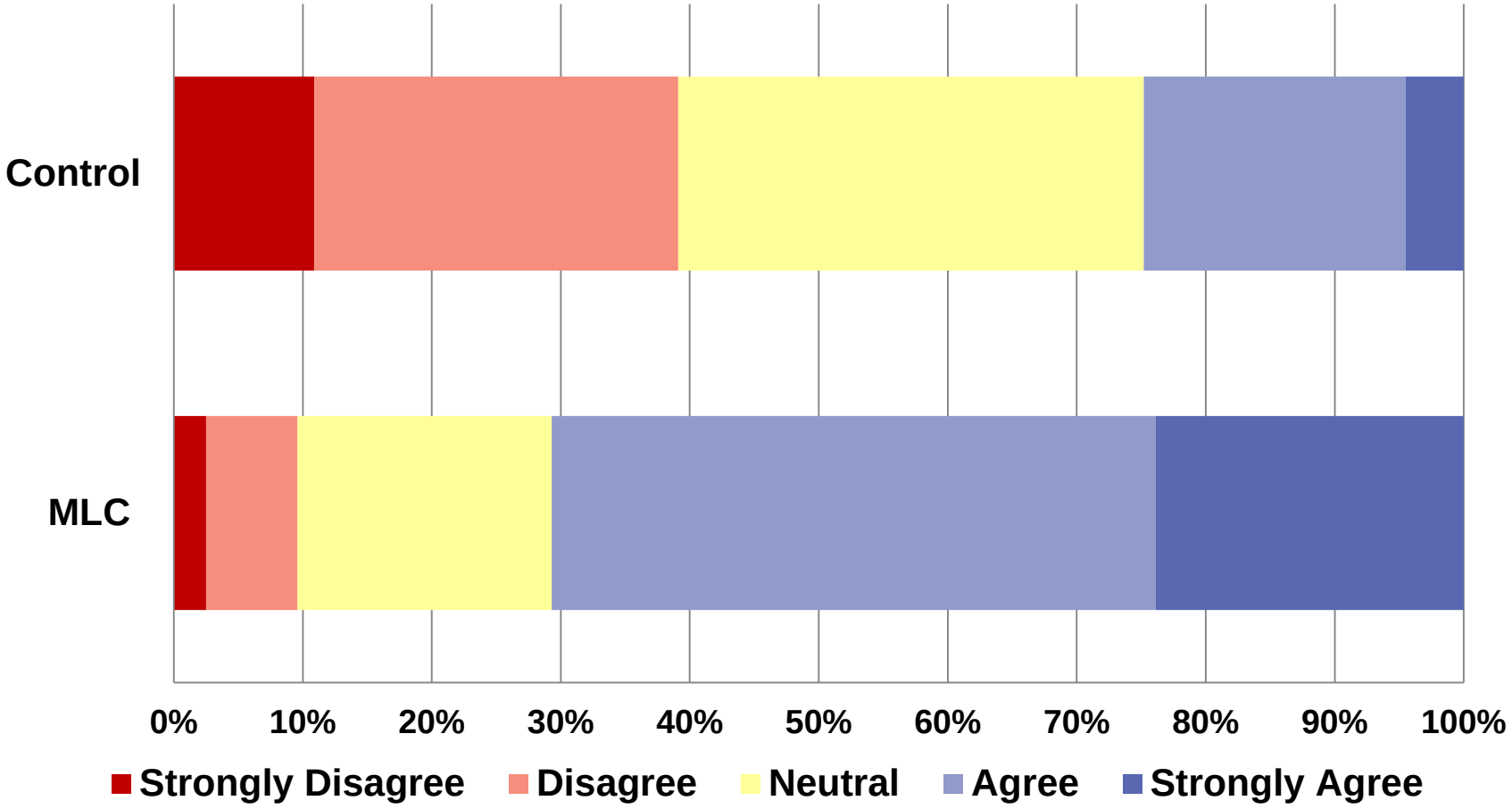
Confidence in participating in academic discussions

