Assignment 11 - Final Reflection Report

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Reflections

Learning Objective 1: Lecturing/teaching

> The participant performs a lesson on the basis of a lesson preparation form, in such a way that he (sic) addresses strengths and executes actions for improvement.

With regards to LO1, I had never prepared a lesson preparation form before this class, it was not a skill I'd exercised, nor had I ever seen a lesson preparation form in real life! Over the course of this module I think my skills in that activity have significantly improved, now I can construct a useful lesson preparation form which can be re-used by other teachers which accurately tracks what learning objectives students are working towards in each portion of the class and which of the Revised Bloom's taxonomy areas that task is exercising. I feel much more confident in this task now and I think the product I've produced has improved at each stage of this module as I had to produce more and more lesson preparation forms.

Here is a comparison of lesson objectives I wrote at the start, and end, of this module

Before	After
Create a "course" object in CoCalc to learn this alternative system for classroom management	LO1: Compute multiple whole genome assemblies in such a way to develop big data processing skills (Apply+Procedural)
Create an assignment to further developer R skills of previous lessons	LO2: Learn to evaluate quality metrics so that they can separate good and bad assemblies (Analyse+Conceptual, Evaluate+Procedural)
Auto-grade the assignment to introduce a new feature of this digital classroom which allows for more automation and saves them time.	LO3: Visualise assemblies so that they understand presentation of various failure modes (Apply+Procedural, Evaluate+Conceptual)

Likewise, my lesson plans improved significantly as well:

Section	Before	After
Schedule	30 min	"Cold Open" 20 minutes
Content	What is CoCalc recap / What can it do	We'll begin with the assembly exercise, students given either paper or digital pieces of paper that they need to re-assemble into their original sentence. Some will have mistakes or low coverage portions so they can make some guesses
Teacher	Presentation on CoCalc	Activity introduction, Observation
Student	Introductions, Listening, Questioning	Students will apply existing knowledge from e.g. legpuzzel solving to assemble the sentences
Justify	Students need to reactivate their knowledge from the previous lesson of how R works.	This goes towards **LO1**, learning about the procedure of whole genome assembly by giving them a fun introductory activity where they can transition from excitement of being in the class to a critical thinking state and begin to *Apply+Procedural* an algorithm and begin to *Analyze+Understand* the algorithm they're making intuitively.

I think from this it's clear my lesson plans have improved significantly from their first iteration, based on the feedback of everyone involved.

Learning Objective 2: Supporting students

> The participant supports students in educational activities in such a way that it encourages them to learn activities.

I worry here I have only become marginally better, as I have not found concrete ways to shift student motivations past "well it affects my grade". As excited as I am about the power of the skills I teach in my classes, the students lack real world problem applications and as such cannot feel the same motivation.

I have learned to develop more engaging lessons, especially through the tip of varying work styles every 7-15 minutes as student attention wanes, using more modes of engaging the students. However this again

has been constrained by real world practicalities–some work modes are simply inappropriate for the lesson–it's hard to have students write an essay on how they feel about a programming language, it does not further their understanding. So it's a new challenge for me to find engaging and varied work forms that are appropriate to the lesson material, and fit within the time constraints.

Learning Objective 3: Designing education

> The participant (re)designs an educational activity, in such a way that it can be performed

I think this was my favourite part of the class by a wide margin; the lessons I teach need a lot of improvement and this class provided dedicated time to work on that *and* research the optimal way to do that. I learned a lot about computer science teaching methodology and the existing body of research investigating this topic in detail. I got to practice those techniques in my classes, to great effect and very positive student feedback. It gave me time and space to identify weak points in the lessons and consider how I would fix those, I only wish I had time to implement the changes, something that could have been done in a similar amount of time to the required report, and would have resulted in a significant improvement for students.

Learning Objective 4: Professional lectureship

> The participant reflects on his teaching position in such a way he (sic) identifies his (sic) strengths and development points

Since the start of the module I've become a lot stronger in rigorous lesson design, applying Bloom's taxonomy to my learning objectives, and breaking up lessons into smaller, more bite-sized chunks for students, to keep their energy levels up. Unfortunately, as I expressed on the first day, I'm weak in overall course design–connecting these lessons together to form a greater whole, and on that topic I haven't progressed due to the nature of this course. That said, this course has given me ideas for more interactive activities I can do with my students and I suspect they'll benefit from that.

Future Improvements

In the near future I will be working to

1. Develop more interactive activities for students. These should help students engage better with the material, for students with different learning preferences or styles.
2. Redesign more lessons, in order to break them up into smaller chunks, and keep student attention high throughout the lesson.
3. Produce more lesson preparation forms to go along with our existing lessons, where they're currently missing.

For item 1 above, I'm specifically excited about two activities I have in mind. First an interactive assembly activity where students replicate

the assembly process done by computers in genomics, but by hand and on paper. Here they get to work together with friends to solve a puzzle, exactly like the computer does. I expect it will make that lesson significantly more engaging and exciting for them to compete with each other. And for the second, I plan to make their formative assessments a bit more (anonymously) competitive so that they can see how their solution performs (in terms of memory and computation time) compared to other students. I hope this will give the competitive students motivation to improve their solutions and find better options.

Feedback Received

I received a lot of good feedback throughout this module which I will summarise here

- Apologise less, once is enough.
- Use 3C learning objectives as LO context is important.
- Include Do's and Don't's when discussing new techniques, to help other teachers and yourself later.
- Include more graphics to help convey meaning, not everyone can read the text and find it sufficient.
- Consider the audience, some terms need elaboration and explanation if they're consumed by a broader audience (e.g. BDB reviewers.)
- "Can you help your friend", get students to help each other if one is stuck.

This feedback came over the course of both lessons and peer-feedback reports and I've found very useful as each assignment passed. Early feedback from Widya had a significant improvement on my lesson preparation forms, while Titia's comments on teaching reminder me to be more confident in myself and my process. Reamflar's reports gave me inspiration for improvements and a reminder that I was writing in an overly insular and inaccessible way, something I do not want! Lastly observing Franca's lesson was instrumental in improving my own and learning new ways to engage with students.