

Summary Report from Plant Biology Program Student Focus Group Spring 2017

PART 1: PROJECT DESCRIPTION AND SUMMARY OF FINDINGS

Background:

The student-led focus group project at UVM was launched in March of 2016, after a team comprised of one faculty member, one CTL staff member and two students attended a three-day training at Wabash College's Teagle Institute over spring break. The training offered examples of successful initiatives at a range of institutions that use student-led focus groups to provide qualitative data on student experiences and incorporate student voices into evaluation of campus initiatives. After the training, a group of three students conducted several pilot focus group projects associated with program assessment at UVM.

In the fall semester of 2016, four students participated in a semester-long online and in-person trainings and practice sessions, preparing them to conduct their first full-scale project. Under the direction of Provost's Faculty Fellow for Assessment J. Dickinson and CTL staff member Henrietta Paz-Amor, the team offered support to the Plant Biology Assessment Committee through the focus group service. The Plant Biology Assessment Committee was interested in using the focus groups to gather information about the experience of junior and senior Plant Biology majors in regard to their learning outcomes.

Preparation:

The student focus group leaders met with the following members of the Plant Biology Assessment Committee, Cathy Paris, David Barrington, and Laura Hill, to gather information that served as the basis for a draft moderator guide. With further input, the moderator guide was finalized and tested with the first scheduled group. The focus group leaders evaluated the guide after this first group and did not find any areas that needed clarification or changing. A copy of this moderator guide, used for all six groups, is attached as Appendix A.

The students chosen to participate in the focus groups were identified by the Plant Biology Assessment Committee, based on their class standing as juniors and seniors. Of the students who attended the focus groups, 4 were juniors and 1 was a senior. We conducted 2 focus groups, with groups ranging from 2 to 3 participants. Additional students arrived after we finished the first focus group and we were able to conduct a second group.

Summary of Findings:

The moderator guide focused students' discussion on the skills and knowledge of students, and on their perception of the learning objectives provided by the Plant Biology Assessment Committee. Students were asked what skills and knowledge a Plant Biology Major should have by graduation and about the most important things they have learned so far. In addition, the students were asked to reflect on the learning objectives provided. They were asked if they felt the objectives made sense, if there were any gaps, if they felt they were achieving the learning objectives, and where they acquired the skills and knowledge provided by the learning

objectives. Their responses to these questions are summarized in the themes in Part 2 of this report.

Our initial findings included the following. Students had variety of knowledge and skill sets that they acquired as Plant Biology Majors. Much of this knowledge and these skills related to specific courses. Focus group participants had different conceptions of what a Plant Biology Major should know by graduation based upon their specific concentration. They felt that each concentration required a different set of knowledge and skills. Of the things students felt they would like to learn more about, lab skills and techniques came up often. The focus group discussion touched a lot on the Learning Objectives provided by the Plant Biology Assessment Committee. Students discussed the ways in which they met the learning objectives inside and outside the classroom, but felt like the learning objective identifying communicating scientific ideas through writing was not met. The focus group discussion also led to some feedback for different courses required for the Plant Biology Major. When it comes to introductory level courses, students would like to see more of a plant focus. Within these courses, students also see the need for a plant focused genetics course. Several students mentioned that they would like to see more plant biology courses. Finally, students would like to see a more even distribution of the 200 level courses offered between the semesters and the years.

Recommendations:

Based on the conversations that students had in the Plant Biology focus groups, we have several recommendations that will allow students to acquire more knowledge through the exploration of their Plant Biology courses. Overall, students felt comfortable and confident about the learning objectives provided to them. One thing that came up often was the communication of scientific ideas through writing. Students feel that they could spend more time working with that learning objective in particular. Students also mentioned that they would benefit if lab techniques were added to the list of learning objectives. There were discussions surrounding the courses that Plant Biology Majors take. From what we gathered through these discussions, we would recommend offering 200 level courses more regularly and more evenly throughout the two semesters. Also, we would recommend speaking with the professors and departments that cover the general and introductory Plant Biology Major requirements, and suggesting that there be more of a plant focus than there currently is.

PART 2: DISCUSSION OF FOCUS GROUP THEMES

Theme #1: Knowledge and Skills Learned

Throughout the focus groups, students spoke about the knowledge and skills that they acquired as plant biology majors. Students discussed in what content they already knew the information already, and which plant biology courses that knowledge related to. There were conversations regarding what students thought Plant Biology Majors should know, and what they hoped to learn by the time they graduate. Many of these conversations related back to the three sections of the plant biology major: molecular, general, and evolution. We have broken this theme up into three subgroups that include what students know already through specific courses, what students think Plant Biology Majors should know by graduation, and areas students would like to improve upon by graduation.

