Sample Project-Based Instruction Syllabus

Prerequisites:
EDC 371 Knowing and Learning
Additional Requirements: Students must use a word processor, email and have access to a web browser. If these requirements cannot be fulfilled, please see instructor.

Course Rationale:

Project-based instruction engages learners in exploring authentic, important, and meaningful questions of real concern to students. Through a dynamic process of investigation and collaboration and using the same processes and technologies that real scientists, applied mathematicians and engineers use, students work in teams to formulate questions, make predictions, design investigations, collect and analyze data, make products and share ideas. Students learn fundamental science and mathematical concepts and principles that they apply to their daily lives. Project-based instruction helps all students regardless of culture, race, or gender engage in learning.

Course Description:

PBI has three essential components:

- Theory-driven perspective: Students learn about how people learn and how project-based instruction may be among our most informed classroom learning environments for bridging the gap between theory and practice.
- Instructional Development: Technological and pedagogical content knowledge are developed as UTeach students work toward the design of project-based units. Competency is continually built as students read about and discuss the principles of PBI; reflect on observations of project-based learning environments in high school settings; and incorporate what they are learning into the design of problem-based lessons and ultimately, an entire project-based unit.
- Field Experience: An intensive field component includes observation of well-implemented project-based instruction in local schools as well as implementation of problem-based lessons with area high school students on a study field trip.

Perspective:

A major hurdle in implementing project-based curricula is that they require simultaneous changes in curriculum, instruction and assessment practices – changes that are often foreign to students as well as practicing teachers. In this course we will develop an approach to designing, implementing and evaluating problem- and project-based curricula and processes for PBI curriculum development that has emerged from collaboration with teachers and researchers. Previous research has identified four common design principles that appear to be especially important: (1) Defining learning appropriate goals that lead to deep understanding; (2) Providing scaffolds such as
beginning with problem-based learning activities before completing project; using "embedded teaching”, “teaching tools” and set of “contrasting cases”; (3) Including multiple opportunities for formative self assessment; (4) Developing social structures that promote participation and revision. We will first discuss these principles individually and then compare them to other design principles suggested by other groups involved with project-based instruction.

Required Course Materials

*Teaching Children Science: A Project-Based Approach*
Joseph Krajcik, Charlene Czerniak, Carl Berger
Publisher: McGraw-Hill Companies
Publication date: October 1998

*Experiencing School Mathematics: Traditional and Reform Approaches to Teaching and Their Impact on Student Learning*
Jo Boaler
Format: Paperback
Publisher: Lawrence Erlbaum Associates; Rev & Engirg
Publication Date: October 2002

*Designing Project-Based Science: Connecting Learners through Guided Inquiry*
Joseph Polman
Format: Paperback
Publisher: Teachers College Press, Teachers College, Columbia University
Publication Date: 2000

