

Graduate Workshop in Education- Partnerships and Discourse in Informal Science Education

(TED 5319 [35492] - 2018 Summer I)

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Department of Teacher Education
College of Education
University of Texas at El Paso

Course Format: Online, 4 weeks, Summer I (June 11- July 6, 2018)

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*This syllabus is subject to change as needed. Any changes to the syllabus will be announced on blackboard.

“Americans spend over 80% of lifetime waking hours outside schools, and potentially have access to a vast array of learning resources, experiences, and educators (Bell, Lewenstein, Shouse, & Feder, 2009)”

Course Description

This course discusses various programs and projects for providing informal science education to all ages of people. Designing and implementing informal science learning activities in real contexts (e.g., local museums) are at the core of this course. Students are provided with opportunities to learn, evaluate, design, and implement research-based informal science activities. As a result, students will be able to plan a project proposal that partners with different collaborators in enhancing science learning in informal settings.

Course Introduction

This course draws on theoretical and practical perspectives to examine various instructional methods and resources to provide informal science resources to their students. In the theoretical part, learning theories and research-based practice are presented and discussed. To apply the theoretical knowledge, students are provided with opportunities to examine, design and implement a project that corresponds to Texas Essential Knowledge and Skills (TEKS). In the practical part, students have opportunities to interact students to gain situated experiences in teaching science. The mechanism and integration of theoretical and practical perspectives in this course allow students to experience a process that can serve as a lifelong learning model to help their professional development in their science teaching careers. This course is designed to help teachers achieve Texas - Master Science Teacher Standards as indicated in the followings:

- Standard I. Content: the Master Science Teacher knows and understands and is able to mentor the teaching of the Texas Essential Knowledge and Skills (TEKS) in science.
- Standard V. Safety: The Master Science Teacher understands, implements, models, and advocates: safe classroom, field, and laboratory experience; safe use of equipment and technology; and ethical use of organisms and specimens and guides others to do the same.
- Standard VI. Inclusive Instruction: The Master Science Teacher uses and guides others to use a variety of instructional strategies and resources to meet the diverse needs of all learners.

- Standard VII. Learning and Teaching Environment: The Master Science Teacher demonstrates and promotes a positive attitude, high expectations, passion, and enthusiasm for science learning and teaching.
- Standard VIII. Student Assessment: The Master Science Teacher collaborates to select, construct, and administer aligned assessments, analyzes the results to modify instruction to improve student achievement, and develops those skills in others.
- Standard IX. Mentoring and Shared Leadership: The Master Science Teacher facilitates standards-based science instruction by: communicating and collaborating with educational stakeholders; exhibiting leadership, mentoring, coaching, and consulting with colleagues; facilitating professional development; and making decisions based on research.

Student Learning Outcomes:

The course is designed to help students to become competent science teachers who can provide various informal science education opportunities for their students. At the end of the course, successful students will be able to:

- 1) Explain and appreciate unique features of informal science education
- 2) Understand and apply research-based knowledge and skills
- 3) Identify and evaluate various resources to support informal science education
- 4) Understand and implement standards for teaching science (TEKS, Next Generation Science Standards)
- 5) Design a quality informal science education project
- 6) Develop the ability to engage students in science activities in informal setting
- 7) Collaborate with other educators to create the best learning opportunities for their students
- 8) Monitor one's learning and identify ways for improvements
- 9) Help other learners and identify ways to improve their learning

* Assessment of course objectives will be accomplished by assessing the student's course assignments and participation.

UTEP EDGE Alignments:

This course will help students gain experience of (1) research and scholarly activity, (2) learning communities, (3) creative activity and help students enhance skills of (1) problem-solving, (2) communication, and (3) critical thinking.