3. Residential Environment Values & Supports Learning

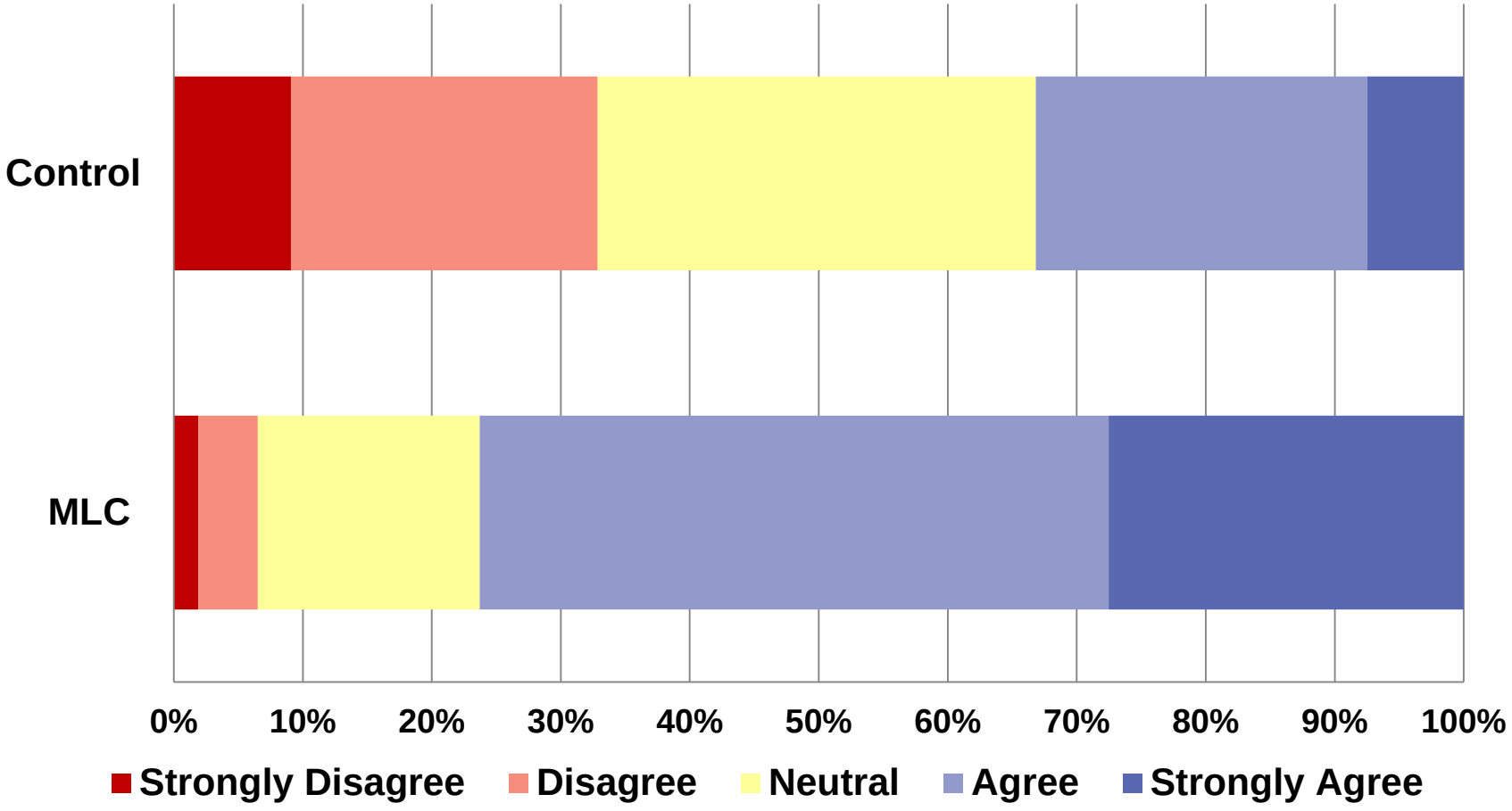
Analyze and critically evaluate ideas



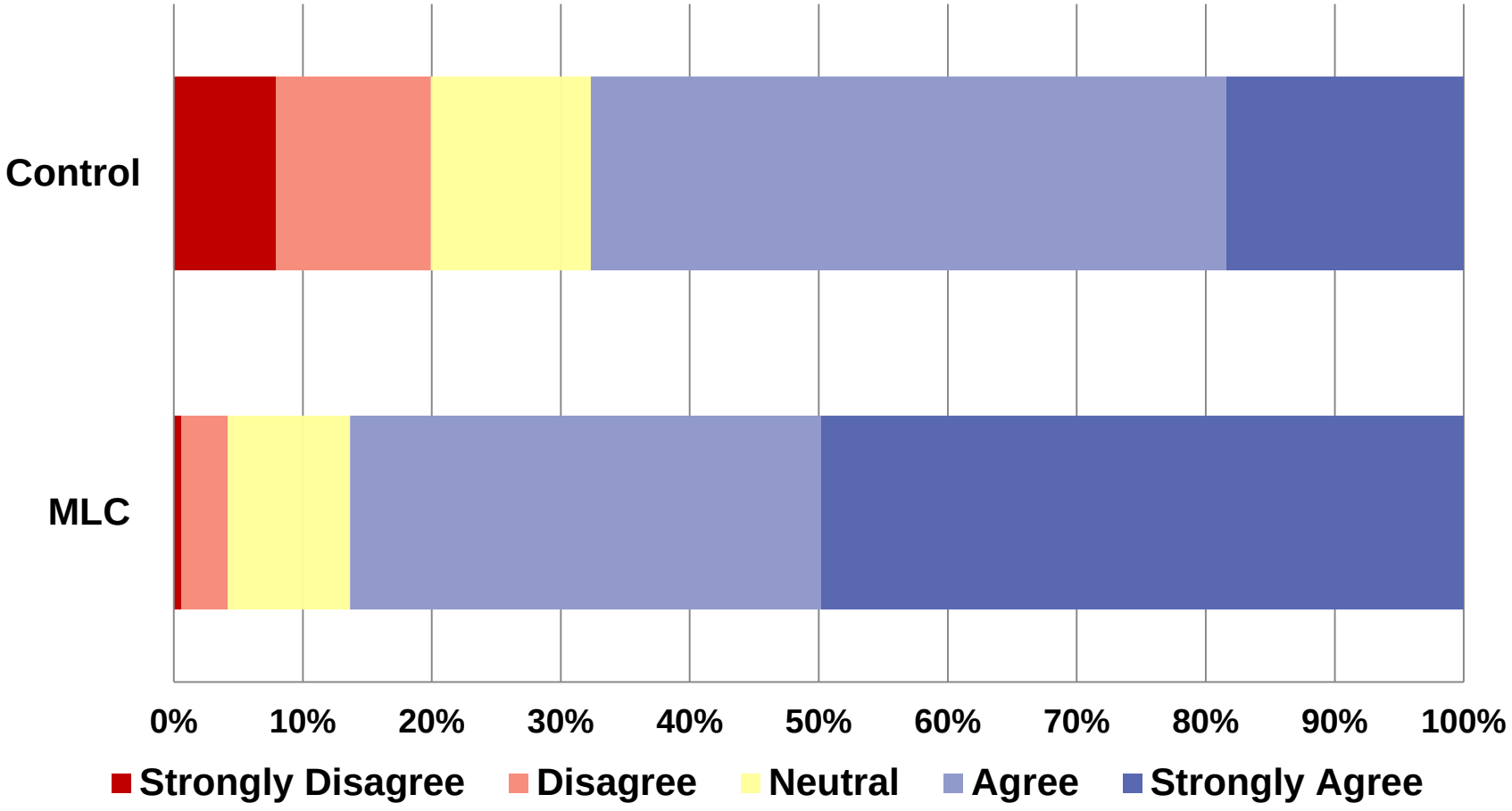
Communicate with faculty



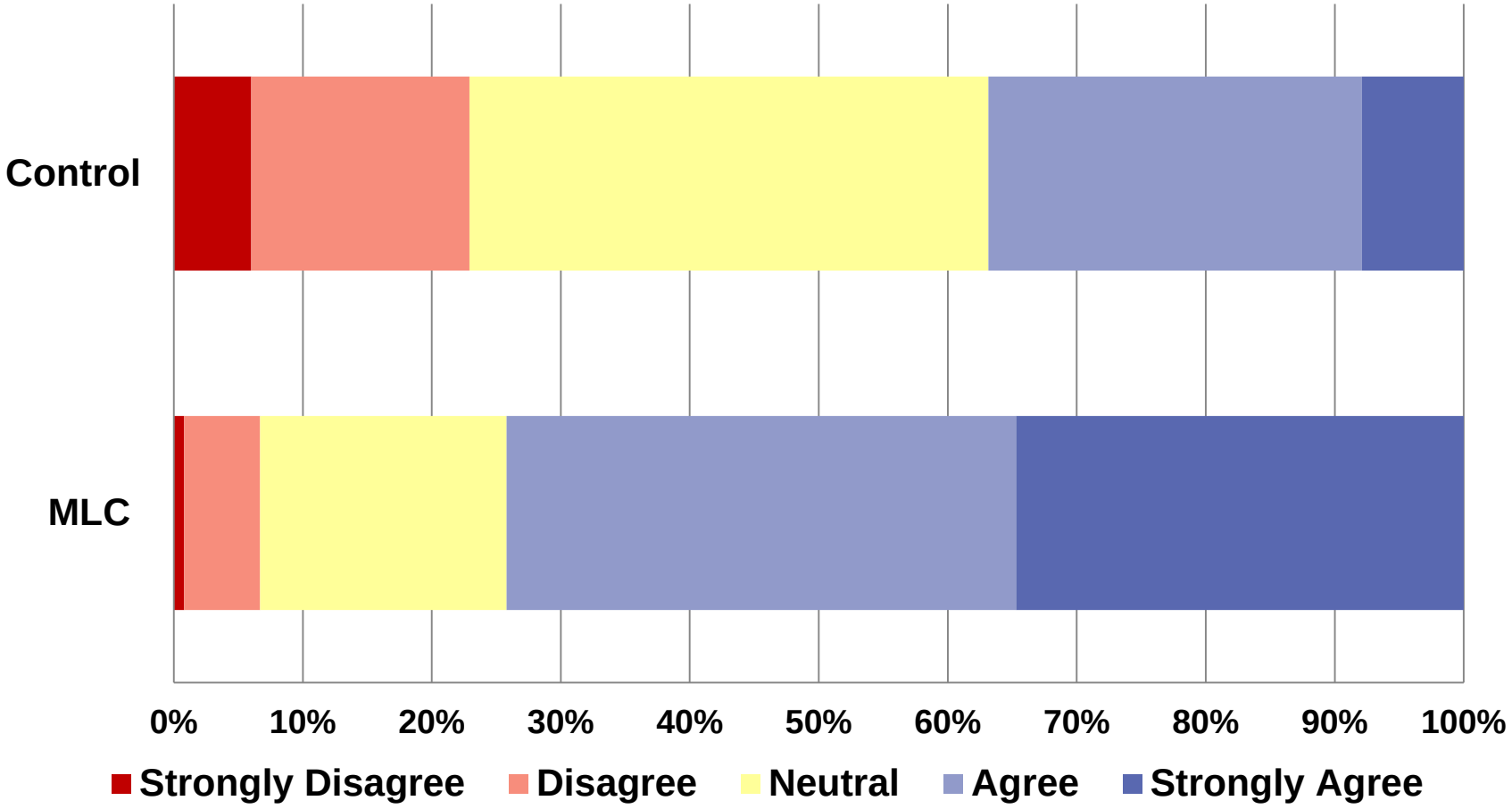
Confidence participating in academic discussions



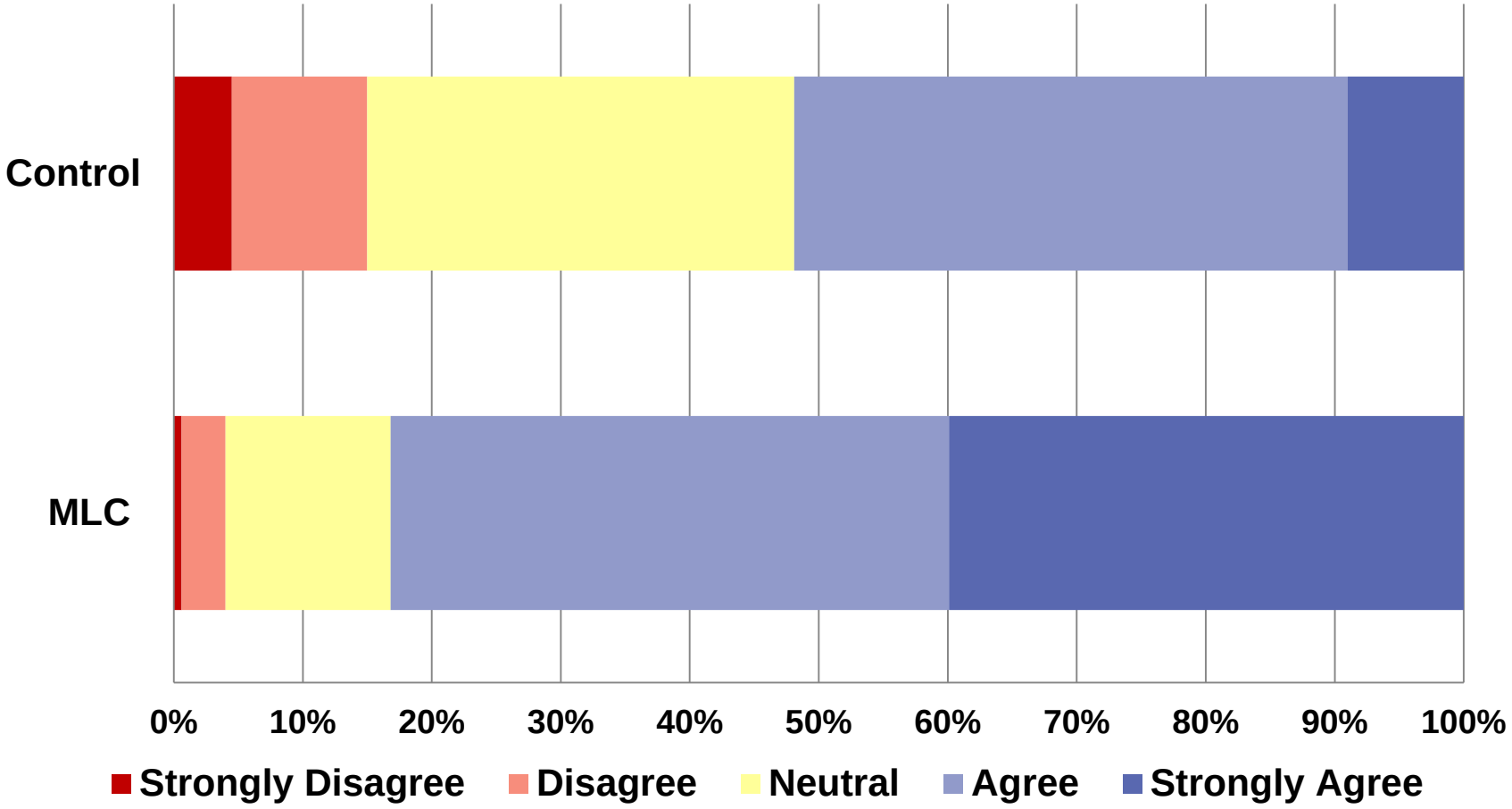
I talk about assignments & projects with people in my residence hall.



My residence hall makes it possible for me to succeed academically.



My residence hall supports my learning.



Next Steps

1. Continued survey revision
   - Depression Assessment
   - STEM and/or Pre-Med
   - Climate
2. Administer for 2014
3. Longitudinal assessment

Questions?

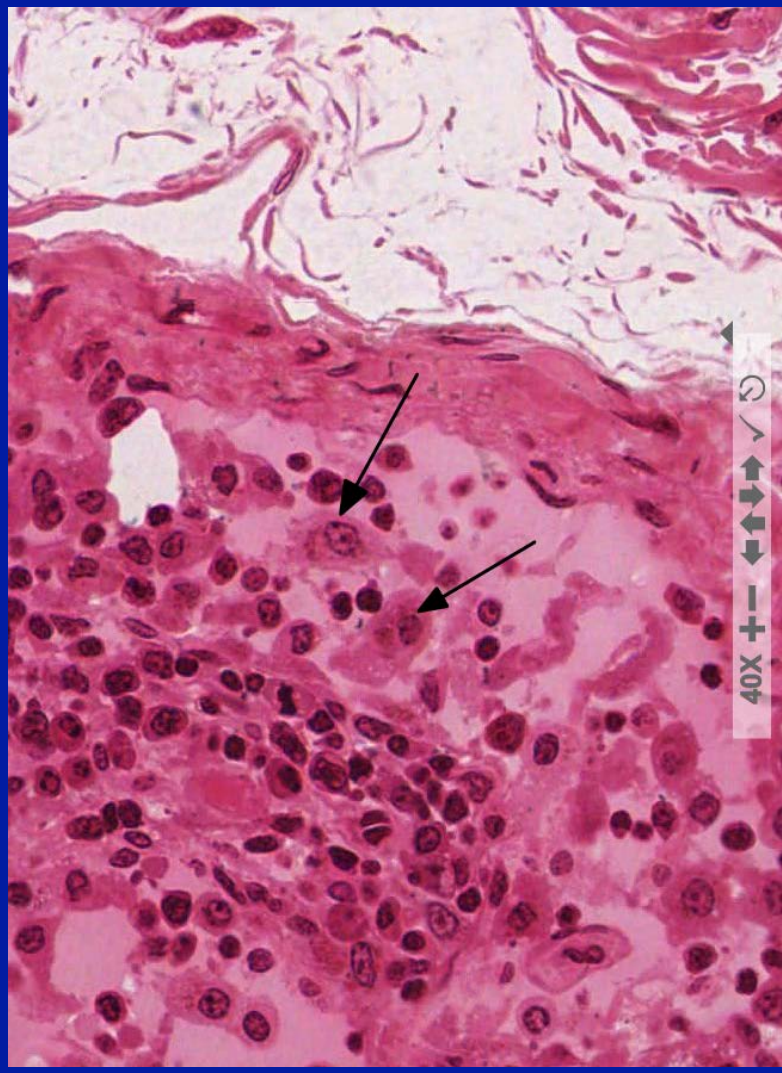
"What we do may not always be good for us*"
Analytics of Michigan Medical Students' Histology Study Strategies and Learning Success