Current Student Knowledge and Skills Relating to Plant Biology Courses

Focus group participants shared a lot of information regarding their current knowledge and skills as Plant Biology Majors. This knowledge was related back to the courses that gave them this knowledge. Typical student comments related to this topic included:

- “I’m in 108 right now, and I think, which is morphology and evolution, and I think that...if I didn't get pushed in the evolution direction, I don't know if I would have taken the class. But I think understanding how things evolved in these different plant lineages that I wouldn't understand like where things came from and where they can go in the future, I think that's like a really important thing.”
- “I have a more molecular focus in my studies so the course that's been the most foundational to me I guess is the plant physiology course which I'm currently in. It just provides a background for everything else. A basic understanding of how the plant works.”
- “Well I would definitely take plant anatomy which is like PBIO150 I think because you learn all the plant cells which...you don't learn in other classes. And that's also cool because it's a lab class so you look at them under microscopes and you learn how to do different sections.”

Plant Biology Major Knowledge by Graduation

Students discussed the general knowledge and skills that they felt Plant Biology Majors should have by graduation. Their discussion brought about knowledge and skills that was directly related to Plant Biology, for example identification, as well as information that was less Plant Biology oriented, for example statistics. Overall, students felt that the different major concentrations called for different sets of knowledge and skills. Typical student comments related to this topic included:

- “I was gonna say identification is a big one for me, of local flora. You should be able to do, actually I think you should have some molecular knowledge as well, be able to work

with PCR in the lab, I think you should be able to do genetics as well as ecology, as well as statistics.”

- “I think you should [know]... you were talking about the identification just like a general knowledge of what's around here. You know like maybe not like know how to identify every single plant in the entire world, but like just a general knowledge of what's around you.”
- “Yes, like really important families. Know that, you know, angiosperms are the biggest group.”
- “Using a key to identify stuff. Also, making a microscope slide, like lab techniques yeah.”
- “I think it's also really dependent on what concentration you are.”
- “I think that depends which track you go into. Personally I’m in the molecular track so I think you need lab skills.”

Would Like to Know

During the focus group conversation, students brought up a few things that they would like to know by the time they graduate. Some of these things were more related to Plant Biology requirements that fall outside of the Plant Biology Department. Others were related to lab. One student spoke about **knowing how to figure out a lab task on her own despite not yet learning the skills necessary**. Typical student comments related to this topic included:

- “There's a couple of specific lab techniques that I wish I could improve upon a little bit, but those are not specific to plant biology but rather all of the sciences that they like--bio core classes, that are responsible for knowing like how to PCR or something, whereas I don't know if I could do that right now. I think some **common yet specific lab techniques I wish I was better at.**”
- **“Making slides, using stuff in the lab that like I haven't used in a lab but I will when I do research. But like we haven't used it in a regular lab class.”**
- “I think that even though I haven't learned these specific skills, I think that I'm pretty like I'm proficient enough in a laboratory setting that like if somebody said this is what you have to do, I could do it.”
- “And I think we already understand a lot of the concepts behind a lot of the different techniques so just like learning how to apply them should be fairly simple.”

Theme #2: Learning Objectives

The second item of the Plant Biology department learning objectives indicated student insight to **draw connections** among the different subdisciplines of plant biology that yields insight into the complexity of science and biology as a whole. Students in the focus groups reflected a broadening in their scope of plant biology from the time they entered the program to their junior and senior years. Some shared that, **while upon entering the program they perceived plant biology as a field synonymous to horticulture, they have since learned to identify more diverse aspects of plant biology**. The present students **attributed the broadening perspective of plant biology to drawing connections between concepts presented in class and research outside of class**. While students were able to independently draw connections between different classes,

many appreciated the explicit way that some professors presented between-class connections.