Technology Requirements and Support

- This course is an online course using the Blackboard system. Each participant must be able to use their UTEP email address and password in order to use their UTEP Blackboard account.
- If you encounter any technical issue in Blackboard, please contact UTEP-Help Desk to solve problems. Phone: 915-747-4357. Email: Helpdesk@utep.edu. The University of Texas at El Paso offers complete technical information and help desk support at: <https://admin.utep.edu/Default.aspx?tabid=74092>

Readings and Reflections

- 1) Reflection 1: NGSS Lead States. (2013). Next Generation Science Standards: For states, by states. Washington, DC: The National Academies Press.
- 2) Reflection 2: Chapters 1-5. Bell, P., Lewenstein, B., Shouse, A.W., & Feder, M.A. (2009). Learning science in informal environments: People, places and pursuits. Washington, D.C: National Research Council of the National Academies.

- 3) Reflection 3: Chapters 6-9. Bell, P., Lewenstein, B., Shouse, A.W., & Feder, M.A. (2009). Learning science in informal environments: People, places and pursuits. Washington, D.C: National Research Council of the National Academies.
- 4) Reflection 4: Chapters 1-5. Friedman, A. (Ed.). (2008). Framework for evaluating impacts of informal science education projects. Washington D.C.: National Science Foundation.
- 5) Reflection 5: Chapters 6-10. Friedman, A. (Ed.). (2008). Framework for evaluating impacts of informal science education projects. Washington D.C.: National Science Foundation.
- 6) Reflection 6: NGSS and Informal Science Education.
Each student will post minimum 500 words to reflect on the relationship and connections between NGSS and Informal Science Education. For example, what are some unique features of NGSS? What is the role of Informal Science Education in NGSS? What are some possible activities in Informal Science Education that can help teachers align NGSS?

* Additional handouts will be made available in classes. These documents play key roles in guiding your assignments and projects. Changes may be made in classes. Please make sure you read these documents in time.

Resources

- Blogger: <http://www.blogger.com>
- WordPress: <http://wordpress.org>
- National Academies Press: <http://www.nap.edu/>
- Next Generation Science Standards (NGSS): <http://www.nextgenscience.org/next-generation-science-standards>
- Assessments Tools in Informal Science (ATIS): <http://www.pearweb.org/atis/>
- Informal Science: <http://informalscience.org/>
- CAISE (Center for Advancement of Informal Science Education): <http://caise.insci.org/>
- Informal Science Education Evidence Wiki: http://iseevidencewiki.org/index.php/Main_Page
- Texas Education Agency (TEA): <http://www.tea.state.tx.us/index.aspx>
- Texas Essential Knowledge and Skills (TEKS): <http://www.tea.state.tx.us/index2.aspx?id=6148>

Principles for this Course

- **Project-Based Learning**
Project-based learning is a pedagogical approach that focuses on real-world practice (instead of paper work), student-led (instead of teacher-led) inquiry, and long-term learning (instead of short-term memorization). It allows students to investigate in depth over a long term topic that matter to them. During this hands-on practice, students are able to digest readings and utilize their creativity to produce a project that allows them to apply the knowledge they learned during my course and so have a sense of ownership of the knowledge.
- **Community of Practice**
Community of practice is a concept that depicts how people work together for their common interests and learn from each other's expertise to develop themselves personally and professionally. To form a community of practice in this course, students are provided with various opportunities to communicate their opinions, share their learning, and help each other improve. In particular, Blogging is served as a tool that strives students to prepare themselves, help each other, and collaborate to achieve individual's project.
- **Service Learning**
Service learning is a teaching method that aims to enrich learning experience and strengthen

communities through services. This course invites students to design an informal science education project for students to contribute what they learn in UTEP back to El Paso communities, including middle school teachers, students, families, schools, etc.

Assignments

The following assignments are designed to help students become competent teachers and achieve different objectives below.

Assignments

1. Knowledge Enrichment (60%)

In this course, each student will read articles and engage in discussions to enrich knowledge about informal science and its relationship to science education.

