Department of Earth, Ocean & Atmospheric Sciences

Designing field learning experiences with the end in mind: A reflection and planning tool for instructors

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Context

This tool was collaboratively produced in the context of Earth Science Experiential and Indigenous Learning (EaSEIL), a faculty and curriculum development initiative seeking to (re)imagine and (re)design field-learning experiences in science courses at the University of British Columbia (Lukes et al., 2022). Among other topics, instructors (16, from 6 disciplines) in the EaSEIL Community of Practice (CoP) engaged in discussions exploring the definitions of field-based learning and why they engage their students with field-based learning activities. This tool was developed to foster and facilitate instructors' self-reflection and community discussions about instructors' goals in designing their field course activities, answering two essential curriculum design questions: **What do you want your students to be able to know or do by the end of this activity/course? Do you tell them that?**

Tool Design

Theoretically informed by:

- "4A's Framework of course design" (Alexander & Fink)
- "aligned course design" (Biggs & Tang, 2011)
- 'backwards design' approach to design (Wiggins & McTighe)

Activity informed by:

- Prior faculty development practices by authors

Content informed (and limited) by:

- EaSEIL course syllabi
- NAGT Field Experiences Working Group
- Developing a Framework for Effective Field & Virtual Capstone Programs Workshop (Rademacher & Burmeister, 2020)

Figure 1: 4A's Framework of Course Design (Alexander & Fink)

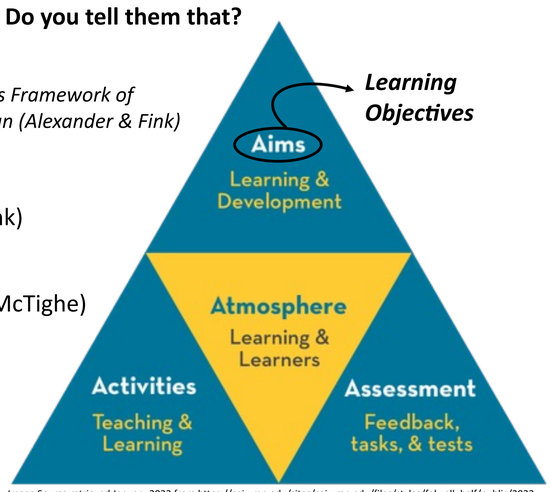


Image Source retrieved January 2023 from https://cei.umn.edu/sites/cei.umn.edu/files/styles/folwell_half/public/2022-04/alignedcoursedesigntriangle_1%20%281%29.png?itok=eUFsf2O9

Tool Development

This tool is iteratively designed and refined by user and practitioner feedback.

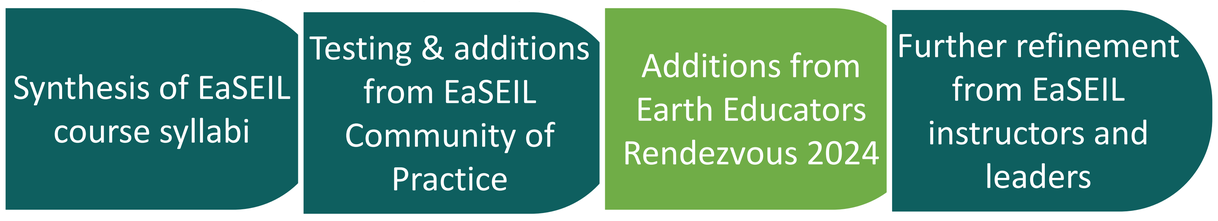


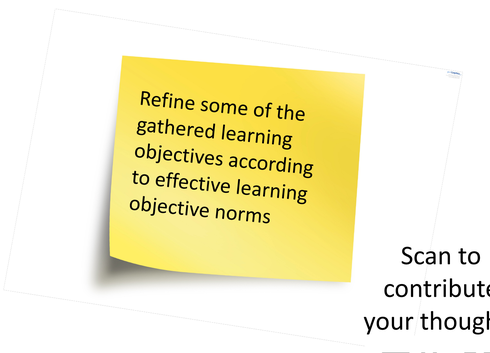
Figure 2: Iterative Design of the Tool

Tool Uses

Tool supports instructors' self-reflection on their course design and transparency of design for students; can be used individually, 1-1 or small group pedagogical coaching, curriculum design workshops. Opens space to also discuss how to write effective learning objectives.

What learning objectives would you add or modify?

We invite you to please add your thoughts by adding post it notes below or commenting via our online form.



Scan to contribute your thoughts

Acknowledgements

The work leading to this document primarily takes place on the traditional, ancestral, and unceded territory of the xʷməθkʷəy̓əm (Musqueam) at UBCPoint Grey campus in what today is called Vancouver, Canada. The authors acknowledge the connection that Musqueam have had over time with the lands and waters throughout their territory as essential to their culture, knowledges, ways of being and practices, as well as a source for teaching and learning.

Contributors: EaSEIL instructors and partners who provided feedback; syllabi shared by Roger Beckie, Mitch D'Arcy, Brett Gilley, Nina Hewitt, Suzie Lavalle and Maite Maldonado

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"The Tool"

Summary of Learning Objectives for Courses Taking Students on the Land to Learn *[Prepared by L. Lukes, Sept. 2022]*

This list is a summary of generalized learning objectives identified from across 6 UBC science field course syllabi (or courses that include components in which students notably interact with the Land) associated with the Earth Science Experiential and Indigenous Learning (EaSEIL) project. Some learning objectives are unique to individual courses and some are common across 2 or more courses. This list illustrates the wide range of goals for learning on the Land, but is in no way exhaustive. It represents one moment in time for a small set of courses from a set of incomplete/non-comprehensive course artifacts. [A single course is NOT intended to include all of these.]