Typical student responses included:

Connections Between Learning Objectives and Plant Biology Subdisciplines

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- “I guess I went into plant bio thinking of it as more from a horticultural point of view, but obviously I knew it was different because there was a whole different major for that. I think plant bio just based on the classes that I’ve taken, I really understood what the field is about. It takes a couple years of study to realize that you’re not just out in the field of sunflowers, it’s research as an animal science major is doing, as a microbiology major, and it’s flexible because there’s so much overlap between these fields that I didn’t know. It’s not as limiting of a degree as I thought and you gain some universal skills.”
- “Even if you’re gonna go out and like do statistical analysis of a stream data, the entire way down they’ll be like, ‘what tree is that, what plant is that,’ like all this identification constantly comes out. And so, lab time is where I actually draw a fair amount of connections.”
- “Just being in those two [classes] at the same time, I can draw so many connections between the two. We learn sort of similar things in both, but then there are these giant differences that, I don’t know, it’s really easy to connect them when I’m in both of them at the same time.”
- “Yeah, I think Kathy is the professor for our 109 and 108 and in 108, she a lot of times refers [to other classes] like, ‘Oh, if you remember from 109 we talked about this,’ and the flowering plants which we’re not really focusing on in 108 necessarily. Yeah and then I think I definitely noticed a lot of them [the different connections between classes and subdisciplines] myself.”

Gaps in Knowledge

Learning objective 3, which identifies student proficiency in communicating scientific ideas verbally and in writing, stood out as the focus group participants did not feel adequately prepared to meet this objective. Students who participated in the focus group were in general more comfortable sharing scientific ideas verbally. When it came to sharing scientific ideas in

writing, most felt like their plant biology courses were not giving them as much practice as their introductory-level chemistry and biology courses. The only student in the focus group who seemed to feel comfortable with communicating their scientific ideas in writing to the level specified in the learning objective list was the only student of senior standing who participated in the focus group. As juniors, the remaining students shared that they would have liked to practice their writing skills more frequently and consistently in the plant biology classes they were enrolled in. Typical student responses included:

- “I would say the most challenging thing for me on here is communicating scientific ideas clearly and effectively. I feel like we don’t get quite enough practice with that.”
- “I was gonna say that that would be the one that I would say particularly the writing part, I think that we present in a lot of classes which is a pretty good demonstration of communication verbally. Writing, I know that they’re doing some morphology right now, but I haven’t had too many like lab papers
- “I think writing is emphasized in the lab components but not as much in the other class other than gen chem, orgo, biochemistry. That is when we are doing probably most of our writing.”

What to Add to Learning Objectives

Interestingly, every student who participated in the focus group agreed that adding laboratory skills in conjunction with undergraduate research should be added to the learning objectives. During the course of the conversation, research repeatedly came up as one of the experiences that the students most valued in their time with the plant biology department, but they did not feel as though that skill and knowledge was represented in the already-outlined learning objectives. Typical student comments related to this topic included:

- “I think working in a lab has given me the most skills because it helps you apply what you’ve learned in class.”
- “I kind of agree with the idea of more emphasis on research. My advisor personally was a strong advocate for it, but we could talk more about published articles in classes outside of the general sciences I’ve had to take.”

General

Despite the recommendations that students in the focus group gave in regard to the learning objectives, students in the plant biology department seem to be very pleased with their experience. They attribute a lot of the department’s success to its caring faculty and extensive research opportunities. When asked about how they would market themselves to a potential employer, many responded by saying they have the ability to excel in general biology and chemistry and simply take their knowledge in these areas one step further by applying them to the context of plants. Some student responses that we thought were important to include but did not match our aforementioned sub themes include:

- “I feel pretty confident about all [the learning objectives].”
- “We have a fundamental background so I guess lab skills and chemistry, orgo we have skills we can apply and outside of the context of just the plant.”
- “Yeah I’m applying to jobs right now and so I took the biochem lab and we purified proteins and so that’s something I mentioned when I applied for jobs. You know I might not have this particular lab experience that you want but I can learn it and I’ve learned similar things.”

Theme #3: Feedback for Classes

The focus group discussion touched on specific feedback for Plant Biology courses. Students would like to see more plant-focused introductory courses. They would also like to see more classes in general, and a more diverse array of courses offered. At the 200 level, students would like to see the courses that currently rotate in and out of availability depending on the semester more evenly spread out throughout the semester. Students mentioned that they would like to see more opportunities to read literature in the lower level courses. A few students discussed the need for a plant genetics course because plant genetics differ from human genetics. We have broken this theme up into four sub-themes that include Plant Focused Introductory Courses, Diversity of Courses Offered, More Courses Available More Often, and Plant Genetics Course.

