

Report of the Development dialogue BSc Biology and MSc Biology 09/07/2020

1. Questions in reaction to the panel's report

Here we pose specific questions about the panel's report. Direct quotes (in italics) and page numbers are offered for context.

- Page 10: *"Some assessment methods are underused in the bachelor programme."*

Which assessment methods did the panel specifically have in mind? How can we improve on this point? Why is this a problem? Is it about a balance?

It is always good to have a balance. The panel noticed that in the BSc nine assessment methods are being used. That is fine, but how are they used? There seems to be a difference between the assessments in the first year and other years. The assessments in the first year are mainly on cognitive aspects and some other assessment are not even graded. Why? It could also be graded alphanumeric or like a testimonial. This is a discussion at the moment. Grading practical work could be linked to the way it is assessed in the thesis or internship. Perhaps the covid-19 situation learned how to test cognitive skills in another way than only by a question-exam? Yes, there are experiences with open book exams – with a focus on reasoning instead of knowing.

The discussion continues whether it is always essential to grade something. Although it might not always be essential, for students it is strange being not graded for certain things. Not grading students might gave them more space (or the feeling of more space) to learn and make mistakes. It's about the congruence between learning outcome – didactical method and assessment method.

- Page 11: *"Formulating clearly separate aims for skills training and including direct references to the expected achievement level of graduates would also help to set the intended degree level more transparently apart."*

How can we improve on this point? Can the panel offer insights into best practices? [This refers to the skills performance level document](#). Make the rubric as specific as possible for all learning outcomes, not only for skills.

- Page 14: *"It would be helpful to include a reference to the intended formation level: for the bachelor's programme 'at junior level', for the master's 'at master level (in the chosen specialisation)'."*

How and where can we better define the difference between BSc and MSc levels? Can the panel offer insights into best practices related to clarifying this distinction?

And

Page 14: *"Finally, the panel concluded that skills training, fundamental for differentiating the level of complexity in skills and knowledge achieved in the programmes, is not clearly set apart in the current sets of ILOs."*

Does the panel think that this can be achieved by improving the skills learning trajectory? Or should this recommendation be viewed and handled in a broader sense? If the latter, can the panel provide further guidance?

For the panel it was hard to see the difference between BSc and MSc level; there are 'content' competences and generic competences. For example: the first learning outcomes of the BSc is about *understanding*. But this is even in the MSc an important thing. And vice versa: the MSc learning outcomes contain *critically* discuss, but you might want BSc students to learn that also. Based on the learning outcomes the programme is asking quite a lot of BSc level. To describe the learning outcomes the Bloom taxonomy or the Deming cycle. One of the MSc learning outcomes (to design and plan own learning processes) is almost PhD level. Keep in mind that after finishing a PhD the students is an independent researcher. In general formulating the learning outcomes is hard. All programmes are struggling with that. See it as a whole picture: the competences are the same but the levels differ. Good idea to involve just graduated BSc students in this process – asking them what they have learned? The perspective of students is interesting!

This Is clear now, related to other questions.

- Page 16: *"The panel advises the bachelor's programme to strive for more uniformity in the way in which theses are set up, including clearer guidelines regarding the use and gathering of data from supervisors or own generated data."*

How strictly should we adhere to a single setup for all BSc theses (also see question 1, above)? Should a BSc thesis always include a data collection and analyses? Or is a literature-based study or review also a valid format?

From September onwards there will be a new procedures regarding the thesis. Amongst others the lower marks will be checked more. Is it allowed to have different types of theses?

Start with a definition of what you think a BSc thesis is. What is the aim of the programme? That should be leading. And it then might be an option to extend a thesis (for example with collection of data). If you want students to show that they can work with data, literature research is not sufficient.

At RuG some programmes work with another type of final product than the thesis, for example a website, brochure, animation or e-learning module – all embedded in a scientific perspective. Main question still is: what do you want students to achieve?