(1) Informal Science Images I & II (6%, 3% at the beginning of the semester and 3% at the end of the semester)

Students will submit one image with 100 words of descriptions to represent their understanding about “Informal Science” at the beginning of the semester (image I) and at the end of the semester (image II).

(2) Blogging Reading Reflection 1-6 (30%, each reflection is worth 5%)

Each student will post six reflections of corresponding readings (Reading 1, 2, 3, 4, and 5 in his/her blog according to the schedule. Each of the reflection 1-5 (minimum 500 words) should include (1) summary of the reading, (2) ideas for possible projects, (3) concerns and questions for the readings or projects. Reflection 6 includes a minimum of 500 words to reflect on the relationship and connections between NGSS and Informal Science Education. For example, what are some unique features of NGSS that can incorporate informal science? What is the role of Informal Science Education in NGSS? What are some possible activities in Informal Science Education that can help teachers align NGSS? Each reflection should cite at least 2 references and post the 2 references at the end of each reflection. The titles for the reflection posts should indicate student name and reflection number: “Pei-Ling Hsu - Reflection 1,” “Pei-Ling Hsu - Reflection 2,” etc.

(3) Responses to Other Classmates’ Blogs on the 6 reflections (24%, each response is worth 2%)

Each student will respond to at least 2 other classmates’ reflections. Each response should: (1) identify merits, (2) suggest ideas for improvements, and (3) end the response with a question. For each reflection, each student will choose 2 different classmates’ blogs to respond each time. The minimum of a response is 200 words. A record of these responses will be posted and updated in Blackboard. Students should check the record regularly and let the instructor know immediately if there is any question about the updated response record.

2. Informal Science Project Proposal (40%)

In this course, each student will propose an informal science project proposal that applies the knowledge learned in the course.

(1) Project Proposal Draft (20%)

Each student writes an informal science education project proposal that corresponds to TEKS and Next Generation Science Standards. Students are encouraged to apply the knowledge learned in readings to propose a research-based project. A project proposal is written to show the rationale and plan for implementing the project. The project should include at least one informal science collaborator (e.g., zoos, museums, science centers) and serves at least 10 participants (e.g.,

students, families) for 40-60 hours to be implemented in 2018 Summer. A project proposal draft is written to show the rationale and plan for implementing the project. Students are provided with “Template01-Project Proposal Draft” to fill out. The project proposal draft (minimum 2500 words) should be submitted to the corresponding assignment section in Blackboard AND B-email the proposal to all in the class.

(2) Proposal Written Review (10%)

Each student will review two other classmates’ project proposal drafts and will provide feedback (minimum 500 words for each review) for improvements. Students are provided with “Template02-Proposal Written review” to fill out. Each written review may include but not limit to (1) praise for merits, (2) identifications of weakness, and (3) ideas and suggestions for improvements. The project written review should be submitted to the corresponding assignment section through the Blackboard system and AND B-email the written review to all in the class.

(3) Final Project Proposal (10%)

Students will revise and improve their proposal report drafts according to the feedback they receive from the instructor and the class. Students are provided with “Template03-Proejc Proposal” to fill out. The project proposal (minimum 3500 words) should be submitted to the corresponding assignment section in Blackboard.

Course Requirements:

1. Due time is **11:59PM** for ALL electronic submissions. Delayed submissions of any assignments will cause grade reductions. One delay day causes 10% reduction of a deserved grade, two delay days causes 20% of a deserved grade, and so on. ***All (delayed) assignments have to be submitted before July 6, 2018.*** Grading Evaluations: A (90% - 100%), B (80% - 89%), C (70%-79%), D (60%-69%) F (<60%)
2. Each electronic file of assignments should not exceed 10 MB.

Online Etiquette (Netiquette)

Meaningful and constructive dialogue is encouraged in this class and requires a degree of mutual respect, willingness to listen, and tolerance of opposing points of view. Respect for individual differences and alternative viewpoints will be maintained at all times in this class. One’s words and use of language should be temperate and within acceptable bounds of civility and decency. Discussion, chat, and e-mail spaces within this course are for class purposes only, unless otherwise stated. Please remember to conduct yourself collegially and professionally. Unlike in the classroom setting, what you say in the online environment is documented and not easily erased or forgotten.