Plant-Focused Introductory Courses

During the focus group, students discussed the limited scope of their introductory courses. Students felt that their introductory and core requirement courses were limited in their plant curriculum. Students would like to see more plant focus in these courses. Typical student comments related to this topic included:

- “I wish Plant Bio was integrated with other classes, but I know there has been a shift out like the MMG 101 used to focus more general on bacterial but now it is focusing on bacteria in the context of human disease. And so that’s not on the Plant Bio Department obviously, but Plant Bio shares, like up until sophomore year you could be pre-vet, you could be pre-med, you could be any sort of major. We have all these super common classes and plants are not remotely near the forefront.”
- “Yeah, [in introductory biology classes] mitochondria are everything and chloroplast are irrelevant. Or like these are the green things.”
- “I came in as a freshman and I was like I’m doing plant bio because of scholarship money is offered like New England program, but like yeah I didn’t really feel like I was a Plant Bio major until junior year.”
- “Yeah, I wish that I could somehow substitute some of the classes I have taken for plant biology directly classes. Although that would limit my like scope of knowledge, it would I don’t know.”
- “And I want like for the molecular the molecular side of things, like the only extra requirement is to take like biochemistry which is very much focused on biochemistry in

the human body and like I took the first semester, so boring, like I don't care about people. I just want to learn about biochemistry in plants.”

More Courses Available More Often

Many students mentioned that they would like to see more courses offered in general.

Branching off of that, students discussed the 200 level courses. Students would like to see these courses offered regularly as opposed to on a rotational schedule. They would like to see these courses spread more evenly throughout the two semesters.

- “Is it crazy to like feel like there’s like so many classes that I can't take them all but like I also want more classes?”
- “I was gonna say I wish there were more classes.”
- “I just want wider variety or something.”
- “It's like hard to know what exactly I want to do because I feel like there's so much more that I could learn that's just not offered.
- “Yeah, make it more directed. And I would say the different divisions in the plant biology major are good in terms of like evolution, normal, and micro bio. But I think there should be some like signpost that is there's a lot more than the three things that we just outlined here ... Somehow the, that part of it, like choosing the specific like subdivision of the major should like include more or at least show that this is not the only thing that's here.”
- “Right, those [the rotating classes] are the cool ones but like I want that symbiosis class to be offered every year.”
- “And those are the sort of classes that will rotate like every two years once a semester like you'll be like oh this class rolled around. Where like if somebody was really passionate about mosses like it would be really awesome but there's only a--this is the first time I've ever seen a graphites class. It's the first time in three years. That's lame if you were really into mosses.”
- “And like I think symbioses are so cool but I haven't taken the right class yet and I might never get to take it again cause it's only being offered one time, so.”
- “One criticism I have is there are – like I think I've learned the most from the 200 level classes and I just wish there were more of them and that they were evenly distributed between both semesters.”
- “It is hard because a lot of the upper level plant bio courses are electives one semester and gone next semester and may be gone for years.”
- “And sometimes there is a lot fall semesters and none fall semester and it's hard to fit them into your schedule.”

Plant Genetics Course

During the discussion, a few students mentioned the need for a plant genetics course. Students felt that the genetics course they currently take is focused more on human genetics as opposed to plant genetics. Typical student comments related to this topic included:

- “It would be nice if you learned specifically just in one class how diploids, triploids, and tetraploids are different and what that means for studying the plants and dissecting super-plants. Because most of the genetics we learned is applied to bacteria or humans and those are like easier to study genetically than plants.”
- “Yeah, cause I'm actually super interested in like a lot of the molecular stuff. But there's no molecular plant biology classes. There's no plant genetics, they should have a plant genetics class, they should have a biochemistry, they should have a plant chemistry class, they should have those kinds of things.”
- “Yeah there aren't a lot of classes I think that talk about genetics. Its mostly like again in the 200 level classes when you go over journal articles but you don't get to apply the genetics, like you don't get to go to a lab and play around.”
- “I guess as a junior I feel as though my education of genetics development evolution have all been abstract from plans, like they are done through Bcore. And then we talked a little bit about diversity in the one class that I've taken, the 200 level PBIO and in BIO109. And physiology I'm taking right now and that's directly plant related which is good, but I do – maybe it's just the path of mine, I do feel like I do not do genetics that much of plants.”

APPENDIX A: Moderator Guide for Plant Biology Focus Groups Spring 2017

As students come in: Greet each person, and ask people to sign in with their name and email. Then invite them to get some refreshments and sit down and write their name on their respective nametags. They can choose their own name if they want, but a fake name is fine too.