- Page 25: *"Other assessment methods, such as the assessment of laboratory/field/computer performance are regularly used, but often do not contribute towards the determination of the final course grade."*

Within Wageningen laboratory/field/computer performance is often evaluated with a testimonial, students can only pass the course if their performance was sufficient. They do not contribute to the calculation of the final mark as it turns out to be hard to mark performance on a 10 point scale. Can the panel provide examples of best practices that we could use to improve this point?

Discussed above.

- Page 25-26 *"It asks the programme to evaluate the position of the assessor, in particular when this daily supervisor is a PhD candidate who also has a relation of dependency towards the chair holder, who is appointed as first assessor. The programme pointed out that the Biology*

team who advise the course coordinator, who in turn functions as the official examiner of the course, play a role in safeguarding the independency of the assessment. It indicated to never have heard of any concerns of junior staff members regarding their position of dependency to the first assessor. The panel asks the programme to clarify the division of tasks in its information on assessment. The division should be: students perform their thesis under a daily supervisor, who can be a PhD student or post-doc. They are assessed by a first assessor, probably here the principle investigator supervising the PhD student and a fully independent examiner who should be appointed by the Biology team and can also be the Biology team member who coordinates the course. Both assessor and examiner need to be staff members, the latter of the WU. The panel sees the involvement of the Biology team as a positive, as this serves as an additional control mechanism. The panel trusts the programme to strike a balance."

And page 26: "It would suggest to make the various roles in assessment more explicit and fully standardised across all Chair Groups, also in the information provided to students in the thesis guide: there should be a daily supervisor, an assessor and a fully independent examiner, who is responsible for the final mark."

Must the first assessor always be different from the daily supervisor, even if the daily supervisor is a not a PhD or postdoc (i.e., is a member of the scientific or teaching staff)? Can the panel provide examples of best practices that we could use to improve on this point?

Daily supervisors give in general a higher grade (one of the reasons is because he/she knows the drafts before and guided the student him/herselves) than an independent examiner (who has a fresh look). But a daily supervisor can grade the daily labwork/process. It also depends on what an how you grade.

When two judgements differ more than 1 or 1,5 point, that is an issue and a third assessor should be asked to take a look.

Options:

- A) The assessor and the examiner (might be from another group but is at least not directly involved with the student – independency is key!)
- B) Supervisor and two examiners (both not involved in supervision, can be from same chair group).

- Page 27: "The panel also found areas for improvement to tighten up the quality control cycle of assessment, specifically at programme level."

We are unsure how to interpret and act on this statement. Should the examining board look more into the programme? Or should the Programme Committee be more involved in the quality control cycle of assessment? Or are there other ways to improve that we are overlooking?

The EB is responsible for the quality control cycle of assessment. The capacity of the EB has expanded; an extra secretary is appointed now. On programme level the EB had a first official meeting with the PC. This will be annual and focuses on the assessment plan of the programme. At this moment adaptations in assessments are discussed with and permitted by the EB and the Board of Education. For practicals there are concerns in case the Corona Measures remain in force. UvA installed separate practical modules during the Academic year where small groups of students can learn practical things which otherwise would be learned

during a specific course. The advice is to determine unique and crucial elements in courses and to think about a solution for that.

2. The PC has repeatedly considered the possibility of increasing the size of the BSc thesis. Such a change would reduce the number of credits allotted to the majors. From the perspective of the PC, an ideal solution would be to give students a choice in the balance between their thesis and their other courses. However, this option is currently precluded by the rules of the Board of Education. What is the view of the panel on allowing students to choose from two EC levels (e.g., 12 or 18) for a BSc thesis?

Small (12 EC) and large (18 EC) BSc theses have different advantages and disadvantages.

12 EC: The biggest problem with a 12 EC thesis is that there is little time for student-directed empirical research. Some theses do involve hands-on work, but in many chair groups, a 2 month thesis is too short for the collection of new data. Twelve EC is the right size to carry out a literature study.

18 EC: With a longer thesis period, more students will be able to collect their own data. However, if all students do this, some chair groups will not be able to handle the number of BSc thesis students. Thus, students will be forced to choose an alternate chair group or to do a 18 EC literature study. Furthermore, a 18 EC BSc thesis will mean less coursework in the BSc Biology programme.