Michael Hortsch, Ph.D.
Departments of Cell and Developmental Biology
and of Medical Education
University of Michigan Medical School

* University of Michigan first year medical student

Histology or Microanatomy

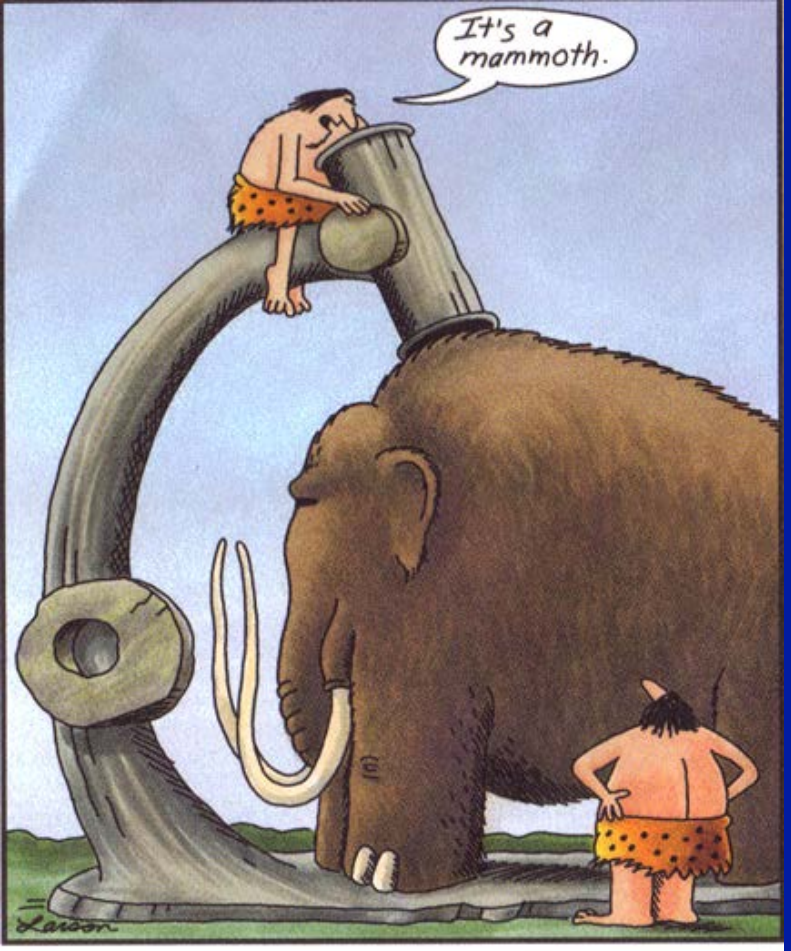
(from the Greek ιστοξ = tissue) is the study of the microscopic anatomy of cells and tissues.



It is taught at the beginning of most medical and dental curricula. The knowledge gained provides a cellular and ultrastructural “framework” for all of the other topics (anatomy, physiology, biochemistry, etc.).

Histology is also the basis for PATHOLOGY.

The Challenges of Learning Histology



Early microscope

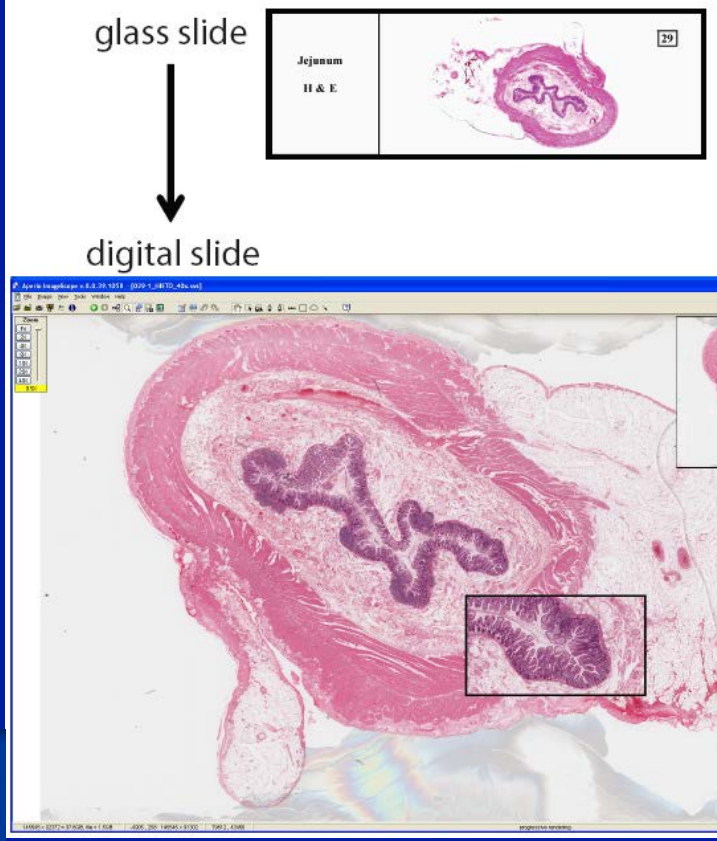
It is a visual task.

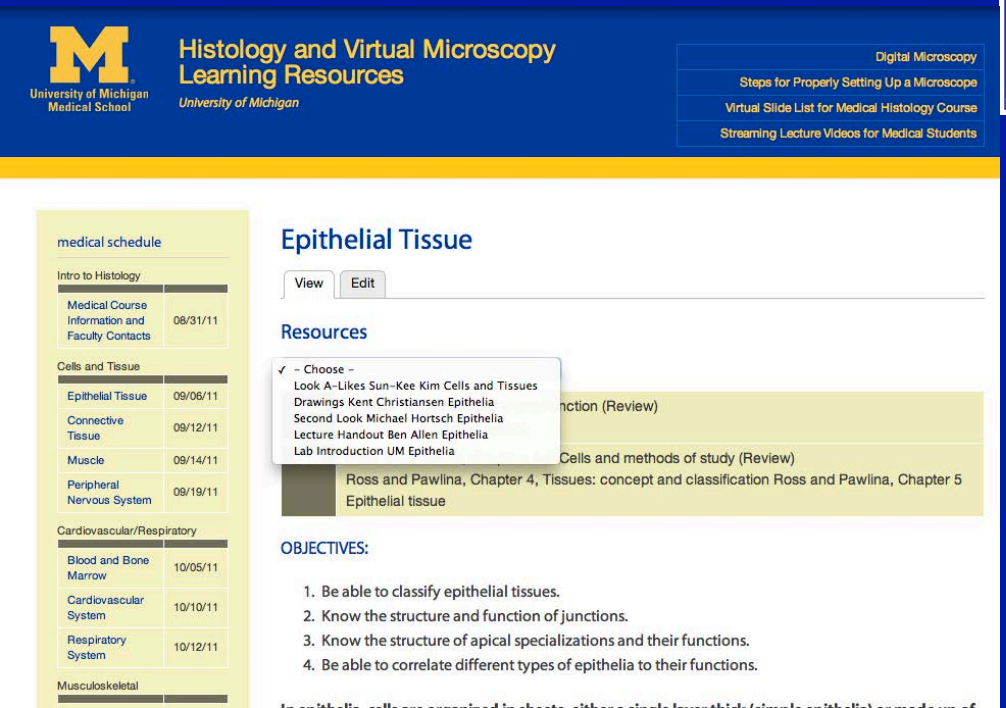
Students are unfamiliar with cells and tissues at the microscopic scale and very few had previous experience.

Virtual Microscopy

At the University of Michigan histology is not taught using traditional microscopes, but from a course website with digitized microscopic images (like Google Earth).

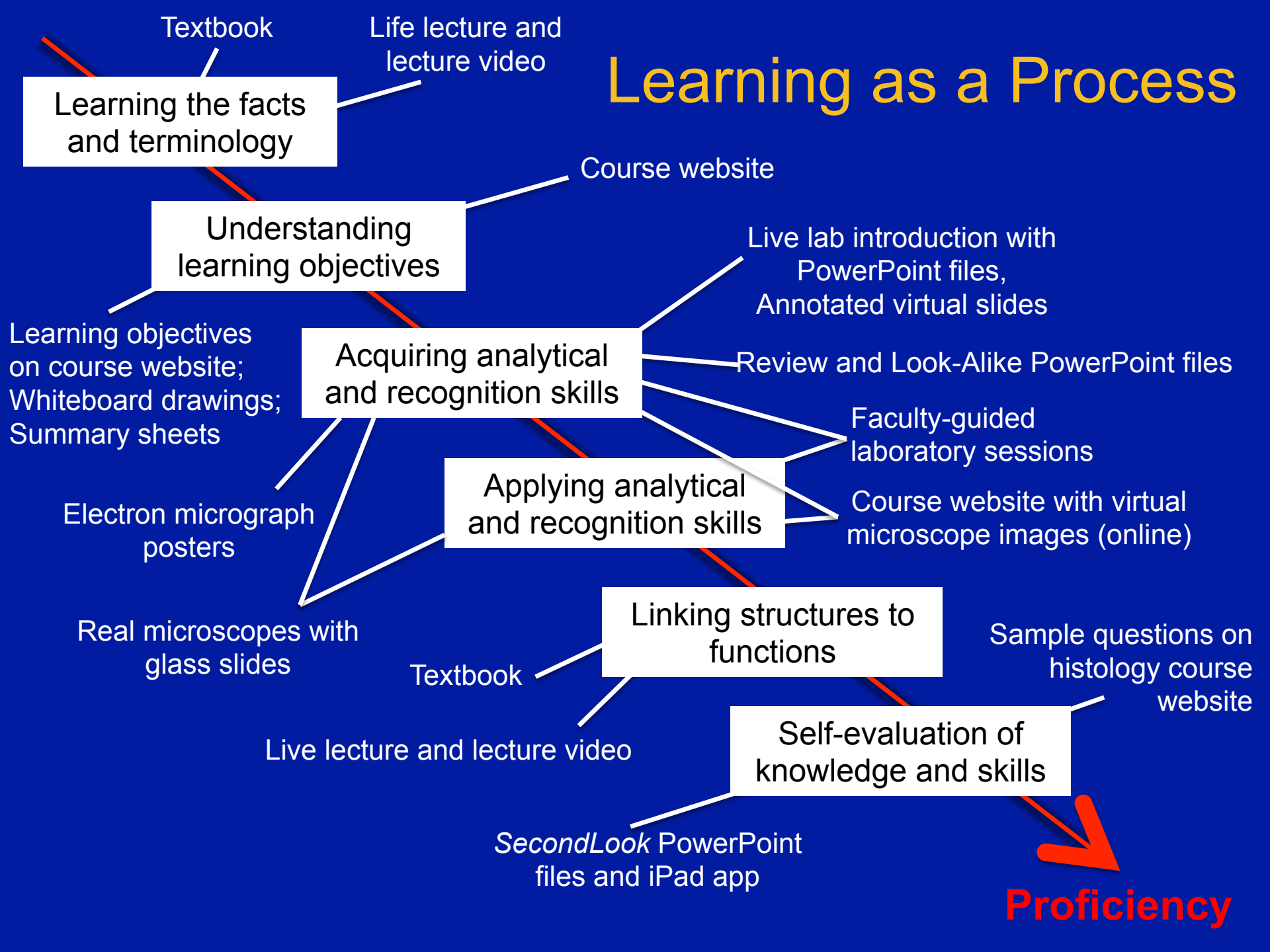
http://histology.med.umich.edu/schedule/medical