Directions:

1. Read the list of objectives and identify the ones that resonate with your objectives for activities involving field sites or data from field sites.
2. Put an "E" next to goals you explicitly tell your students are key learning objectives and put an "I" next to those that are goals, but are implicit (you don't directly tell them this is a goal and/or don't assess them on it).
3. Put a star next to any that you want to think about more or are considering adding or shifting from implicit to explicit.
4. **What do you notice is missing from this list? What would you add?**

Category	Generalized learning objective
General Knowledge about Working in Field Settings	1. Explain how these activities count as 'approved' or recognized field work experience in your discipline (e.g., certification/licensure)
	2. Describe appropriate field safety procedures
	3. Conduct/implement proper field safety protocols
	4. List stakeholders and/or describe major ethical considerations of assessing land/field sites for field work
	5. Practice professionalism and 'best and ethical practices' in the field sites for discipline
	6. Demonstrate general professionalism at field sites/conducting field studies (e.g., showing up on time, having equipment, running safety checks, active engagement)
	7. Describe a diversity of approaches/different positionalities with regards to designing and conducting field work, using equipment, etc. (e.g., guest experts sharing their take on course-related content and skills)
	8. Conduct field work and field data analysis with humility
	9. Describe the history of technologies/tools/techniques and/or approaches in field studies and activities at field sites
	10. Identify what types of data are collected and why in field settings in your discipline and explain why/what they can be used for
General Geography & Science Skills	11. Use positioning or navigation tools to yield a global position
	12. Read maps (e.g., topographic, geologic, ecologic)
	13. Interpret maps
	14. Locate/situate field site(s) on maps
	15. Create digital versions of field site(s)
	16. Practice spatial thinking skills: constructing mental models of physically observable and imagined surfaces, etc.
	17. Describe/explain research as a process
	18. Describe/explain systems thinking
Field Study Design Skills	19. Develop a research question or hypothesis
	20. Determine data sources needed and equipment needed to collect data
	21. Design a field study: identifying appropriate field site(s) and sampling techniques
	22. Design a field study: how to analyze data
	23. Iterate on design in response to changing conditions or new information
Field Skills	24. Navigate and position oneself at field site(s)
	25. Make observations of field site(s), field conditions, or samples at field site
	26. Install and/or calibrate field equipment
	27. Use instruments to take measurements/collect data at field site(s) using analog tools
	28. Use instruments to take measurements/collect data at field site(s) using digital tools
	29. Collect data under unstable, adverse or challenging conditions (managing and mitigating risks)
	30. Record field data on paper according to disciplinary norms (e.g., field notebooks)
	31. Record field data using digital recording systems according to disciplinary norms
	32. Survey field site(s)
	33. Create a draft map of field site(s) while on site
	34. Conduct field skills or lab skills in field quickly or demonstrate time management to achieve data collection goals in field sites [limited field access]
	35. Relate theory and conceptual knowledge to physical observations or experiences at site
	36. Apply lab skills at field site in real time
	37. Implement a study/sampling plan for field site(s)
Lab Skills	38. Describe and practice proper lab safety: Chemical use
	39. Process samples using disciplinary lab equipment
	40. Record lab processes & data from samples collected in field site(s) according to disciplinary norms
	41. Translate/transfer written field notebook data into software systems
	42. Correct and reduce field data for analysis
	43. Analyze and visualize data by hand
	44. Analyze and visualize data using digital tools (e.g., R Studio, Google Earth)
	45. Synthesize data from multiple sites
	46. Extract values from data for mathematical models
	47. Reduce and synthesize large and disparate data associated with field collection
	48. Analyze example datasets before field work
	49. Interpret analysis results
	50. Interpret analysis results in context of site/regional conceptual model
	51. Propose conceptual/theoretical models from data and analysis results
Communication Skills	52. Read and summarize a scientific paper for content
	53. Read a scientific paper for critical perspective of study design or presentation (peer review)
	54. Read a scientific paper to extract specific information
	55. Present results of field work orally (informally)
	56. Present results of field work orally (experientially—according to standards/in formal norms of discipline)
	57. Present results of field work in written forms (informally)
	58. Present results of field work in written/visual technical reports or journal article or poster according to discipline standards or norms (experientially)
Collaborative Skills	59. Work effectively in pairs/teams to collect, analyze, or synthesize data
	60. Work effectively across teams to collect, analyze, or synthesize data
	61. Provide constructive feedback to peers (peer review)
Community-Engaged Work Knowledge and Skills	62. Develop networks or relationships with community partner(s)
	63. Engage in action with community partner(s)
	64. Create a scope of the community challenge
	65. Create a vision for a solution and/or propose a plan to address community challenge
	66. Iterate and adjust community-engaged plan [based on…feedback? New info.?]
	67. Produce a proposal that meets community partner needs
	68. Implement a community project plan.

References

Alexander and Fink, as represented in University of Minnesota's Center for Educational Innovation site retrieved July 2024 from https://cei.umn.edu/teaching-resources/aligned-course-design
Biggs JB, Tang CS (2011) Teaching for Quality Learning at University: What the Student Does. 4th edn. Maidenhead: Open University Press.
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