The programme, chair groups, and students value flexibility in the BSc thesis options. Ideally, this means facilitating theses that are focussed on literature review, data analysis, or experimentation/data collection. How should the programme best oversee different types of theses? One option is to maintain the current system (i.e., one course code, one rubric, etc.) and adapt as needed, in agreement between a student and supervisor. Another option is to have specific course codes and rubrics, for example, for 12 EC theses that focus either on literature review or data analysis. Under this model, the latter could be paired with an optional 6 EC course with its own rubric aimed at data collection and practical skills. What does the panel think about these options?

Is discussed above.

3. Sometimes the potential barriers of scheduling conflicts and finances are avoided, and we are presented with opportunities to add new courses to the Biology programmes. However, adding new courses changes the nature of a programme in different ways, for example, greater customization comes at the expense of standardization of experiences and knowledge. Which criteria should be considered when determining which courses to include in a programme?

Increasing the number of courses in a programme increases the breadth and diversity of that programme. However, increasing the number of courses can also dilute the programme and reduce shared experiences among students. Furthermore, problems can arise from giving students too much choice (e.g., a disjointed study plan). The Programme Committee is interested in feedback on how to strike the best balance in terms of programme offerings.

You have to define (and be critical) about what Biology is. More diversity for students might be interesting but is it in the end still a Biology programme?

In Utrecht 135ECTS cover the Biology programme in fact. The other 45ECTS are up to the student. Having new courses is good, but it should be evaluated: does it add something? What is the quality? Is there overlap with other courses? Define criteria as a Programme to check the courses. Students don't see the difference between funded courses or not funded courses. Communicate to students what the biology programme is.

4. Compared to most study programmes at WUR, Biology emphasizes fundamental science. However, compared to other Biology programmes in the Netherlands, Biology at WUR has a stronger applied dimension. How can this unique position of Biology at WUR be best exploited to ensure our students are optimally prepared for the job market?

At WUR, many courses focus on fundamental topics in biology; however, some courses focus more on application of biological concepts. Students can gain further exposure to both fundamental and applied dimensions of biology during their thesis and internship. The shared focus on both of these dimensions is a strength of the WUR Biology programme. Nevertheless, one point of attention from student evaluations relates to their perceptions of their preparation for the job market. The Programme Committee is interested in feedback on how to best exploit our unique position to optimally prepare students for the job market.

- ➔ It should be clear about what is Biology (but it is indeed difficult to define).
- ➔ Profile yourself within the (applied) context Wageningen offers.
- ➔ The Study advisor can help students by offering a more applied perspective (if necessary but students seem to know this very well) – but the core is fundamental biology. Be aware that a job out of university might ask more applied knowledge/skills.

So it is a good option that there is so many too choose but it is also sometimes hard to choose. The perspective of the job the student is trained for, might help a little. A BSc internship can be very valuable for student to discover if they prefer a fundamental or applied career. But again; a definition of the core of the Biology programme might help. Now it is so general that it does not say anything.

5. Since the last visitation, the setup of the MSc programme has changed in several areas. Most notably, the specializations have been streamlined and new data science courses have been realized. How does the panel view these changes and the new setup of the MSc programme? How can this programme be improved further?

The setup of the master has changed in several areas. Firstly, we now have four specialisations. Each specialisation consists of two courses, an internship, and a thesis. In one course, students go through an entire research cycle; in the other, students sharpen their analytical skills. The goal of these two courses is to guarantee that students are prepared for doing their own research during their thesis and internship. These changes were made for two reasons. Previously, the differences among specializations were not always clear to students. Furthermore, in the old programme, not every student went through an entire cycle of research in her or his specialisation before taking on an independent research project.

Secondly, several optional courses on data science have been added to the common part of the MSc programme (Table 1). Students can integrate knowledge from these courses later in their programme, including in their thesis and internship. This change was made to facilitate

students wishing to develop their quantitative skills in a rapidly developing area of biology that is of interest to many potential employers.

