Geophysics Curriculum Questionnaire Results

The event was the BC Geophysical Society's "Symposium: Geophysics in 3D", attended by approximately 50 people, including six academics from UBC (2 professors and ~4 students) and about 45 industry professionals, mostly (although not all) from Vancouver.

I had about 5 minutes to outline CWSEI and EOS course and curriculum reform work (no slides, just talk). This resulted in about 10 minutes of discussion, followed by handing out the one page questionnaire to everyone. This included 8 questions as follows (name was optional):

1. What is your current job description?
2. How long have you been practicing as a geoscience professional?
3. What subjects or activities from your university days have you found MOST useful?
4. Are there any subjects or activities that you feel were a waste of time?

If you were about to hire a recent B.Sc. graduate into a geophysics position…

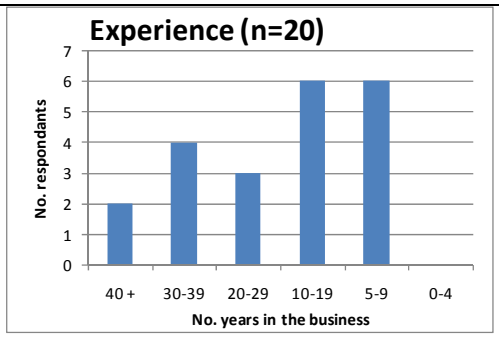
5. What technical skills and knowledge (geophysics, geology, math, computing, etc.) are currently most important? Please be as specific as possible. (Continue on reverse if needed.)
6. What general skills and knowledge (writing, business, team-working, etc) are currently most important?
7. What new skills, knowledge or abilities do you think graduates will need in the near future?
8. Do you have any other ideas about what a dynamic, flexible B.Sc. geosciences (especially geophysics) curriculum should include or look like?

Twenty one responses were obtained from the roughly 40 (non-student) attendants at the meeting, ranging from one or two word answers to a 270-word response to question 8. These people are all doing geophysics specifically for minerals exploration. There were few involved in geotechnical work, and fewer working in petroleum exploration.

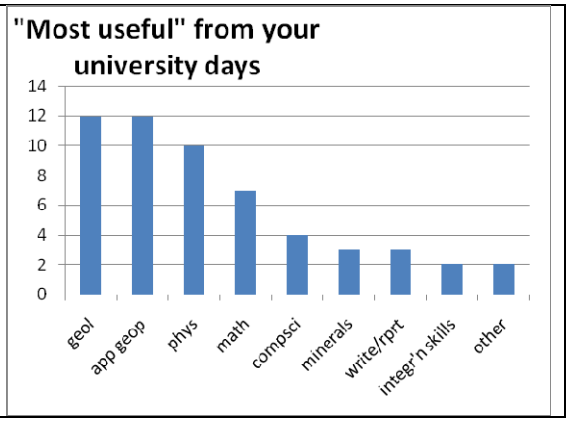
Results for questions 2 through 8 are summarized after coding responses in terms of categories shown on the horizontal axis of figures. No discussion of implications is included in this summary – it only presents the data.

All ideas offered in response to question 8 (ideas for curriculum) are also listed on the last page.
Note if there are questions or concerns about categorization or summarizing, the raw data can be provided. Please contact fjones@eos.ubc.ca.

2. How long have you been practicing as a geoscience professional?



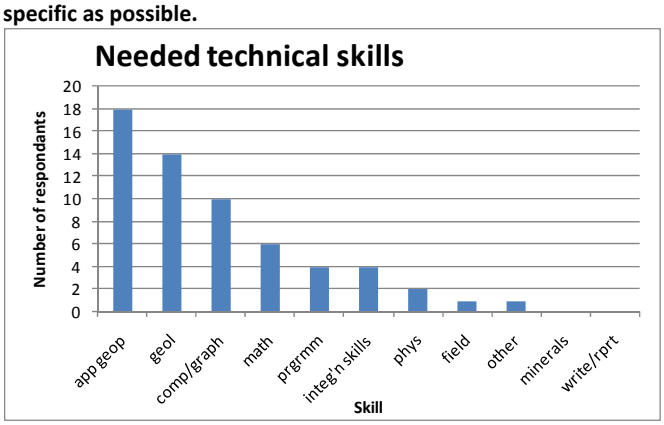
3. What subjects or activities from your university days have you found MOST useful?