Accommodation

If you have a disability and need classroom accommodations, please communicate your needs to the instructor and contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass.

Standards of Academic Integrity

Students are expected to uphold the highest standards of academic integrity. Any form of scholastic dishonesty is an affront to the pursuit of knowledge and jeopardizes the quality of the degree awarded to all graduates of UTEP. Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are not attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts. Proven violations of the detailed regulations, as printed in the Handbook of Operating Procedures (HOP) and available in the Office of the Dean of Students, may result in sanctions ranging from disciplinary probation, to failing grades on the work in question, to failing grades in the course, to

suspension or dismissal among others. You may learn what count as plagiarism in this website: <http://www.plagiarism.org/>

Equal Educational Opportunity

In order to create equal educational opportunities in the class, all students are expected to demonstrate respect for the diverse voices and individual differences in the class. Particularly, no person shall be excluded from participation in, denied benefits of, or be subject to discrimination under any program or activity sponsored or conducted by the University of Texas at El Paso on the basis of race, color, national origin, religion, sex, age, veteran status, disability, or sexual orientation. Any member of the University community who engages in discrimination or other conduct in violation of University policy is subject to the full range of disciplinary action, up to and including separation from the University. Complaints regarding discrimination should be reported to the University's Equal Opportunity Office. Inquiries regarding applicable policies should be addressed to the University's Equal Opportunity Office, Kelly Hall, 3rd Floor, 915.747.5662 or eoaa@utep.edu <mailto:eoaa@utep.edu>.

Course Schedule: Changes may be made during the classes. Students should follow the latest changes.

No	Date	Themes	Assignments Due (11:59PM)
01	June 11	Review Syllabus	Informal Science Image I
02	June 12	Learning science in informal environments: People, places and pursuits	Reflection 1
03	June 13		Response 1
04	June 14		Reflection 2
05	June 15		Response 2
06	June 18		Reflection 3
07	June 19		Response 3
08	June 20		Framework for evaluating impacts of informal science education projects
09	June 21	Response 4	
10	June 22	Reflection 5	
11	June 25	Response 5	
12	June 26	NGSS and Informal Science Education	Reflection 6
13	June 27		Response 6
14	July 2	Apply previous readings to design an informal science project proposal	Project proposal draft (template 1, B-Email to everyone)
15	July 4		Proposal written review (template 2, B-Email to everyone)
16	July 6		Final Project proposal (template 3) Informal Science Images II

Appendixes:

Grading Rubric for “Reflection”

	67-100%	34-66%	0-33%
Follow instructions to cover required content	Reflection (minimum 500 words) should include (1) summary of the reading with a visual representation, (2) ideas for possible project proposals, (3) concerns and questions for the readings or project proposals. Each reflection should cite at least 2 references and post the 2 references at the end of each reflection. The titles for the reflection posts should indicate student name and reflection number: “Pei-Ling Hsu – Reflection 1,” “Pei-Ling Hsu – Reflection 2,” etc.	Reflection covers most of the requirements.	Reflection covers only a few requirements.
Analysis / Interpretation	The reflection uses sources, including outside as well as required reading. In addition, it demonstrates that the student has gained new understanding of the topic.	Some reflections do analysis or interpretation well, but a significant number do not. This might be because the analysis was not done well or because it was not attempted (that is, was simply opinion).	Reflections generally show little evidence of analysis, consisting instead of opinion and feelings and impressions.
Writing Skill	Sentences are clear and wording is unambiguous. Correct word choice, correct spelling, and correct grammar. Writing style can still be conversational rather than formal. The writing does not have to be flawless, but it will be better than average writing.	Ordinary, good writing. Lapses are regular and patterned, but do not undermine the communication or the persuasiveness of the argument.	Grammar, spelling, and/or word choice errors are frequent enough that the sense of the message is lost or muddled.

