

A Competency-based Distance University

Western Governors University and The American Museum of Natural History (AMNH)

Providing Authentic Experiences through Technology



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A Competency-based Distance University

WGU Competency-Based Education



WGU Science Programs

WGU Degree Programs in Science

Initial Licensure

Bachelor of Arts in Science 5-9

Bachelor of Arts in Science 5-12 Biological Science

Bachelor of Arts in Science 5-12 Geosciences

Non Licensure

Bachelor of Arts in Educational Studies - Science 5-9

Bachelor of Arts in Educational Studies - Science 5-12 Biological Sciences

Bachelor of Arts in Educational Studies - Science 5-12 Geosciences

Advanced Degree

Master of Arts in Science Education 5-9

Master of Arts in Science Education 5-12 Biological Science

Master of Arts in Science Education 5-12 Geosciences



The Situation

- Given that WGU is providing the only on-line initial licensure program in Science in the United States, it is critical that we model truly exemplary practice.
- The students at WGU were getting the content and pedagogy required by the state and national standards through a variety of learning resources, but they still weren't getting the authentic scientific experience, which handicapped their ability to connect abstract concepts
- The science faculty needed ways for the students to engage in the content
- In summary, the students needed a new-found excitement for science and a genuine experience as a scientist through authentic learning experiences



The Importance of Authentic Learning

- Authentic learning is a pedagogical approach that allows students to explore, discuss, and meaningfully construct concepts and relationships in contexts that involve real-world problems and projects that are relevant to the learner (Donovan, Bransford, & Pellegrino, 1999).
- In such a place, technology becomes a tool for discovery, supporting the learning process as students seek new knowledge and insight.



One Solution

- AMNH – Seminars in Science – an online teacher development program
- The program consists of ten online graduate [courses](#) in the life, Earth, and physical sciences
- The courses are co-taught by an experienced educator and a Museum scientist.
- Participants benefit from the rich discourse each week in online discussion boards that can be accessed any time and any place where web access is available.



AMNH Course Examples



AMNH Courses Providing Authentic Experiences

- Students gain understanding of science through scientific inquiry
- Strengthen, enable, and help students connect the abstract concepts
- Effective at providing teachers with a genuine experience as a scientist



First-hand, authentic, learning experiences

- A scientist with the fishes course imagines learners in their kitchens, looking – really looking – at a fish:

For me, a great step is to know that after the course, the student takes with him a sense of how diverse fishes are and what it "means to study fishes" (which involves getting familiar with the research activity per se). Just to imagine the student in front of a fish from the fish market, trying to observe and describe it, and in the process, getting aware of features that he hadn't paid attention to before, is already an accomplished assignment. That's my goal, to make him sit and observe and then compare. He won't learn much about the 'world of fishes', but he will certainly be putting in practice what scientists do for their research.



The WGU/AMNH Fit: WGU's Assessment System

- WGU offers a *competency-based* program for completing its degree and certificate requirements.
- WGU students demonstrate mastery of the standards and competencies by completing assessments.



WGU's Assessment System cont.

- Assessments come in many different forms, including
 - Assignments involving problem-solving in science
 - Computerized science examinations consisting of multiple-choice, matching, and other question types
 - Projects requiring the student to design a lesson plan about science history
 - Reflection essays about scientific theories
 - Research papers on particular topics within science.
- Our learning resources, i.e. courses, texts, CD, online labs, prepare students for these assessments



WGU's Assessment System cont.

Assessment	AMNH Course	Number of Tasks
SEA4/5 – Earth and Space Science	Earth: Inside and Out	2
	The Ocean System	2
SPA4/5 – Physics	Space, Time and Motion	2
SLA4/5 – Life Science	Genetics, Genomics, Genethics	2



NSTA Standards

- Western Governors University's assessment system in science was built from the National Science Teachers Association and state standards
- All standards are incorporated into our various curricula



AMNH Course Competencies

- The following standards, based on National Science Teacher Standards and their competencies, are covered in the AMNH courses:
 - **Unifying concepts and processes in science**
 - **Standard A: Science as inquiry**
 - **Standard B: Physical science**
 - **Standard C: Life science**
 - **Standard D: Earth and space science**
 - **Standard E: Science and tech**
 - **Standard F: Science in personal and social perspectives**
 - **Standard G: History and nature of science**



The Result of this Partnership

- Students are getting the competencies addressed by the standards
- Students are connecting the abstract concepts
- Students are engaging the content
- Students are coming away with an excitement for science