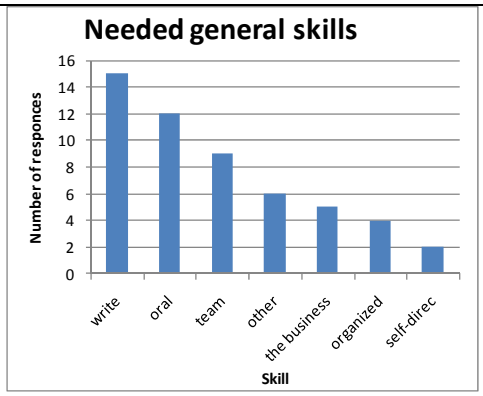
4. What subjects or activities do you feel were a waste of time?

- paleontology
- n-dimensional math
- some engineering courses
- paleontology, astronomy, glaciology
- modern physics
- yes, but due to bad teaching
- learning obsolete technologies, sftwr & programming languages.
- computer science introduction
- required, first yr introductory geography courses
- seismic processing, geophysics field school (better survey experience in summer jobs), optical crystallography, mineralogy, paleontology
- no, not even chemistry and world affairs -> they are all valuable
- Not particularly, however, space plasma physics as an elective was interesting, but not applicable to what I chose to do
- no, none, or blank = 9

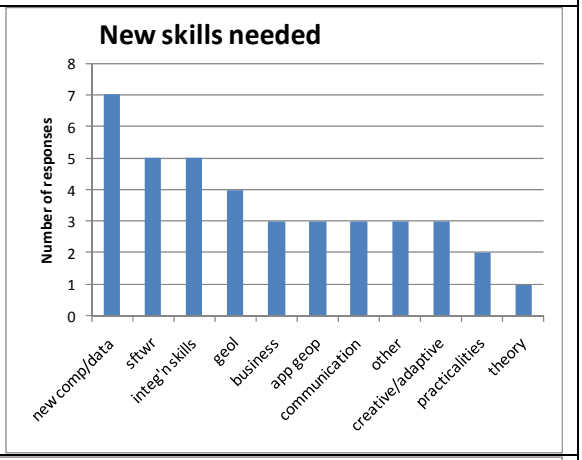
5. What technical skills and knowledge (geophysics, geology, math, computing, etc.) are currently most important? Please be as specific as possible.



6. What general skills and knowledge (writing, business, team-working, etc) are currently most important?

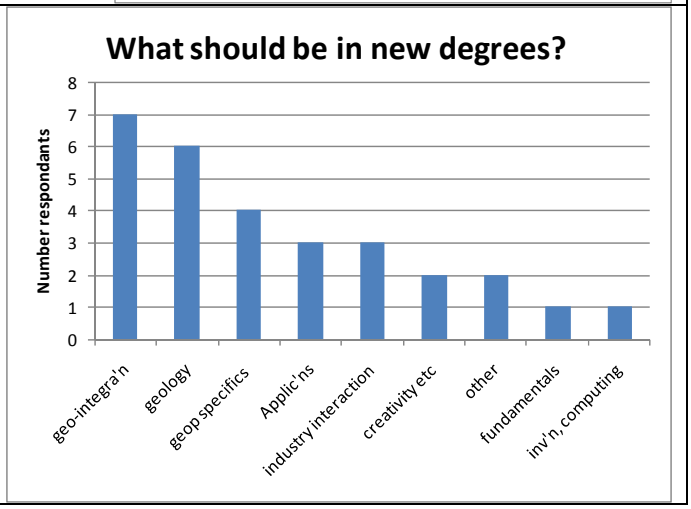


7. What new skills, know-ledge or abilities do you think graduates will need in the near future?



8. Do you have any other ideas about what a dynamic, flexible B.Sc. geosciences (especially geophysics) curriculum should include or look like?