Articles


### Course Objectives

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<tr>
<th>Course Objectives and Evidence of Student Learning and Engagement</th>
<th>Evidence:</th>
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<td><strong>Students will</strong></td>
<td><strong>Evidence:</strong></td>
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| Discuss and critique the merits of project-based instruction in terms of student's cognitive development, equity and motivation. | • In-class and online discussions  
• A project-based unit that includes a rationale and objectives  
• A grant proposal to implement a project-based unit that includes a rationale and potential impact |
| Reflect on applications of educational theory as it relates to classroom practice in the area of project-based instruction. | • In-class and online discussions  
• A grant proposal to implement a project-based unit that includes a rationale and potential impact |
| Distinguish between project-based instruction and other instructional approaches and decide which approach best fits instructional goals based on the benefits and limitations of each. | • In-class and online discussions  
• A project-based unit that includes benchmark lessons and a lesson sequence that incorporates appropriate instructional approaches. |
| Evaluate the usefulness of technology in achieving learning objectives and select appropriate resources for student use based on the relationship of salient features of the technology to learning objectives. | • An annotated list of relevant resources and technological tools for a project-based unit  
• Classroom presentation utilizing technology tools |
| Use inquiry methods with secondary students in a problem-based setting. | • A project-based unit that includes benchmark lessons and a lesson sequence that incorporates appropriate instructional approaches.  
• Videotape evidence of UTeach students leading problem-based activities in a field setting |
| Describe examples of project-based instruction in math or science and analyze those examples in terms of several well-studied, field-tested models for PBI. | • In-class and online discussions  
• Field observations of project-based classrooms |
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<tr>
<td>Demonstrate skill in setting up and managing wet lab and field project-based environments.</td>
<td>• Videotape evidence of UTeach students setting up and managing wet lab and field project-based environment</td>
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<td>Use PBL design principles to develop an interdisciplinary, three to four-week project-based unit for secondary math and/or science courses.</td>
<td>• A project-based unit including an anchor video, calendar, rationale, objectives, theoretical basis for the project, concept map, benchmark lessons, investigations, alternative assessments, strategies for differentiating instruction for students with special needs, related resources and technology tools.</td>
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<td>Develop alternative assessments appropriate for project-based instruction.</td>
<td>• Problem-based lessons that include alternative assessments</td>
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<td>• A project-based unit that includes alternative assessments</td>
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<td>Discuss lab safety and liability issues related to project based instruction and wet-lab or field environments (OSHA regulations, how to read materials safety data sheets, safe disposal of chemicals, etc.)</td>
<td>• Participation in class discussion on safety and liability issues</td>
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<td>• A project-based unit that includes safety precautions</td>
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<td>Use relevant technology to develop projects (e.g., concept mapping software, video editing software, etc.).</td>
<td>• Technology-based or developed project elements</td>
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<td>Integrate relevant technology into curricular units (e.g., Internet, simulations, data analysis packages, modeling software, etc.).</td>
<td>• A project-based unit that includes lessons that integrate the use of technology</td>
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<td>Plan instruction that promotes equitable and diverse participation so that all students have an opportunity to learn.</td>
<td>• A project-based unit that includes lesson plans documenting modifications for special populations</td>
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**Grading**
Student grades are based on participation in discussions, successful completion of classroom observations and study field trips, and a final project-based unit. Grades are determined as follows:

- Attendance, Participation: 5%
- Discussions: 25%
- Field Experiences: 25% (made up of 4-6 hrs classroom observation, 6-9 hrs preparing in the field, and 9-10 hours teaching in the field)
- Final Project - PBI unit: 45%

Study Trip Component: Field-Based Teaching Experiences

PBI Field Teaching Experience. Students will be provided with opportunities for working in classrooms teaching a problem-based lesson that could be used to introduce a project-based instructional unit. These teaching opportunities will occur at local middle and high schools. The field locations this semester will be McKinney Roughs Nature Center and the Blanton Museum of Art. PBI students will conduct a preliminary trip to learn about resources and investigate possible problem-based lessons for secondary school students. The Blanton MA introduction will occur on Friday, February 27th (3-5 pm) at the Blanton Museum of Art. A joint exploration of McKinney Roughs Nature Center and the Blanton MA will occur on Saturday, Feb. 28th from 9-1 (McKinney Roughs) and Blanton MA (1:30-4:30). PBI students will teach preliminary lessons to secondary students on Thursday and Friday (April 2nd and 3rd) to launch "mini" projects with the secondary students. PBI students will then meet with the secondary students in the field the following Saturday, April 4th. Secondary students will be provided with resources to collect and analyze data collected in the field to then prepare a presentation for the following Monday (April 6th). These field experiences will be videotaped, and taught twice in the same day so that reflection and revision can be employed for lesson improvement between teach one and teach two. Draft lessons are due two weeks prior to the teach dates so that review and revision can occur in a timely fashion.

Observations. Each UTeach student is required to spend 4 - 6 hours observing high school classes that are structured on the Project-based method of teaching. They are to record their observations and answer specific focus questions, and then post them to the class website. The information gathered in these observations is also used to inform the class discussions of the peer-reviewed literature on project-based instruction. There is a form posted to the course web site that must be signed by the classroom teacher to verify their presence during these observations. Students will be provided with classroom teacher contact information and schedules to better plan these observations.

Final PBI Project

Each UTeach student prepares a PBI unit (two to three weeks minimum, 6 weeks maximum) to be taught in the secondary class of their choice. It is recommended that the unit be prepared to meet curricular objectives and state and national standards for some portion of the time the student anticipates working in Apprentice Teaching. The
unit will include components as described on a separate handout entitled "Final Project Checklist".

