Designing an Online Biotechnology Laboratory Course: The Impact of Structure

Sophia Noel[1], Carlos Goller[1], Stefanie Chen[1], Melissa Srougi[1], Hayden Huggins[1], Caitlin McKeown[2], and Dan Spencer[2]
North Carolina State University [1]Biotechnology Program; [2]Digital Education and Learning Technology Applications (DELTA)

Motivation

- **Course**: Online, flipped-classroom, synchronous learning sessions, asynchronous lab sessions, mixed academic level & program/major (10-16 students)
- **Challenges**: Student readiness, effort/autonomy vs face-to-face (F2F), learning management system (LMS) setup/navigation, limited student-student and student-instructor interactions
- **Solutions**: Organization, modification, and increased transparency of expectations

Implementation

- Obtain Quality Matters (QM) certification
- Introduce Moodle roadmap
- Increase clarity of guidelines
- Promote peer-to-peer and instructor support through synchronous and asynchronous communication
- Beginning and end of semester surveys (n = 17)

Results

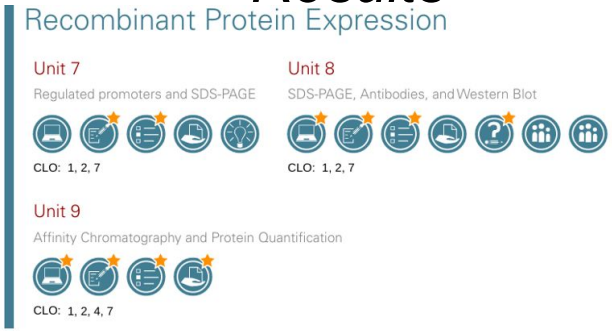


Figure 1: Example student screenshot of one subsection of the roadmap. Taken in Spring 2023

Table 1. Student perceptions of course structure (n = 17)

	Disagree	Neutral	Agree	M (SD)
...keeps me connected with my [peers/my instructor]	0.0%	11.76%	88.24%	4.24 (.66)
...allows me to [participate/interact] with others in my course regularly	0.0%	29.41%	70.59%	4.06 (.83)
...creates an active learning community for me to engage in	0.0%	17.65%	82.35%	4.18 (.73)

Note: Scale was collapsed across categories for ease of interpretation: Disagree = Somewhat & Strongly disagree; Neutral = Neither agree nor disagree; Agree = Somewhat & Strongly agree

Results & Discussion

- Most students (>75%) engaged in the roadmap "often" or "very often", and since it was not a requirement to interact, it is likely these students did so because they found it useful
- Most students (>75%) found the roadmap was "very" or "extremely" helpful in engaging in course-related behaviors or tasks, showing that it's an added benefit to course structure
- Emphasizing the structure of the course increased awareness of assignments and expectations

Acknowledgements

BIT team; our fabulous TAs: Dilán Rivera, Erin Cavanaugh, and Amilcar Rodriguez; and all students who have taken distance ed Core!

References

QM guidelines
IRB approval

Designing an Online Biotechnology Laboratory Course: The Impact of Structure

Authors: Sophia Noel[1], Carlos Goller[1], Stefanie Chen[1], Melissa Srougi[1], Hayden Huggins[1], Caitlin McKeown[2], and Dan Spencer[2]
North Carolina State University [1]Biotechnology Program; [2]Digital Education and Learning Technology Applications (DELTA)

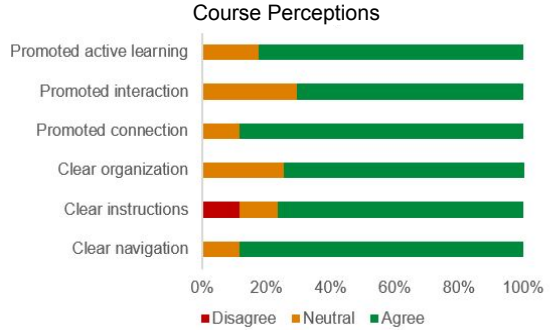
Motivation

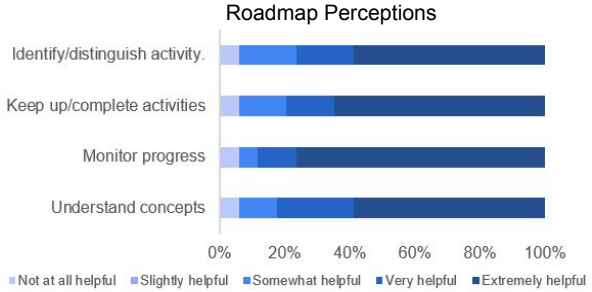
- **Course:** Online, flipped-classroom, synchronous learning sessions, asynchronous lab sessions, mixed academic level & program/major (10-16 students)
- **Challenges:** Student readiness, effort/autonomy vs face-to-face (F2F), learning management system (LMS) setup/navigation, limited student-student and student-instructor interactions
- **Solutions:** Organization, modification, and increased transparency of expectations

Implementation

- Obtain Quality Matters (QM) certification
- Introduce Moodle roadmap
- Increase clarity of guidelines
- Promote peer-to-peer and instructor support through synchronous and asynchronous communication
- Beginning and end of semester surveys (n = 17): including perceptions of LMS site, course structure, as well as roadmap behaviors, helpfulness, and user experience. (IRB# 25900)

Results





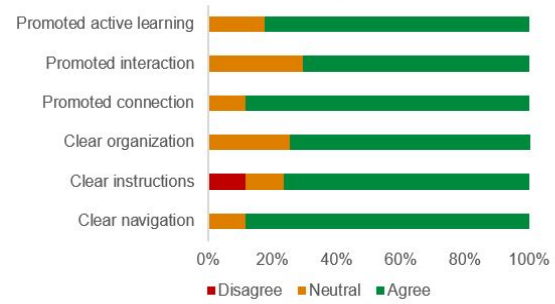
Roadmap Design

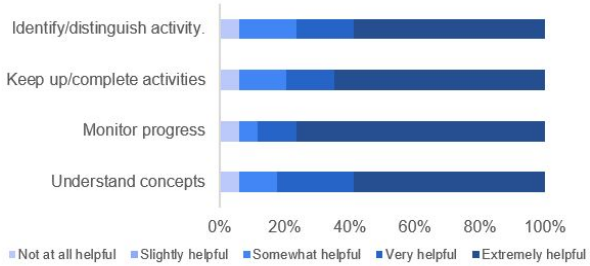
Conclusions

Emphasizing the structure of the course increased awareness of assignments and expectations. Students engaged with the roadmap frequently and found it/the course structure helpful for their learning

Acknowledgements

BIT team; our fabulous DE TAs: Dilán Rivera, Erin Cavanaugh, and Amilcar Rodriguez; and all students who have taken DE Core!


Promoted active learning
Promoted interaction
Promoted connection
Clear organization
Clear instructions
Clear navigation
0%
20%
40%
60%
80%
100%
Disagree
Neutral
Agree


Identify/distinguish activity.
Keep up/complete activities
Monitor progress
Understand concepts
0%
20%
40%
60%
80%
100%
Not at all helpful
Slightly helpful
Somewhat helpful
Very helpful
Extremely helpful