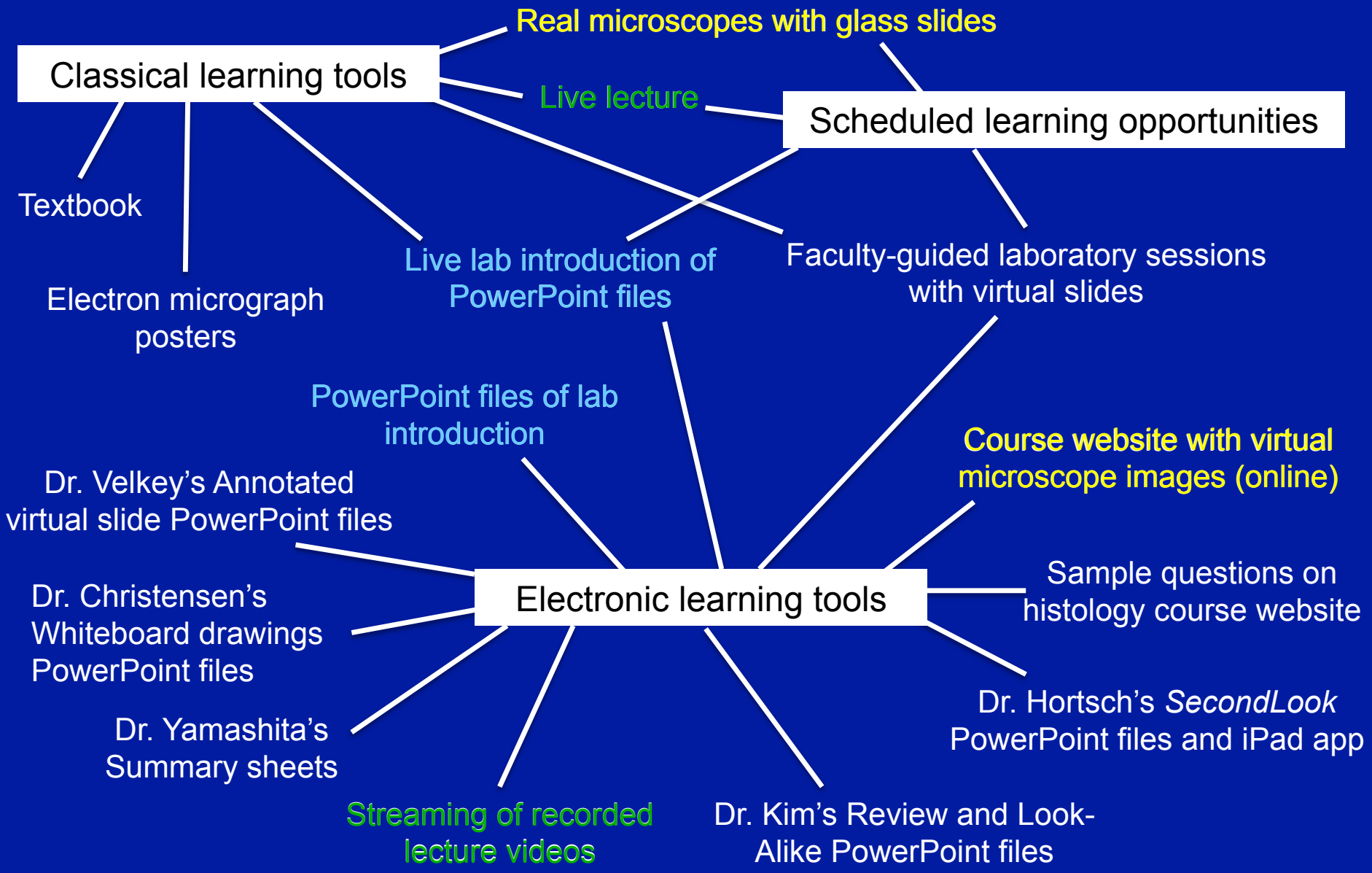


That website and the Michigan virtual slide collection is accessible worldwide for free under a Creative Commons License.

Learning as a Process



Different Flavors of Instruction & Learning Resources



If students can choose between different equivalent learning resources, what will they choose?

Will their choices always be good for their learning success?

Which learning strategies and resources are used by successful versus struggling learners?

A survey given to the three last Michigan M1 classes and one current dental class after they complete the first year histology module.

The project was funded by a Faculty Investigating Student Learning (ISL) Grant by CRLT.

Personal Background: Type of college degree, previous relevant experience, color blindness.

Use of Histology Resources: Attendance of lectures and labs, use of electronic (lecture videos, webpage, PowerPoint series etc.) and other resources (books, lab guides, handouts etc.) and change thereof over time, students opinion of the most useful resources.

Histology Study Habits: Motivation to learn histology, individual versus group study, amount of time spent on histology and changes thereof.

Student collaborator Stephanie Johnson, School of Dentistry, Class of 2015.

Student collaborator Louisa Holaday, Medical School, Class of 2015

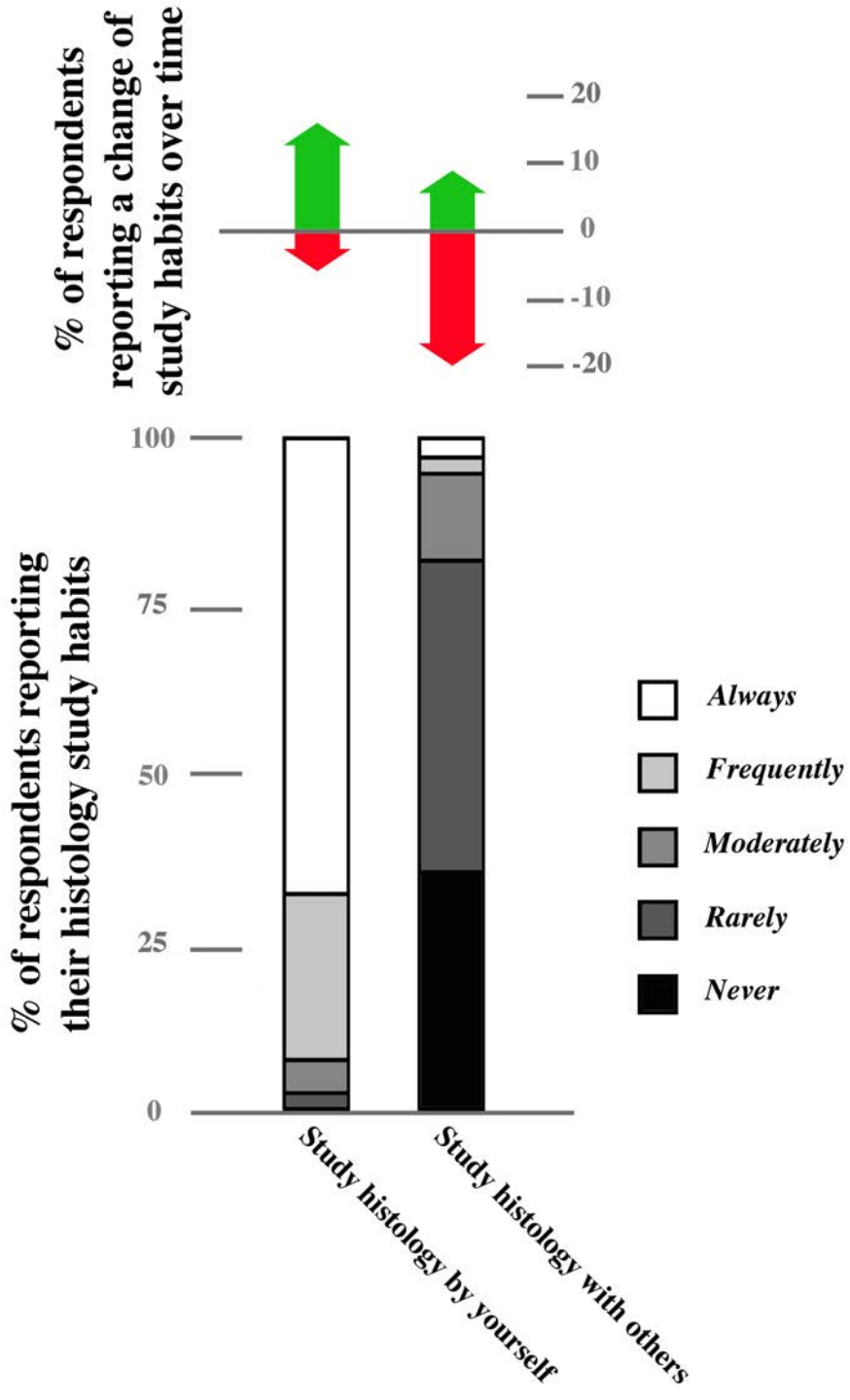
Student collaborator Daniel Selvig, Medical School, Class of 2014

Logistic and statistical support is provided by collaborator Dr. Joel Purkiss, Office of Student Education/Medical School

Survey of Histology Learning Strategies and Resource Usage by the Michigan Medical School Class of 2014

