

Impact of inclusive field trips

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The geosciences benefit from diverse student perspectives and backgrounds, but the field-based learning requirements pose barriers to students with disabilities. If carefully designed, fieldwork can be made accessible while still meeting expectations of academic rigour.

The geosciences pose many academic challenges. However, for students with disabilities, the requirement to undertake fieldwork can present additional physical and psychological barriers to engagement and inclusion. There are two important reasons to address these barriers for students with disabilities. First, all fields of expertise, including the geosciences, are strengthened by diversity. Innovation can be bolstered through diverse perspective: if all practitioners have similar perspectives, scientific progress becomes stagnant and potentially limited. Second, the geosciences are facing a workforce shortage. According to the American Geosciences Institute, nearly half of the current workforce is expected to retire over the next decade in the USA^{1,2}. It is unclear how many of these positions would require field-based learning experiences and would be accessible to graduates of all abilities. However, many geoscience positions in fields such as geophysics and planetary geology would require little accommodation and are accessible to a wider variety of students than typically assumed. Therefore students that are academically capable should be encouraged to study geoscience.

Barriers to inclusion

Field-based experiences are an important component of geoscience education³⁻⁵. However, physically rigorous field-based experiences often marginalize individuals with physical and sensory disabilities. Opportunities for alternative field experiences, such as real-time telepresence and virtual fieldwork, do exist⁶⁻¹⁰; however, there is no definitive substitute for first-hand experience of the natural environment. Given the clearly recognized workforce need, discouraging participation or creating barriers for learners with disabilities interested in becoming geoscientists is counterintuitive. Making fieldwork accessible would allow instructors to focus on the intellectual talents of everyone, regardless of their physical abilities, and thus encourage more students to view the geosciences as a viable career option.

To this end, we developed a fully accessible field course, which we ran during the 2014 Geological Society of America annual meeting in Vancouver, British Columbia (<http://www.theiagd.org/2014-field-course/>). Thirty academic instructors and students from first year to graduate level took part in this one-day trip. Of these participants, 18 identified as having one or more of a variety of physical, sensory or cognitive disabilities. We interviewed the participants before and after the event to assess the experiences of learners with disabilities while engaging with fieldwork (Box 1).

Students with disabilities feel concerns about fieldwork prior to and during university¹¹, and also report feelings of exclusion^{12,13}. There is also a perception in the geoscience community that students with disabilities are actively discouraged from participating in geoscience¹⁴. Participants in the accessible field course we ran in conjunction with the Geological Society of America meeting reported encountering similar attitudes. For example, statements such as, “I still feel

like, potentially, people are not encouraged to do things like the geological sciences, which has a long history of being physically demanding,” were common.

Impacts on participation

The accounts of previous fieldwork undertaken through universities in North America recounted by participants in the accessible field course revealed feelings of exclusion and concern to be commonplace: “Sometimes [fieldwork] can be intimidating, especially when folks are gung ho and they run up the mountain, and it may seem that you’re just stuck there sitting back saying ‘what just happened?’ You know, no one talked to you, where the hell is everybody?”

Students participating in our accessible field course were most interested in the opportunity to experience fieldwork in which their limitations had been fully considered. In contrast to the students’ previous fieldwork experiences, this course was designed to accommodate a wide variety of physical sensory and cognitive disabilities. It was also designed to encourage participants to consider other people’s



Box 1 | Participant feedback before and after the field experience.**Student experiences of perceptions of accessibility and standard field experiences:**

“It’s exhausting going through school having been questioned so many times about why I was making the choices I was making [to go into science], and why I wanted to work hard, to the point that [I thought] I must be giving the wrong answer.”

“It stopped making sense to go to field and see something that I don’t understand. I swapped my career from geology to geophysics. Because in geophysics all I have to do is collect the data and model them, based on my interpretations.”

“Field camp is a requirement for my undergraduate and I am scared to go to field camp.”

Participant perceptions of the inclusively designed field experience:

“I came into it thinking, very selfishly, they’re all going to be physically disabled, so you’re gonna make it physically accessible for me — because that’s the

world I live in, right? That’s my main limitation. I didn’t think about cognitive limitations, I didn’t think about visual impairments — I didn’t think about any of that. I thought ‘oh, this is for physically disabled people’. And then I get there, and people have much more diverse limitations than I had ever considered.”

“It was an even playing field for everybody. That day there were no disabilities. Everybody was on the same page, and we were all equal.”

“It’s really interesting to see that, like — just even, like, the change of pace and questions that were asked helped accommodate for all types of disabilities.”

“I guess I really needed this trip to be this weekend, because I got a whole boost of confidence, and I got a new direction and new passion for what I’m going to be doing.”

“It was also really nice that clearly the geology and the education part of it did not suffer.”

abilities in the field environment. Students and faculty were paired together such that at least one partner in each pair had a disability of some kind. Care was taken to introduce the partners and give the participants time to get to know each other and overcome social barriers. As a result of the unique learning community that developed, participants learned how others experienced fieldwork through perspectives that were often very different from their own. The impact of these design features on the students’ experiences was readily apparent.

Maintaining academic rigour

Field-based learning that is inclusively designed has the direct benefit of developing a community feeling that is focused on content while being open and accepting of everyone’s (dis)abilities. The adaptations made for the Vancouver field course relative to previous field courses run in this area were not extensive. We used alternative materials, such as tactile maps and audio

field guides and teaching to accommodate a variety of disabilities. We also began the trip with discussion of expectations and engaged in explicit community development to help create a supportive environment within the group. Finally, we reduced the physical barriers, for example, by selecting locations that could accommodate an accessible bus. The trip was less physically rigorous than many standard field trips, but we ensured that the academic rigour did not suffer, for instance, by partnering the participants and tailoring activities and questions to ensure maximum engagement at each stop.

A valuable outcome of this trip is the vibrant and experienced learning community it has created. Students found the experience to be positive and encouraging. Finally, one participant told us, “I know that field geology can be amazingly accessible. I loved the fact that different people were able to experience geology in their own way, and that can be — that was — quite self-fulfilling as well.” Several

of the participants continue to be actively involved in the geoscience community and are advocating for the development of more accessible field-based learning opportunities.

The future of inclusivity

Awareness of accessible and inclusive opportunities in the geosciences is building: the American Geosciences Institute recently published a statement on access and inclusion; the Geological Society of London signed a declaration on diversity, equality and inclusion with other learned societies in the UK’s Science Council; and the Geological Society of America is actively supporting diverse students’ attendance at their meetings through the On To The Future programme.

Information on joining this growing community can be found at www.TheIAGD.org. For assistance in making your trips, classrooms and workspaces more inclusive, please contact info@theiagd.org. □

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