Grading Rubric for “Project Proposal”

	67-100%	34-66%	0-33%
A.1. Project title	-The title is intriguing, succinct and represents the project	-The title is intriguing and represents the project	-The title is intriguing but does not represent the project
A.2. Issues to be addressed in the project	-Identify existing issues or problems -Draw on research-based findings to address the importance of the project -Articulate the potential of the project to address the existing issues and problems	-Identify existing issues or problems -Loosely draw on research-based findings to address the importance of the project -Articulate the potential of the project to address the existing issues and problems	-No identification of existing issues or problems -Do not address the importance of the project -The link to research is weak
A.3. Project objectives	-Concise descriptions of what learners are expected and able to do by the end of the project - Objective statements include a variety of actions verbs that address what learners will be able to “do” - There is evidence in the assessment section that students’ learning is linked to the concepts and skills addressed in the learning objectives.	- Descriptions of what learners are expected to learn are general. -Most action verbs in the objective statements do not address what learners will be able to “do” -Fail to show connection with the assessment section.	-The description of the learning objectives is vague. -Action verbs in the objective statements do not support meaningful learning. -Fail to show connection with the assessment section.
A.4.	-Describe thoroughly what are the	-Describe superficially what are	-Describe superficially how the

Intervention – learned in the course	knowledge learned in the course -Describe thoroughly how these knowledge apply to the project -Cite the readings assigned in the course	the knowledge learned through self-study -Describe superficially how these knowledge apply to the project -Cite the readings assigned in the course	knowledge learned in the course provides guideline to the project -Describe superficially how these knowledge apply to the project -Do not cite the readings assigned in the course
A.5. Intervention – learned through self-study	-Describe thoroughly what are the knowledge learned through self-study -Describe thoroughly how these knowledge apply to the project -Cite self-study readings	-Describe superficially what are the knowledge learned through self-study -Describe superficially how these knowledge apply to the project -Cite self-study readings	-Describe superficially what are the knowledge learned through self-study -Describe superficially how these knowledge apply to the project -Do not cite self-study readings
A.6. Texas Essential Knowledge and Skills alignment	-Listed standards reflect the grade level, concepts and skills learned in the project -There is evidence (i.e., in the assessment section) that student’s learning is linked to the components of the listed standards.	-Listed standards reflect the grade level and the concepts -Partial evidence (i.e., in the assessment section) that student’s learning is linked to the components of the listed standards.	-Project is loosely connected to the standards.
A.7. Next Generation Science Standards alignment	-Listed standards reflect the grade level, concepts and skills learned in the project -There is evidence (i.e., in the assessment section) that student’s learning is linked to the components of the listed standards.	-Listed standards reflect the grade level and the concepts -Partial evidence (i.e., in the assessment section) that student’s learning is linked to the components of the listed standards.	-Project is loosely connected to the standards.
B.1. Collaborators	-Identify at least one collaborator for this project -Evidence of support from the collaborators	-Identify at least one collaborator for this project -No evidence of support from the collaborators	-No identification of collaborators for the project
B.2. Age of participants	-Identify the age range of participants -The project is suitable for the age identified	-There are some concerns of the use of the project for this grade	-The project is not suitable for the grade identified
B.3. Number of participants	-Engage in at least 10 participants in this project -The project is suitable for the number of participants	-Engage in 5-9 participants in this project -The project is suitable for the number of participants	-Engage in 1-4 participants in this project -The project is not suitable for the number of participants
B.4. Participant recruitment plan	-Describe timeline and activities of recruiting participants for this project -Activities are logically sequenced, so that learning builds progressively; connections between activities are clearly made	-Describe only timeline or activities of recruiting participants for this project	- Activities do not have a logical sequence.
B.5. Timeline of activities	-Time is appropriate -Timeline of activities is clearly described -These activity relates to the project objectives	-Time is somewhat inappropriate	-Time is not described or inappropriate
B.6. Materials and resources required	-Required materials and resources are clearly listed -Reference in procedures are clearly defined as to they are to be utilized	- Most of the required resources and materials are listed. -Some reference or clear definition in procedures	- Some citing of resources through the lessons; materials listed but not included in the procedures
B.7. Plan to obtain materials and resources	-Describe timeline and activities of obtaining materials and resources for this project	-Describe only timeline or activities of obtaining materials and resources	-No plan description of obtaining materials and resources
B.8. Safety considerations	-Safety concerns are discussed; suggestions or solutions for	-Safety concerns are discussed	-Safety concerns are not discussed