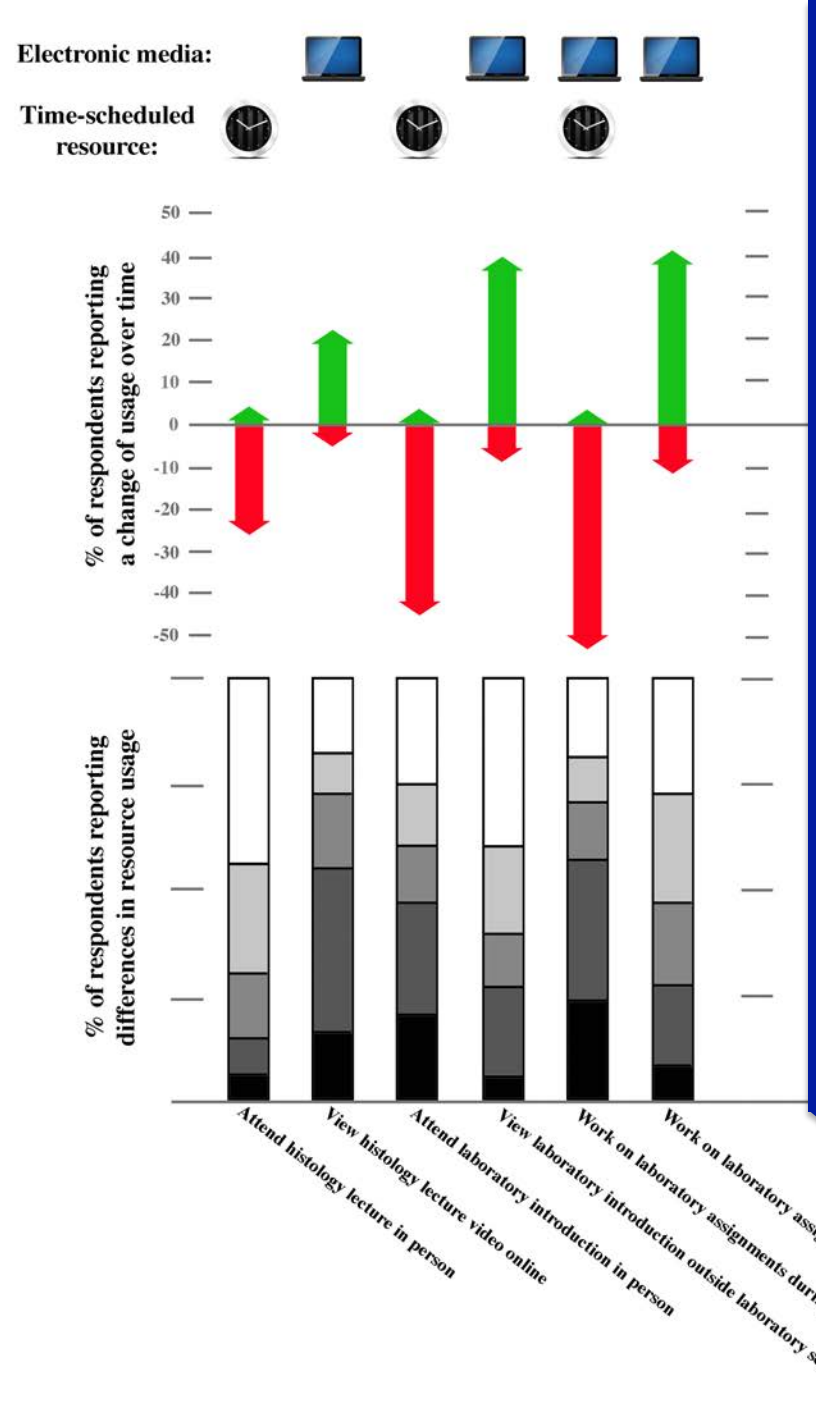
146 of 168 students from the Class of 2014 participated in the survey. That corresponds to a participation rate of 86.9%. (Three $70 cash prizes helped)

If students can choose between different equivalent learning resources, what will they choose?



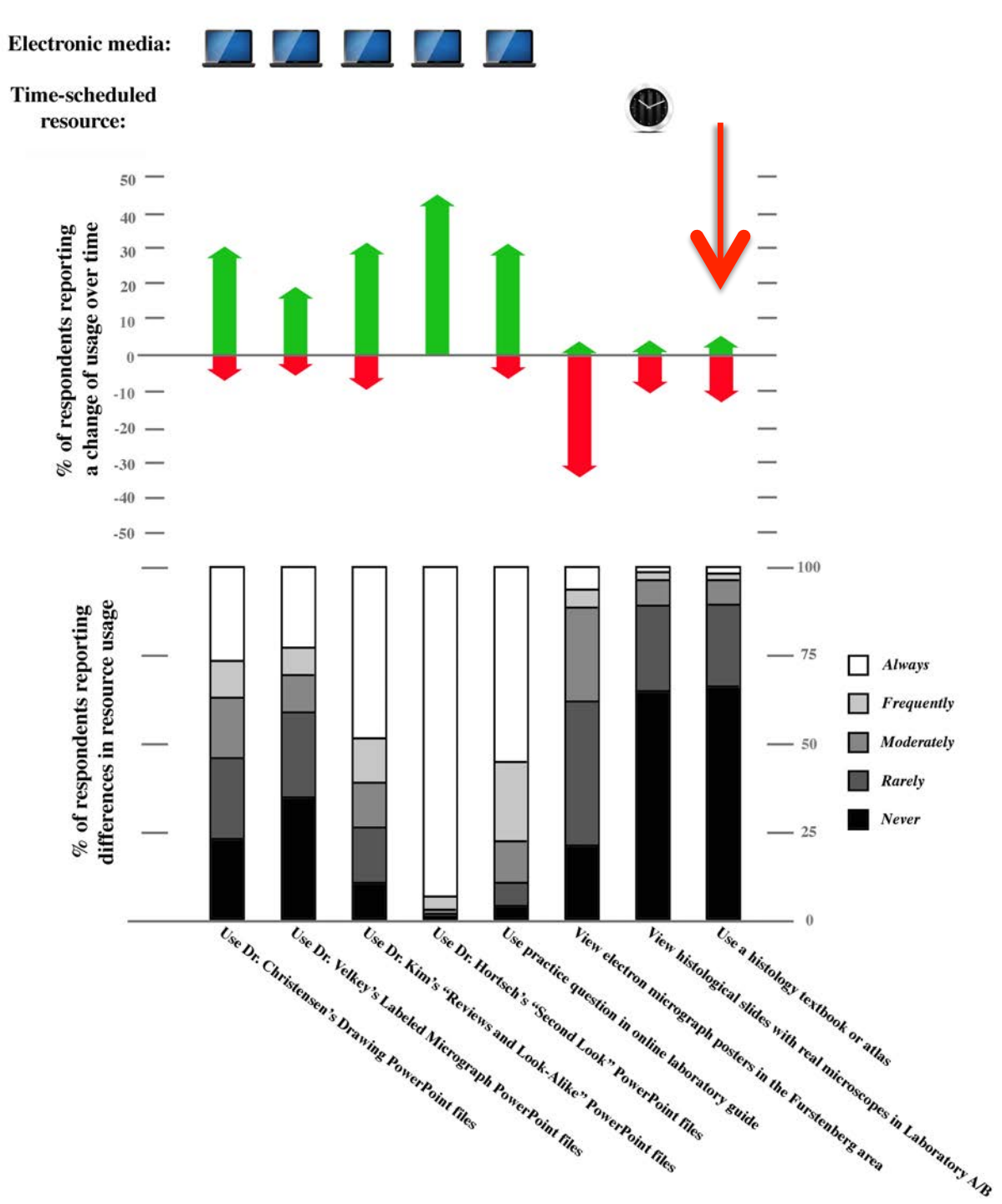
How frequently did you use the following study habits (on average) over the course of the academic year ?

Students prefer to learn alone, rather than in study groups. Over the academic year, this study pattern becomes even more predominant.



How frequently did you use the following histology resources and how did this usage change over the course of the academic year ?

Although most students still come regularly to lectures, all education offerings that are scheduled at specific times are less and less attended as the course progresses. In contrast, electronic media that can be accessed any time become increasingly used as time progresses.



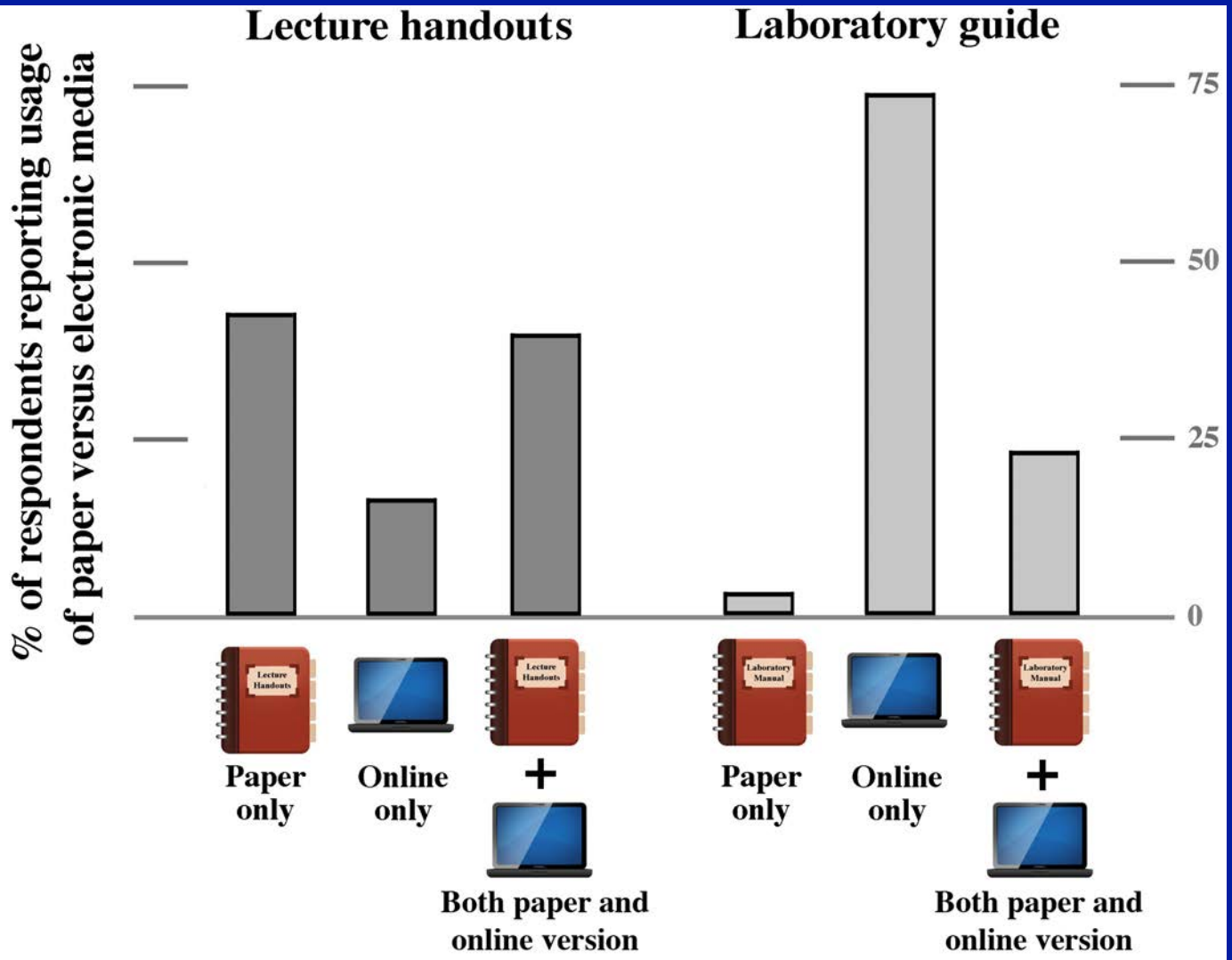
How frequently did you use the following histology resources and how did this usage change over the course of the academic year ?