**Attendance and Class Participation**

- Prepare for and participate in class discussions (face-to-face and virtual discussions on course web site) in a timely fashion.
- Attend class each day and work in teams as directed by instructor or as required to collaborate and complete various aspects of the final project.
- Several readings and other support materials will be made available ONLY during class times so attendance is required.
- EXCUSED ABSENCES are allowed ONLY if students communicate one of the following to the instructor via email:
  - ONE WEEK prior to class, religious holidays OR conflicts with required absences due to UT sponsored activities;
  - Illness should be communicated as soon as possible and, if lasting more than one class period, a doctor’s note should be provided when the student returns to class.

**Discussions**

**Web Discussions.** On-line discussions: Students will participate in frequent on-line discussions on course readings and field experiences by posting answers to Discussion questions assigned on the course web site. These will take place prior to class sessions and may form the basis for class activities.

**Class Discussions:** Instructor lead in-class discussions will tie together theory and field experiences. Students will use on-line discussions, readings, class activities, and field experiences as the basis for discussing focus questions.

**Discussion Leadership:** Students will sign up for a turn as a discussion leader for small group discussions of the peer reviewed literature assigned, including the Baron and Petrosino articles and the Polman and Boaler readings. The roles and responsibilities of the discussion leaders are to:
  a) Read all class discussion posts PRIOR to the in-class session and be prepared to summarize for their small group the class responses to the focus questions provided by the instructor;
  b) Prepare a second set of questions for the face-to-face discussion of these readings, for the purpose of extending and deepening student thinking about the assigned readings and how they compare to their observations in project-based classrooms.

**Course Schedule and Syllabus:**
A [tentative] semester overview is provided with this handout. Every attempt will be made to adhere to the schedule provided, but the instructor reserves the right to make changes as needed. Announcements about these changes will be made in class and posted to the course web site.

**Technological Support for Students in PBI:**

Learning Technology Center (LTC)  
[http://www.utexas.edu/education/LTC/about/index.php](http://www.utexas.edu/education/LTC/about/index.php)

The LTC provides a full range of computer facilities and services for College of Education (including UTeach) students, faculty and staff. During open lab hours, students may use a computer workstation and log in with their EID. Multimedia lab computer workstations may be reserved online; however, most computers will be available on a walk-in basis. The LTC Media Lab provides supplies, facilities, equipment and instruction for students to produce a variety of audio-visual and digital media. Basic AV production equipment and supplies are available for sale in the Media Lab with a Lab Card or personal check. Media instruction is a large part of the Media Lab’s service, providing students with the knowledge and skills to properly use AV and multimedia equipment to produce effective instructional materials.

**Disability Services:**

If you qualify for accommodations because of a disability, please submit a letter to the instructor from the Services for Students with Disabilities Office (SSD) as soon as possible so that you needs may be met. For information, call (512) 471-6259 or visit 100-B West Dean Keeton St., SSB 4.104. See [http://www.utexas.edu/depts/dos/ssd/](http://www.utexas.edu/depts/dos/ssd/)

**Classroom Behavior:**

Every effort will be made in this class to model best teaching practices and a respectful, engaging and collaborative community of learners. While learning about Project-based instruction, we will model and engage in many of the practices and processes required for managing the PBI environment. As a member of the faculty of UTeach, I have the professional responsibility to treat each and every student with understanding, dignity and respect. As an UTeach Master Teacher, I can assure you that the most important classroom management tool available to you is your ability to establish a climate of trust and respect in your own classroom. We will all listen carefully to other’s opinions and ideas and I will help to guide classroom discussions in just such a manner. In my high school classroom, I had only two rules: 1) When I talk, you listen, and 2) Respect everyone and everything. These two rules will be modeled repeatedly in this classroom, whether we are learning through whole class or small group interactions.
Academic Integrity:

According to the General Information catalog, "the value of a university degree depends on the absolute integrity of the work done by each student for that degree, a student should maintain a high standard of individual honor in his or her scholastic work" (p. 98). Policy of Scholastic Dishonesty: Students who violate University rules on scholastics dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University.

As teachers, we are often tempted "steal" good ideas from each other – I always considered it a form of flattery if someone else thought my lesson plans or grading policies or other classroom related activities were good enough to copy. However, it goes along with both the idea of academic integrity and respect for all to be sure to annotate all references and give credit where credit is due.