Table 1: An overview of the optional data science courses in the programme

Course code	Course name
MAT-20306	Advanced Statistics
INF-34306	Data Science Concepts
MAT-32806	Statistics for Data Scientists
REG-33806	Data Science for Ecology
CPT-30503	Data Science Ethics
BIF-31806	Data-Driven Discovery in the Life Sciences: Hypothesis Generation from Omics Data

Current lecturers are no data science experts. In general there are no sufficient data scientist. The programmes did a great job having this courses already available. Next step is to improve it the coming years and to discuss about implementing it in the programmes. It might be an option to hire data scientists for other courses? For these scientists it might be interesting also to involve them in Biology-courses; working with new datasets, different challenges.

6. In addition to the full courses outlined above, another way to expose more students to data science may be by incorporating the topic into existing biology courses. However, many teachers have not been explicitly trained in data science, making this possibility more difficult to realize. Does the panel think such an approach is worth pursuing? Can the panel offer advice on best practices on this topic?

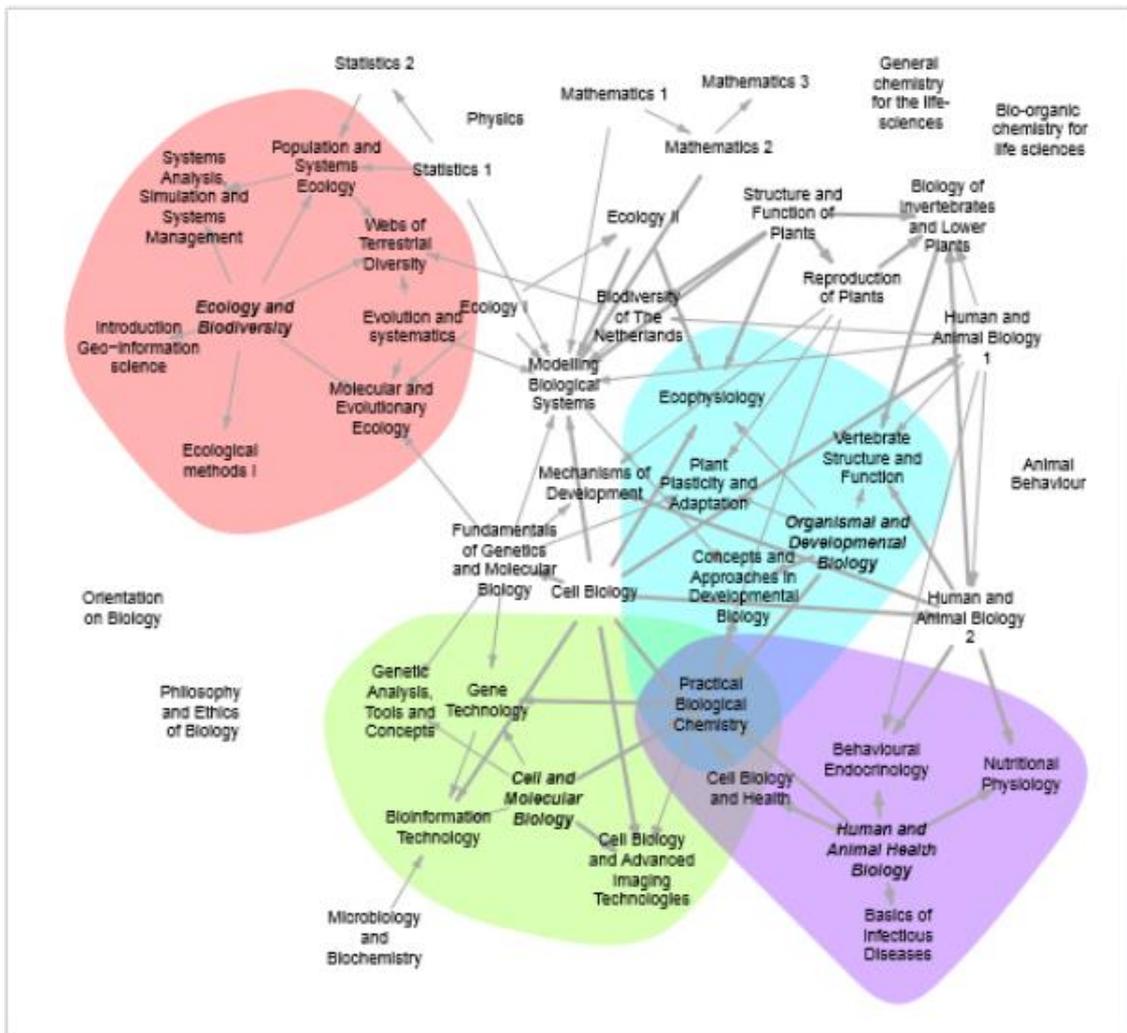
Many biology students may be unfamiliar with concept of data science and its relevance in biology. Exposure to data science in the context of other courses may help drive interest in this topic and in the more specialised data science courses in the Biology programme (Table 1). Ultimately the goal is to ensure students are well informed about cutting edge topics in biology.