Electronic learning resources are preferred by students and increasing used over time. Traditional learning resources are abandoned over time.

The least favorite learning resource:

The textbook

Do you use the paper LECTURE and LABORATORY handouts, or the online versions of the LECTURE and the LABORATORY handouts ?



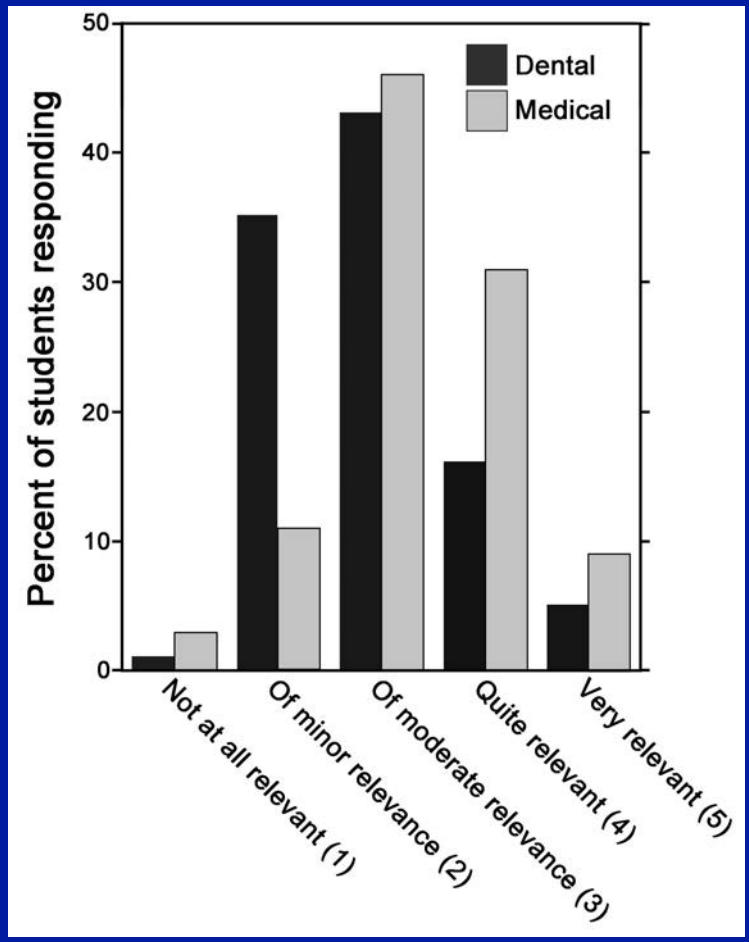
Students still use paper handouts to take notes during lectures. However, the paper laboratory manual saw little use as the virtual slides are accessible from the course website. Therefore, we discontinued issuing paper laboratory manuals to the students.

Summary slide

- Students strong strongly preferred learning histology working alone rather than in study groups.
- Students increasingly gravitate to using electronic study tools over most traditional didactic offerings.
- In addition, students report a strong preference for learning opportunities that are not scheduled and restricted to specific times.
- Histology resources that provide immediate and efficient feedback are also highly valued by most students.

Summary of Comparing Dental and Medical Students Learning Histology

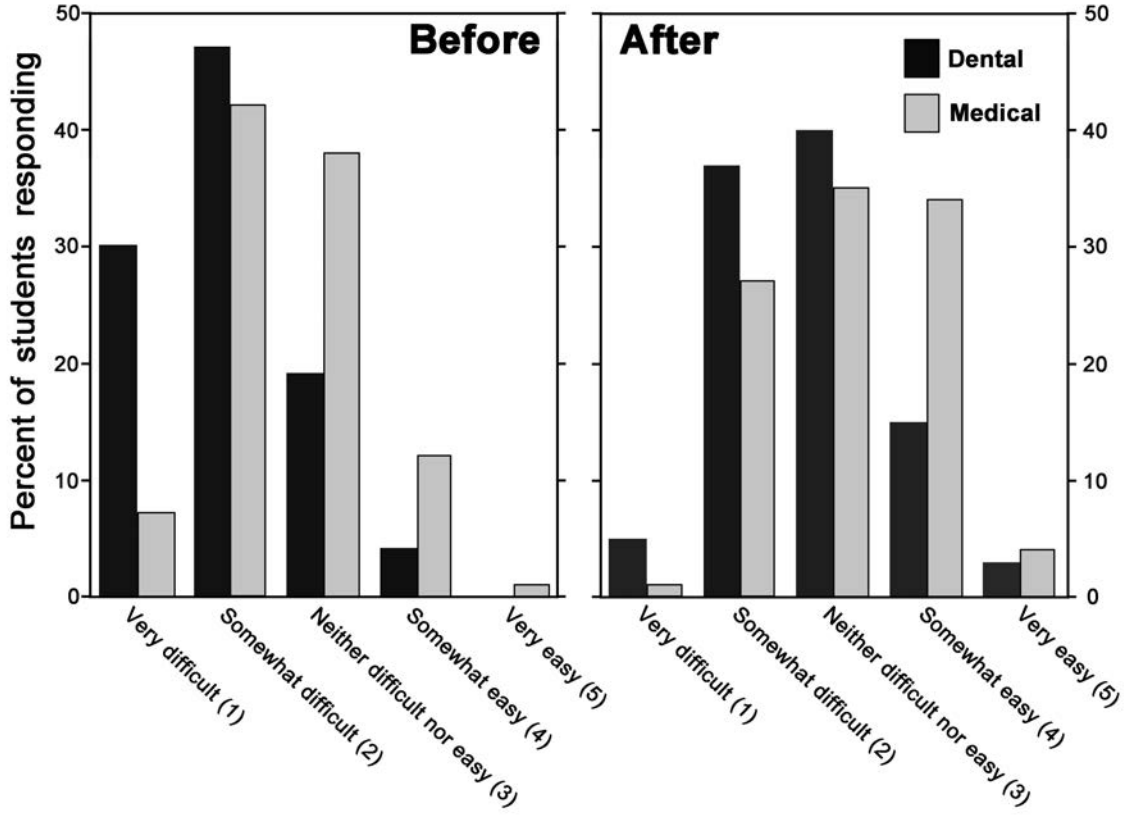
- Dental students consider histology as less relevant for their professional career.



ANOVA analysis p=0.001

Summary of Comparing Dental and Medical Students Learning Histology

- Dental students consider histology as less relevant for their professional career.
- Dental students view histology as a more difficult study subject than medical students.



ANOVA analysis Before $p<0.001$

ANOVA analysis After $p<0.001$

Summary of Comparing Dental and Medical Students Learning Histology

- Dental students consider histology as less relevant for their professional career.
- Dental students view histology as a more difficult study subject than medical students.
- Dental students report a higher classroom attendance than medical students (mandatory lecture attendance).

P-value = 0.0152

Summary of Comparing Dental and Medical Students Learning Histology

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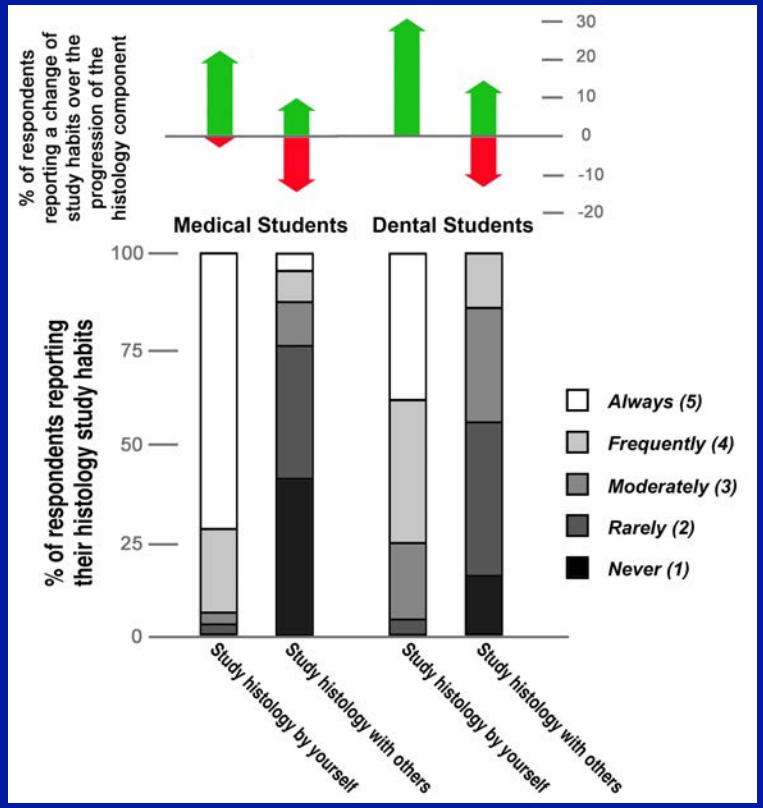
- Dental students are more likely to work in study groups.

