Some Thoughts on Graduate Trainee Competencies

Nicola De Zanche: dezanche@ualberta.ca

In response to the increasing desire to develop learning outcomes for graduate programs (e.g., https://cloudfront.ualberta.ca/-/media/gradstudies/programs/learning-outcomes/110c-fgsr-council-may-2019--learning-outcomes-report-v2.pdf) I have assembled the following list of abilities and tasks that I believe a successful trainee should be able to perform independently. They capture the essential skills of a competent graduate at each stage of the academic career in my research program. To achieve these goals the university, instructors, and the trainee's supervisor are responsible for providing instruction, mentorship and assistance to the trainee.

1. MSc (guided research)

An MSc graduate must:

- □ have solid grasp of the fundamentals
- □ perform a comprehensive literature search
- □ explain the role of his/her research in the broader context
- □ maintain an organized and complete lab notebook following institutional or lab guidelines
- □ follow supervisor's guidance
- □ report periodically to the supervisor on the research and students' other activities
- □ manage time efficiently
- □ complete tasks on time
- □ acquire, analyze, present and soundly interpret experimental data
- □ have advanced knowledge of scientific computing platforms and operating systems
- □ have advanced knowledge of appropriate instruments, software, programming languages, etc.
- □ communicate effectively orally and in writing
- □ organize and deliver scientific presentations
- □ maintain ethical and professional conduct
- □ assist with supervision of undergraduate students

2. PhD (independent research)

A PhD graduate must be able to do all of the above plus:

- □ identify and develop an original research direction independently
- □ have command of the relevant research literature
- □ become an expert in the field
- □ work independently
- □ provide detailed constructive criticism and review of others' work (e.g., review for journals)
- □ have expert knowledge of scientific computing platforms and operating systems
- □ have expert knowledge of appropriate instruments, software, programming languages, etc.
- □ assist with instruction of a course or lab
- □ assist with supervision junior graduate students

3. PDF

A post-doctoral fellow must be able to do all of the above plus:

- □ write research grant proposals
- □ manage a research lab
- □ supervise graduate students
- □ design and deliver a course or lab

4. License

This work is licensed under the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License. To view a copy of this license, visit http://creativecommons.org/licenses/by-nc-sa/4.0/ or send a letter to Creative Commons, PO Box 1866, Mountain View, CA 94042, USA.