Notes:
- "Geo-integra'n" means integration of geoscience & exploration concepts.
- "Applic'ns" means applications – generally means providing more opportunities to practice on real data and exploration situations.



COMPLETE Q. 8:
Do you have any other ideas about what a dynamic, flexible B.Sc. geosciences (especially geophysics) curriculum should include or look like?

- I think it is important to focus on a solid background. Industry trends come and go but fundamentals remain pretty well the same.
- Conventional "university" tends to "conform". Add "creative thinking". Constrained only by wise forward thinking professors and advisors.
- More hands-on application of theory using common software (see comment), solving real world problems.
    - examples: Use publically available geophysics data to illustrate IVD, AS, TDR, RTP, etc.
    - Or invert available data like geoscience BC data and integrate with geology to develop understanding of a given area, or develop targets for followup.
- Need more up to date text books for geophysics or leading edge learning materials.
- Stress geology first, then geophysics, or at least offer this as a stream or option
- More course options for students; students need some advice for choosing major or curriculum
- no idea
- These should contain a significant portion of geology,
- specific derivation of commonly used geophysical filters (asig, AGC, hgrad, …)
- rock property data (to be able to model a specific mineral body in all geophysical fields),
- geophysical signatures of deposits!!!)
- For a geophysicist, geology is critically important; understanding of geological processes - ore, structures.
- it needs to include geology because our patrons are geologsits who need to have their geologic problems solved.
- It requires computer modelling and inversion theory given it's importance in imaging.
- more practical applications - surveying, familiarization with equipemnt; software use;
- correlation between geology & geophysics
- possible intro to stress modelling and fluid flow
- It should provide better integration with industry through placements / internships, etc. but we need to make it easy for companies to participate. For us now it is a resources sink as we have to educate new people.
- Co-ops. This will be easier in some areas than others.
    - For example, summer work in data acquisition is easier than trying to get useful inversion work out of someone in 2-4 months of training (unless they had a good understanding of inversion theory to begin with).
- I believe that all geophysicists should spend a good amount of time collecting data in order to gain a sense of what constitutes good vs. bad data in the real world. Data is the basis of everything else we do and graduates must know how to collect good data.
- Training of geologists in the use of geophysical tools and methods with a focus that is on the geological interpretation rather (than has been the case in the past) than on the technical / mathematical aspects.
    - Geologists in future will be using very technical applications as part of larger software packages, where a general understanding of methods will be required, when balanced with a diverse range of skills & knowledge.
- Diversity and integration - specialists are important, but diversity of knowledge and an ability to integrate multiple types / sources of information is now becoming recognized as lacking in the geoscience community.
    - University faculties have tended to perpetuate the "specialists" problem by hiring specialist faculty. Let me propose a new specialist "integration specialist".
- Core areas (computer programming, math, physics, chem, etc) should be taught in an applied way, with courses designed specifically for geoscientists.
    - For example, learning how to program in "C" for it's own sake can be uninteresting and lack purpose. However, if students are taught how to program to solve a geological problem (from say field school) then excellent / interesting / meaningful.
- There has been a tendency for a lack of integration of courses, eg structural geology, petrology, etc. are often taught independently.
    - Enhance the bridging of courses and create a system of gradual complimentary development in each subject area.
- NOTE these comments come from my own perspective from having been a student, research and teacher. I however have no specific knowledge of the state of courses at UBC, which may already address the issues above.
- BSc geosciences (mention geophysics), sub-mention minerals exploration