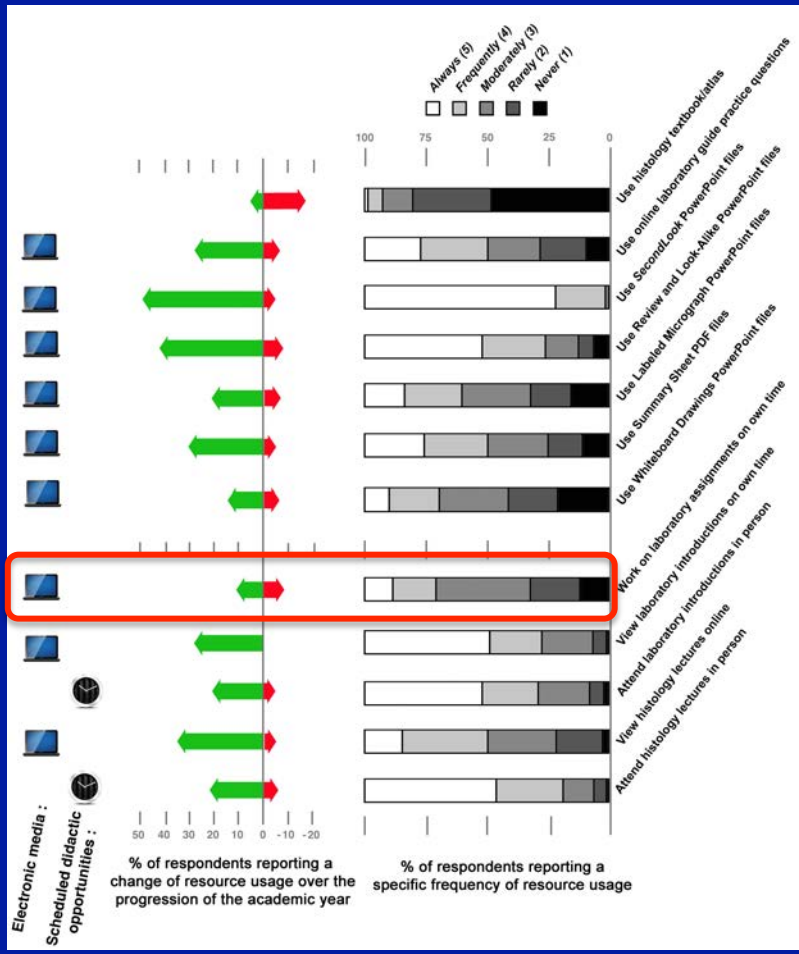


Study alone ANOVA analysis $p<0.001$

Study with others ANOVA analysis $p=0.007$

Summary of Comparing Dental and Medical Students Learning Histology

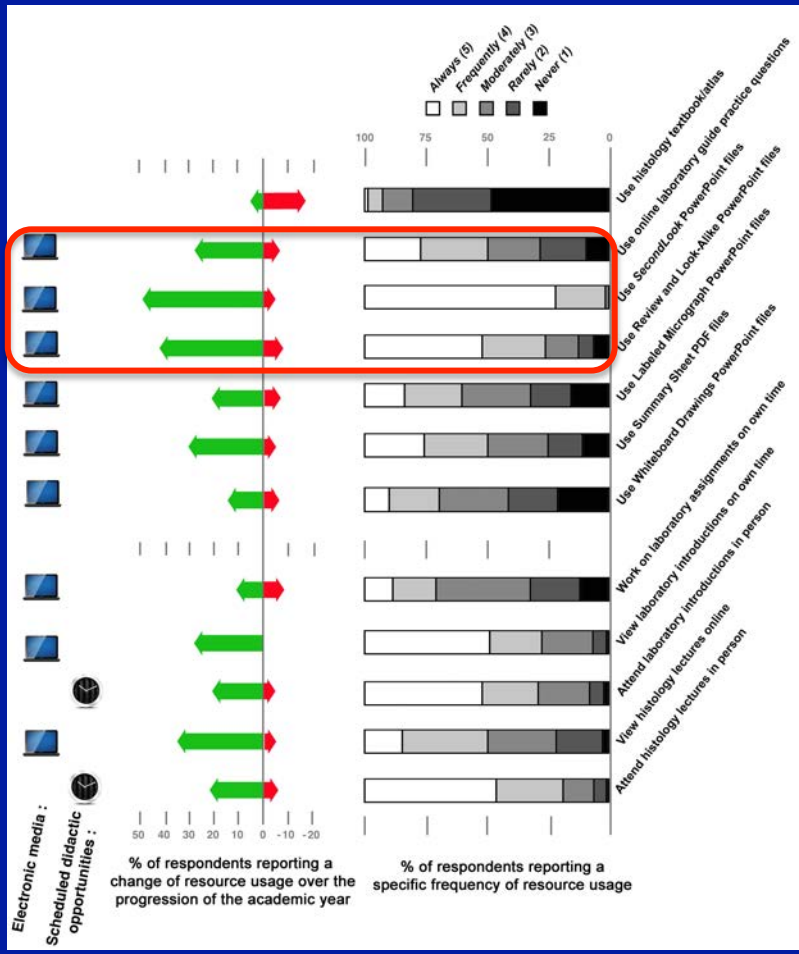
- Dental students consider histology as less relevant for their professional career.
- Dental students view histology as a more difficult study subject than medical students.
- Dental students report a higher classroom attendance than medical students (mandatory lecture attendance).
- Dental students are more likely to work in study groups.
- Dental students make less use of out-of-classroom learning opportunities (especially the Michigan Dental Histology website)



ANOVA analysis p=0.0004

Summary of Comparing Dental and Medical Students Learning Histology

- Dental students consider histology as less relevant for their professional career.
- Dental students view histology as a more difficult study subject than medical students.
- Dental students report a higher classroom attendance than medical students (mandatory lecture attendance).
- Dental students are more likely to work in study groups.
- Dental students make less use of out-of-classroom learning opportunities (especially the Michigan Dental Histology website)
- Both dental and medical students like to use electronic resources that provide efficient feedback.



Which learning strategies and resources are used by successful versus struggling learners?

Survey of Histology Learning Strategies and Resource Usage by the Michigan Medical School Class of 2014, 2015 and 2016

449 of 506 students from the three last M1 classes participated in the survey. That corresponds to a participation rate of 88.7%.
(Three or four $70 cash prizes helped)

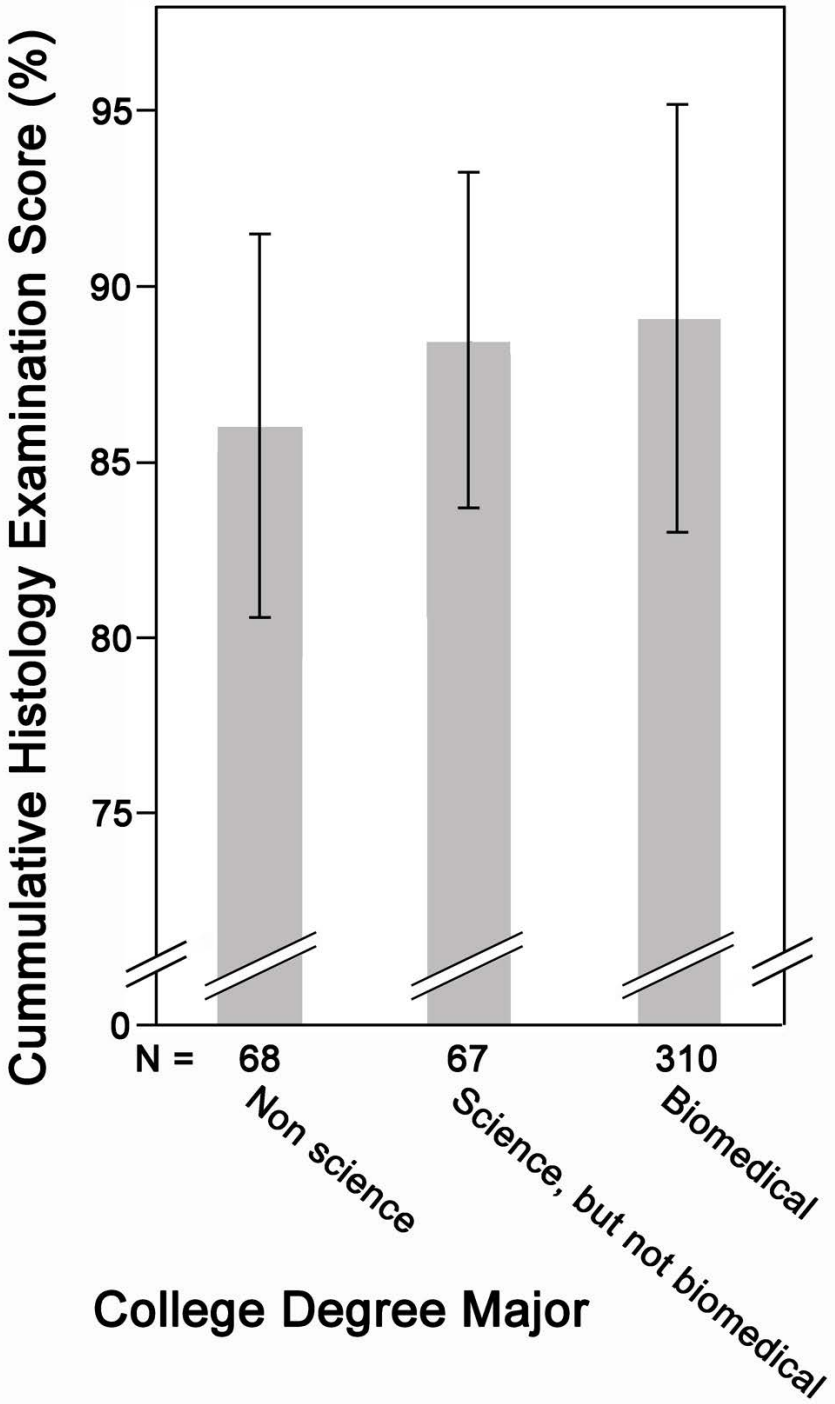
Things we asked and for which found no statistically significant correlation with histology quiz/exam scores:

Work in a research lab during the last 5 years, time since graduating from college, member of the MSTP program, color blindness, studying for histology alone or in a group, time of study outside the class room.

What was your undergraduate major ?

Students with a biomedical college degree do statistically better than students with a non-science major.