Welcome:

Welcome and thank you for joining us for this group discussion. I'm _____ and I'll be leading our conversation today. [Introduce notetaker and explain their role]. We are part of an initiative at UVM that helps programs and colleges get student feedback on specific areas where they would like to improve the student educational experience.

Today we are going to have a conversation about your experiences as a Plant Biology Major. So, all of you should be students who are Plant Biology Majors. Is that correct? Is anyone not a Plant Biology Major? [Politely ask anyone who does not qualify to leave.]

The Plant Biology Assessment Committee, which is responsible for evaluating student outcomes for the within the Plant Biology Department, has asked us to conduct a series of group discussions with students to find out more about your experiences as a Plant Biology Major, and how they are fulfilling the learning outcomes presented by the Plant Biology Department. We really value your honest feedback, so I am going to ask you to think about all of the questions carefully and to answer them honestly. We'd like you to focus on your own experiences as much as possible, so try to stay away from talking about an experience that your friends may have had.

Remember, there are no right or wrong answers to the questions we are asking today. We want to hear many different viewpoints and we would like to hear from everyone. We hope you will be honest even when your responses may not be in agreement with the rest of the group. We would like to remind you that this is intended as a safe space. Please be respectful to everyone within the focus group and be mindful that people may have different opinions regarding the topics at hand.

The information we gather today will only be used to evaluate and improve the University experience for students and all comments we include in our report will be anonymous, So please do not be afraid to answer honestly. Please respect the privacy of others in the focus group and keep this the contents of this conversation confidential.

Consent form:

We will have a notetaker writing down the main ideas of what you say in the discussion, but we will also be recording this so that we can make sure our notes and our understanding of your main points are as accurate as possible. The recording will not be shared with the Plant Biology Assessment Committee, and it will be erased at the end of the semester after we complete our summary of the discussion. The Committee will, however, receive a summary of this conversation that we will prepare for their review. We have short consent forms for each of you, outlining that you agree to be recorded, with the understanding that all quotes will be anonymous, the material will be used only for program evaluation, and that the recording and all copies will be erased by the end of May, 2017. Please take a moment to read over the consent form and sign it.

Questions:

[Plan on 8-10 minutes per question, including the final question]

1. I'd like to start by having everyone go around and introduce themselves. Please tell us your name, year, and when you declared your Plant Biology major.
2. What knowledge and skills do you think a Plant Biology Major should have by the time they graduate?
 - a. Do you feel like you've achieved this knowledge and these skills?
3. What do you feel are the most important things you've learned in your Plant Biology major? What makes these things important?
4. If you haven't already, please take a minute to look over the Learning Objectives on the paper in front of you (this will be handed out with the consent form). After thinking about these for a minute, do you feel you have achieved these?
 - a. Just from this first look, do these goals make sense?
 - b. Do you think there are any gaps in your knowledge? Anything you think should be added to the list?
 - c. Do you believe that you are achieving these Learning Objectives?
5. Reflecting back on the previous question, where have you acquired these skills/this knowledge? Was there a specific activity that was most helpful?
 - a. At UVM? Outside UVM?
 - b. Class, research, extracurricular experience in labs, field components, capstone, etc.?
6. Take another look at the first and second learning objectives. Where do you feel like you've made connections between the different sub disciplines of Plant Biology.
7. What advice would you give to a good friend or younger sibling interested in Plant Biology? This advice might include specific classes or other experiences you would recommend, tips for

getting the most out of the program, or anything else that you think a new Plant Biology major should know or do to succeed.

8. Next, I'd like you to imagine a scenario. You are being interviewed for a job and they are interested in your major, and ask "What skills will you bring to the position from your experience as a Plant Biology major at UVM?"

9. This has been a really helpful discussion, thank you all for taking the time out of your busy schedules to talk to us today. As a final question, we just want to ask if there is anything you think we have missed. Are there any other aspects of the Plant Biology Major that you think are important for us to know? If you think we've covered everything, thank you again and have a wonderful night!

PBIO Learning Objectives, April 13, 2017

1. Demonstrate a foundational knowledge of the subdiscipline of plant biology, including diversity and evolution, development and physiology, genetics, and ecology.
2. Draw connections among the plant biology subdisciplines that yield insights into the complexity of the science.
3. Communicate scientific ideas clearly and effectively, both verbally and in writing.
4. Demonstrate an understanding of the scientific method.
5. Use critical analysis skills to interpret and explain observations, questions and data.