



Supporting the Creation and Publication of Reviewed and Tested Teaching Modules through the InTeGrate Project

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InTeGrate-developed Materials

InTeGrate is dedicated to providing robust curricular materials that increase Earth literacy among undergraduate students. The project aims to change the way earth science is taught through a variety of mechanisms, including webinars, workshops, and new teaching materials.

These teaching materials are free, rigorously reviewed and tested, and can be adopted or adapted for use in a variety of courses and range in scale, from 1-4 week modules to entire courses.

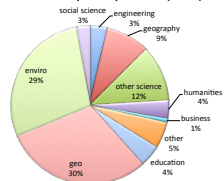
Materials Development Teams

The InTeGrate project has developed a highly successful process for integrating community expertise – in content and pedagogy – to create curricular materials that instructors can use across the curriculum to address the Grand Challenges facing society.

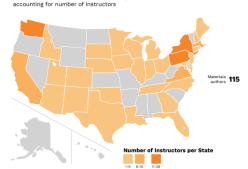
Keys to this success include:

- Building an interdisciplinary author team that can provide a multi-disciplinary perspective to challenges related to hazards and sustainability.
- Creating teams that embody a mixture of institution types, regions, and disciplines to bolster usability for a variety of users.
- Following a development process with a series of checkpoints to help keep teams on track.
- Facilitating communication among teammates.
- Providing support and a network of experts to provide feedback throughout the process. In addition to the authors, teams are made up of:
 - A **team lead** (a project PI), who provides guidance on content and pedagogy.
 - An **assessment team member**, who provides pedagogical guidance and ensures materials meet the rubric requirements.
 - A **web team person** who assists with formatting and technical questions.

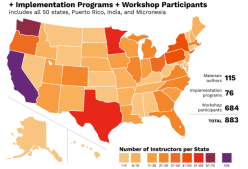
Material Developers' Departments (n=112)



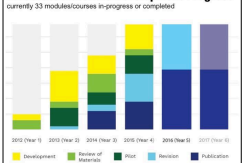
Distribution of Module/Course Authors



Distribution of Module/Course Authors



InTeGrate Materials Development Progress



Materials Development Process

Faculty worked both synchronously and asynchronously to develop materials following a two-year process, which is scaffolded using seven checkpoints.

Phase 1: Materials in Development (4 checkpoints)

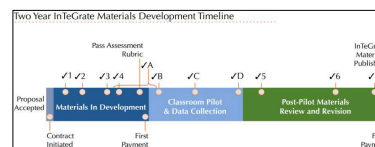
- Teams meet face-to-face to get introduced to the project, process, and personnel and start working on materials.
- Authors work on their own to develop materials, keeping strong communication with and responding to periodic feedback from team lead, assessment consultant, and web consultant.
- Once materials are developed, team alerts the assessment team it is ready for review against the rubric. Team must pass rubric review by at least two members of the Assessment Team. If they do not pass, they must revise to pass before piloting.

Phase 2: Classroom Pilot

- Authors pilot their materials in class, taking note of what worked/didn't work.
- Authors are required to collect pre- and post-surveys to measure changes in student attitude and understanding of basic geoscience content (for project-level evaluation) and to submit summative assessment for assessment team review – to ensure materials meet their overarching goal(s).

Phase 3: Post-Pilot Materials Revision (3 checkpoints)

- Teams meet face-to-face at a second meeting to discuss pilot experience and summative assessment results, which are used to inform revision plan.
- Once revision plan is approved by team lead and assessment team, team starts working on their revisions and formatting for publication. Team completes this asynchronously and submits letter to team lead to start final reviews.
- Final reviews consist of: (1) external science expert review; (2) technical review by web consultant; (3) copy edit. Once teams respond to feedback from these reviews, team lead and assessment lead provide final review and sign off.
- After publication, materials are promoted for use via press releases, social media posts, and featuring them at workshops and webinars.



Materials Design and Refinement Rubric

Developed by the InTeGrate Assessment Team for authors as they developed materials. All materials must pass review against the rubric by two reviewers before piloting. The rubric consists of six sub-areas:

1. **Guiding Principles of InTeGrate teaching materials:** address one or more of the geoscience-related grand challenges facing society; develop student ability to address interdisciplinary problems; improve understanding of nature and methods of geoscience and geoscientific habits of mind; make use of authentic and credible data; incorporate systems thinking.
2. **Learning objectives and goals:** strong, measurable goals that are appropriate for their intended audience and address overarching aim of module.
3. **Assessment and measurement:** assessments measure and are consistent with learning goals.
4. **Resources and materials:** address appropriate content, are credible and current.
5. **Instructional strategies:** engaging methods that support learning goals, develop metacognition, strengthen science communication skills, and scaffold learning.
6. **Alignment:** all materials are aligned with one another.

http://serc.carleton.edu/integrate/info_team_members/currdev/rubric.html

Project Products & Outcomes

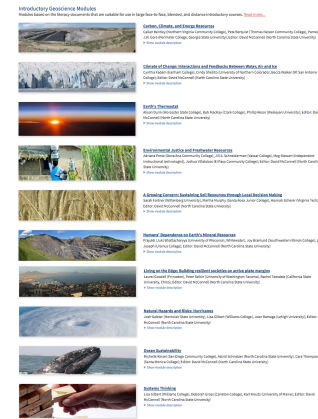
Authors report that the development process is a strong professional development opportunity in itself – they learned a great deal from one another, team leads, and the assessment team. To date, 19 modules have been published and 14 courses and modules are undergoing final revision and review in preparation for publication. Materials are widely used at a variety of institutions across the country and have been featured at InTeGrate workshops and webinars, as well as adapted for program-scale use at a number of institutions.

Explore the Materials

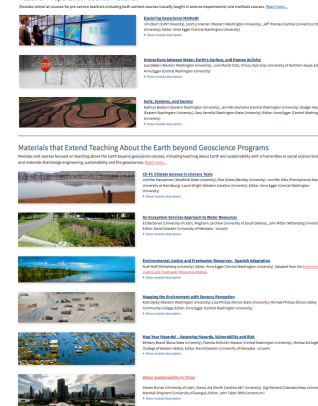
Explore the Modules and Courses

General Education Course Material

Introductory Geoscience Modules



Teacher Preparation Course Material



Materials in Development



http://serc.carleton.edu/integrate/teaching_materials/modules_courses.html
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