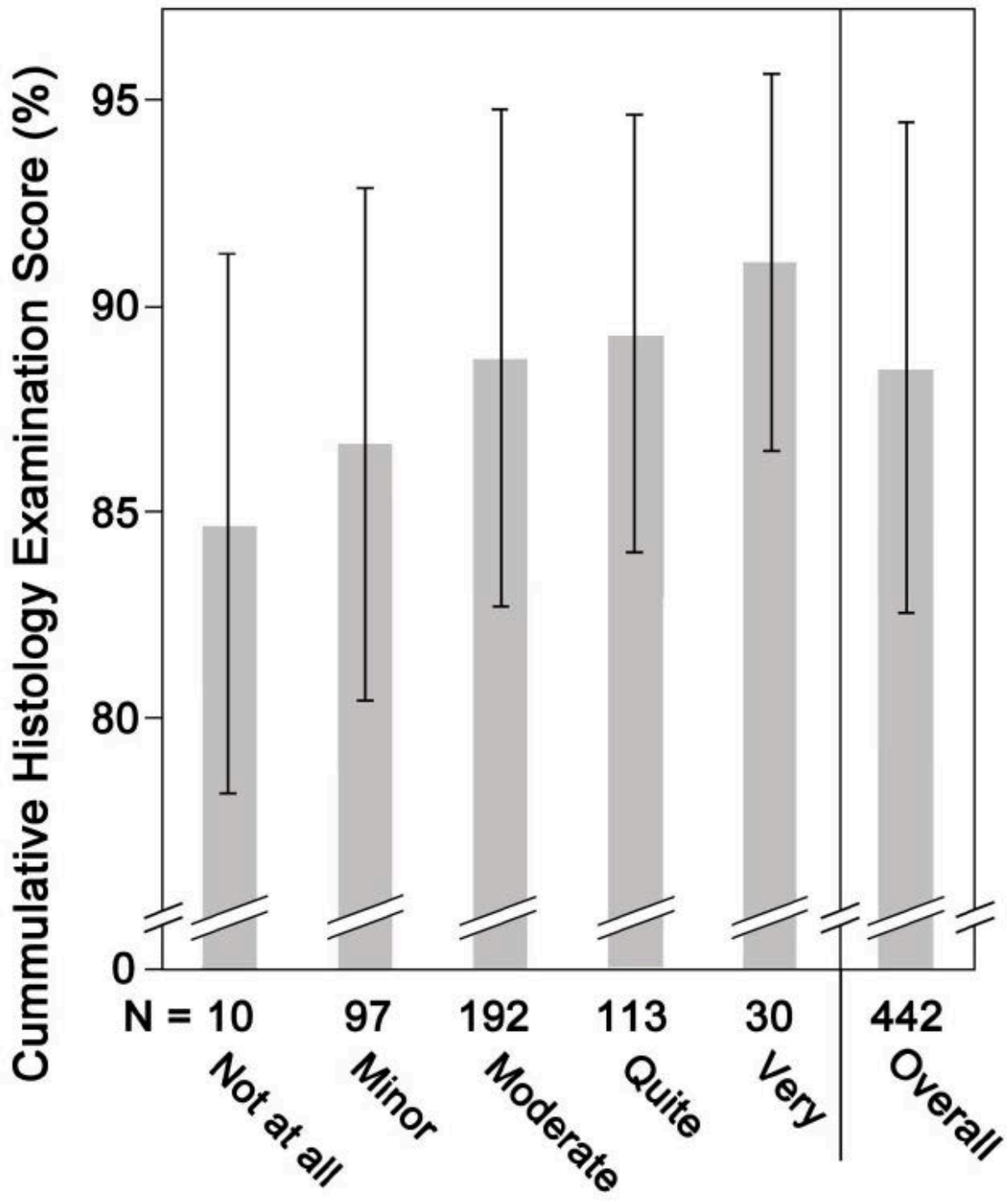
ANOVA analysis $p < 0.001$



How relevant do you think the M1 Histology course content is to your future career as a physician ?

Students, who think that histology will be relevant for their future career as physician do statistically better.

ANOVA analysis p = 0.002



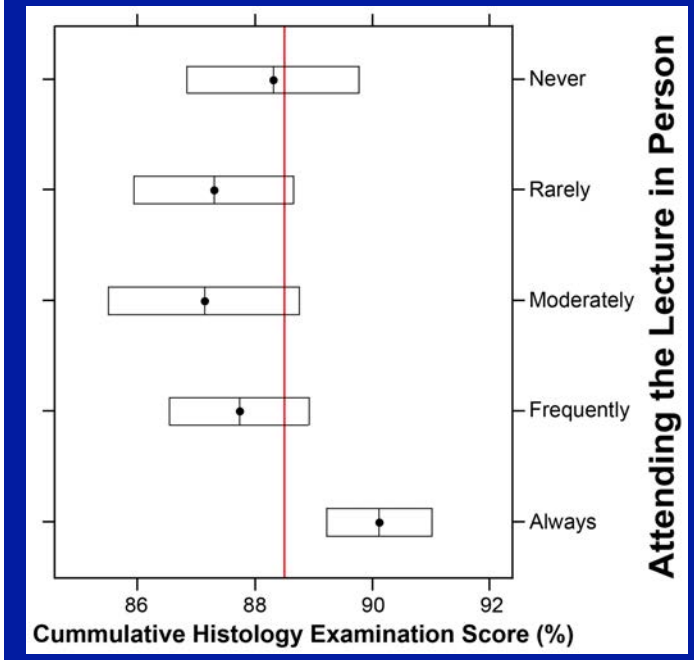
Students perform better in histology examination if they attend faculty-guided learning experiences.

Statistical analysis of final cumulative histology scores and students' use of specific histology learning opportunities and didactic resources.

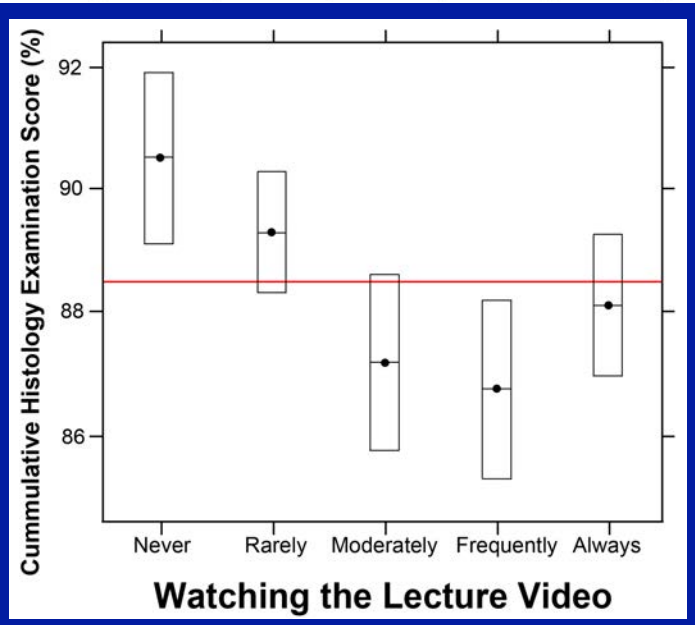
How frequently did you use the following resources?	Never	Rarely	Moderately	Frequently	Always	OVERALL	ANOVA Analysis	Tukey's B
	Mean (SD) *N*	Mean (SD) *N*	Mean (SD) *N*	Mean (SD) *N*	Mean (SD) *N*	Mean (SD) *N*		Post-Hoc Tests
Attendance at laboratory introduction presentations in person.	**88.35** (5.72) *90*	**88.2** (6.18) *125*	**87.29** (6) *52*	**87.88** (6.35) *80*	**90.1** (5.15) *97*	**88.48** (5.93) *444*	F=2.66, **p=0.032***	*'Always'* and *'Moderately'* groups differ significantly.
Studying the laboratory introduction PowerPoint files outside of the laboratory session.	**89.39** (5.33) *64*	**89.29** (5.79) *84*	**88.34** (5.88) *60*	**86.88** (6.71) *80*	**88.55** (5.73) *156*	**88.48** (5.93) *444*	F=2.27, p=0.061	n/a
Work on laboratory assignments in person, during lab hours after the lecture.	**89.08** (5.42) *144*	**87.19** (6.09) *132*	**88.98** (5.62) *57*	**88.16** (6.96) *54*	**90.03** (5.38) *56*	**88.51** (5.9) *443*	F=3.1, **p=0.015***	*'Always'* and *'Rarely'* groups differ significantly.
Work on laboratory assignments outside of laboratory hours.	**87.79** (5.09) *44*	**88.94** (5.93) *74*	**88.52** (6.19) *87*	**87.59** (6.18) *98*	**89.05** (5.82) *141*	**88.48** (5.93) *444*	F=1.14, p=0.335	n/a

Attending the Lecture in Person (%)	Watching the Lecture Video (%)					
	Never	Rarely	Moderately	Frequently	Always	Total
Never	**89.4** +/- 4.2 (5)	**86.2** +/- 4.5 (4)	**86.0** +/- 7.0 (3)	**89.1** +/- 4.4 (5)	**88.6** +/- 4.6 (23)	**88.3** +/- 4.5 (40)
Rarely	**93.1** +/- 1.2 (2)	**81.6** +/- 4.0 (7)	**86.4** +/- 5.6 (5)	**88.2** +/- 6.0 (22)	**87.6** +/- 5.8 (41)	**87.3** +/- 5.9 (77)
Moderately	**86.0** +/- 17.3 (3)	**88.2** +/- 2.9 (6)	**87.5** +/- 6.0 (25)	**86.3** +/- 6.4 (18)	**87.5** +/- 6.3 (13)	**87.1** +/- 6.5 (65)
Frequently	**88.4** (1)	**89.1** +/- 6.1 (49)	**87.2** +/- 6.1 (29)	**85.1** +/- 5.9 (18)	**87.7** +/- 6.8 (8)	**87.8** +/- 6.1 (105)
Always	**90.8** +/- 5.1 (57)	**90.3** +/- 5.8 (78)	**86.8** +/- 5.8 (6)	**85.1** +/- 4.8 (5)	**89.6** +/- 6.3 (11)	**90.1** +/- 5.6 (157)
Total	**90.5** +/- 5.7 (68)	**89.3** +/- 5.9 (144)	**87.2** +/- 5.8 (68)	**86.7** +/- 5.9 (68)	**88.1** +/- 5.7 (96)	**88.5** +/- 5.9 (444)

Average scores with 95% confidence interval



ANOVA Analysis
P < 0.001



ANOVA Analysis
P < 0.001

Attending Lectures versus Video Watching

Students, who attend lectures in person, do statistically better in quizzes and exams.

Students, who rely on lecture videos, do statistically worse in exams.

Summary slide

- Students' college major (non science vs. biomedical science) and previous histology experience correlates positively with histology examination success.
- Motivation to learn histology (it is important for my career) is highly correlated with histology examination success.
- Students perform better in examination if they attend faculty-guided learning experiences.
- Histology exam success is highly correlated with always attending live lectures. Students who rely on streaming lectures as podcasts do significantly worse answering histology examination questions.

The Influence of Classical and Electronic Educational Resources on Students' Learning Success in the First Year Medical School Histology Component at the University of Michigan

Holaday et al. in *Medical Science Educator* (2013). Vol. 23(4), pages 607-619. (Journal of the International Association of Medical Science Educators)

Learning Histology – Dental and Medical Students' Study Strategies

Johnson et al., revised manuscript submitted to the *European Journal of Dental Education*.

Correlating Students' Educational Background, Study Habits and Resource Usage with Learning Success in Medical Histology

Selvig et al., revised manuscript submitted to *Anatomical Sciences Education*. (Journal of the American Association of Anatomists)