	addressing these safety concerns are provided		
B.9. Scientific Topics involved	<ul style="list-style-type: none"> -Topics show sequence and progression. -The descriptions of these topics are fully introduced -Opportunities are provided for students to link daily work to past and upcoming content/skills. 	<ul style="list-style-type: none"> -Topics show somewhat sequence and progression. -The descriptions of these topics are provided -Opportunities are provided for students to link daily work to past and upcoming content/skills. 	<ul style="list-style-type: none"> -Topics does not consider the proper sequence and progression -No descriptions of these topics are provided -No relevant connections to students' daily life
C.1. Formative assessments	<ul style="list-style-type: none"> -Assessments allows an understanding of students' learning process for necessary adjustments and improvements -There are a variety of assessment practices -Assessment tools are designed to address instructional objectives and standards. -Assessment practices are engaging and relevant. 	<ul style="list-style-type: none"> -Assessments are linked to objectives and standards. -There is no variety of assessment practices. 	<ul style="list-style-type: none"> -Assessment provides little or no evidence for student understanding of the new concept/skill.
C.2. Summative assessments	<ul style="list-style-type: none"> -Assessments allows an overview understanding of the impact of the project -Assessment tools are designed to address instructional objectives and standards. -Assessment practices are engaging and relevant. 	<ul style="list-style-type: none"> -Assessments are linked to objectives and standards. -There is no variety of assessment practices. 	<ul style="list-style-type: none"> -Assessment provides little or no evidence for student understanding of the new concept/skill.
D. Informal Science Alignment	<ul style="list-style-type: none"> -Explain the key features of informal science in the project (what makes this project an informal science project?) -Explain how this project align with some design principles in informal science 	<ul style="list-style-type: none"> -Partially explain the features and design principles used for informal science in the project. 	<ul style="list-style-type: none"> -It is unclear how this project is an informal science project
E. Reference	<ul style="list-style-type: none"> -More than 20 references are cited for the project proposal -Reference sources are formatted in APA style and cited clearly 	<ul style="list-style-type: none"> -Six to ten references are cited -Reference sources are indicated and cited clearly 	<ul style="list-style-type: none"> -One to five references are cited -Reference sources are indicated and cited vaguely
F. Appendixes	<ul style="list-style-type: none"> -Attach all necessary information that help readers understand the project (e.g., instruments, curriculum, working sheets) 	<ul style="list-style-type: none"> -Attach most of the relevant information that help readers understand the project (e.g., instruments, curriculum, working sheets) 	<ul style="list-style-type: none"> -Attach only part of relevant information that help readers understand the project (e.g., instruments, curriculum, working sheets)
Mechanics of English	<ul style="list-style-type: none"> -Appropriate expression of concepts, varied and accurate vocabulary, no errors occur with regards to grammar, conventions and spelling. -Follow APA format 	<ul style="list-style-type: none"> -Clear expression and vocabulary, some mechanical errors exist but not to get in the way of understanding. -Have some APA format errors 	<ul style="list-style-type: none"> -Some mechanical errors exist but not to get in the way of understanding. -Many errors with regards to grammar, spelling, and conventions. -There is no obvious APA formatting structure