Discussed above

7. Learning trajectories are an important aspect of the Biology programme. Can the panel offer advice on best practices related to setting up learning trajectories? How can learning trajectories be best documented and communicated?

The learning trajectories in the Biology programme are very interwoven (Figure 1). Only a few subjects are a part of a clear line of courses; most are interconnected to different courses in different ways. This interconnectedness presents a challenge when communicating about the programme and its trajectories with students and staff. The Programme Committee is interested maximizing the utility and transparency of the different learning trajectories.

Figure 1: Flowchart showing possible progressions through courses in the Biology programme. (courses and specialisations)



How to set up learning trajectories?

University Utrecht works with “zichtbare leerlijnen” – a way of visualisation of learning trajectories. <https://www.uu.nl/onderwijs/leerlijnen/doel-leerlijntool> - a suggestion is to visit UU or UvA to be informed/inspired about their learning trajectories.

Define with the programme team which learning trajectories can be defined. And how many learning trajectories are intended? What is your vision of them? Are the learning lines about a topic/knowledge (contentlevel), skills and/or competences? Each trajectory should have its own learning outcomes and aim and exists of different levels. In the visual of WU (figure 1) is the level of the course not visible. Can courses be distinguished in level 1/2/3?

UvA had 6 learning trajectories. One was a founding trajectory; the basis in year one. Each trajectory has two coordinators. The coordinators form a team together to discuss it with the programme team.

8. Currently the examining board conducts extensive chair group visits, in which all subjects are discussed; however, this setup is time and resource demanding. An alternative aimed at increasing the frequency of chair group visits could be more-focussed thematic visits (e.g., one on theses, others on introductory-level courses, internships, etc.). What are the pros and cons that the panel sees with such a change?

Examining boards have many important responsibilities, including visiting the chair groups. The examining board uses these visits to evaluate and discuss many subjects, such as courses, theses, and internships. Because the preparation for visits is time consuming for all involved parties, a new "thematic" setup is being discussed. The intention is that the new thematic setup would reduce preparation time. During each visit fewer subjects would be discussed, but the frequency of visits would increase. The Programme Committee is interested in feedback on how to best balance the trade-off between frequency and thoroughness of visits, in light of the limitations on time and other resources of members of the examining boards and the chair groups.

Visiting the chair groups more frequently makes really sense. More close contact, by a meeting every year, is a good idea. If capacity and resources permit this. This can be about specific themes and also is an opportunity to discuss relevant signals about assessment quality or in case something burns up. More contact will make the contact in between meetings even more easy.

The EB could ask other colleagues (non-EB) to help them with the (preparation of) the visits. For example by assessing samples of theses or assessments. This does take place now.

The programme director visits all chair groups each year (40 visits). That is good but causes maybe also a high burden. Is visiting the chair groups on department level an option? No. Try to divide tasks where it is possible. Maybe a team of people can be formed to share the task of the visits.