What is the Texas Teacher Externship Program?

TEX$^2$

Texas Teacher Externships

Alice Fisher, Patricia McMorris, Zehra Tayyeb
What is an externship?

An externship is a professional development opportunity connecting the classroom to the workplace.
What is TEX²?

• TEX² is based at the Center for STEM Education at the University of Texas at Austin and funded by the Texas Education Agency.

• The RUSMP Externship program is one of twenty programs around the state.
What is RUSMP TEX²?

Teachers in the RUSMP Tex² program interacted with industry leaders at Bluware and learned about trends and skills in this industry in order to enrich and strengthen their instruction and bring relevance to student learning.
What is Bluware?

Bluware delivers petrotechnical software solutions to oil and gas companies.

“The modern workforce will orchestrate and automate workflows that will break down long standing technical barriers and literally change the face of the E&P (exploration and production) business. This is Platform-as-a-Service. This is true digital transformation. This is Bluware.”
Blueware Development Teams

- Geophysical IO Toolkit
- Comprehensive Data Interpretation System
- Interactive Quantitative Interpretation Suite
RUSMP Tex² Program Timeline (2018)

- Orientation meeting in May
- On-site visits, online meetings, and other opportunities during June, July and August
- Retrospective meeting in August
- Presentation during Networking Conference
- Implementation of lessons learned in classroom during Fall (externship artifact)
Teachers spent 40 hours in externship activities including:

• on-site visits at Bluware
• online Blueware meetings
• written reflections
• online coursework
• group meetings
The Agile Process

Michael Redmond, Rebecca Mondesir, Sanaa Hamdan
What is Agile?

Agile is an ideology in Project Management that is useful in managing critical projects that combine the following four characteristics:

1. Strict (usually short) deadlines
2. Consists of multiple tiers or independent sections
3. Involve the work of teams (versus one person)
4. The team expects change (uncertainty) and respond accordingly instead of following the old plans (adaptability)
Agile Development Cycle
Methodologies Used to Implement Agile

**Scrum Methodology**
- Iterative Development Model
- Fixed length Iteration called Sprints (one to two weeks in length)
- Regular Sprints are held to assess progress, the need to modify, and plan the next step

**Kanban Methodology**
- Is visual
- Utilize a board with many columns (minimum of 3 columns: To Do, In Progress and Done)
- Others may consist of more than 3 columns such as Backlog, Ready, Coding, Testing, Approval, and Done
Mousetrap Vehicle
Teams design, build, and test...
Identify the needs and construct...
Student 2

Boomilever
In this event, competitors design...
Identify the needs and construct...
Student 1

Wright Stuff (Glider)
The Wright Stuff category of...
Identify the needs and construct...
Student 3
<table>
<thead>
<tr>
<th>Backlog</th>
<th>Description</th>
<th>Status</th>
<th>Mentors</th>
<th>Done</th>
<th>Meeting Dates</th>
<th>Agenda</th>
<th>Assigned 1</th>
<th>Assigned 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mission</td>
<td>Participants will be tested on their knowledge of classical mechanics and related topics as well as their ability to construct a self-propelled air-launched vehicle that moves down a track.</td>
<td>Sprint Planning</td>
<td>Redmond, Michael</td>
<td></td>
<td>09/06/18</td>
<td>Identify the needs and constraints (2) schedule meeting times</td>
<td>Student 5</td>
<td>Student 2</td>
</tr>
<tr>
<td>Mousetrap</td>
<td>Teams design, build, and test a vehicle using one or two snap mouse traps as its sole means of propulsion that can push a plastic cup forward, reverse direction, and come to a stop behind the start point.</td>
<td>Planning</td>
<td>Mondesir, Rebecca</td>
<td></td>
<td>09/06/18</td>
<td>Identify the needs and constraints (2) schedule meeting times</td>
<td>Student 2</td>
<td>Student 1</td>
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<tr>
<td>Wright Stuff</td>
<td>The Wright Stuff category of airplanes fits into a class of competition models known as Indoor Fireflight aircraft.</td>
<td>Planning</td>
<td>Samir Hamdan</td>
<td></td>
<td>09/06/18</td>
<td>Identify the needs and constraints (2) schedule meeting times</td>
<td>Student 3</td>
<td>Student 5</td>
</tr>
<tr>
<td>Boonie Liver</td>
<td>In this event, competitors design and build a boonie liver prior to the competition, with the intention of supporting the most load with a small weight (i.e. maximize efficiency).</td>
<td>Planning</td>
<td>Mondesir, Rebecca</td>
<td></td>
<td>09/06/18</td>
<td>Identify the needs and constraints (2) schedule meeting times</td>
<td>Student 1</td>
<td>Student 5</td>
</tr>
</tbody>
</table>
Some of these techniques overlap and are part of a typical Agile Heartbeat:

- Face-to-face interaction
- Lead by example
- Customer interaction
- Deliver frequently
- Demonstrate progress
- Demonstrate support
Application of Agile in the Mathematics Classroom

Lan Wu, Alexander Mironychev, Warren Morales
The Agile - Scrum Framework

Inputs from Executives, Team, Stakeholders, Customers, Users

- Product Owner
- The Team

- Scrum Master
- Burndown/up Charts
- Daily Scrum Meeting

1-4 Week Sprint

- Task Breakout
- Sprint Backlog
- Sprint Planning Meeting

Sprint end date and team deliverable do not change

- Sprint Review
- Finished Work
- Sprint Retrospective
Agile Principles
Applied in the Mathematics Classroom

• Students must work together in groups by contributing their part to the project.
• Students will trust the team to get the job done.
• The most efficient and effective method of conveying information is face-to-face conversation.
• At regular intervals, the team reflects on how to become more effective, then adjusts its behavior accordingly.
The Three Parts of the Agile Application Process

Step 1: Sprint Planning Meeting

Step 2: Weekly Scrum Meetings (check-points and face-to-face communications)

Step 3: Presentation of Project
Step 1: Sprint Planning (45 minutes)

- Break down the project into smaller pieces distributed among specific team members.
- Discuss specific topics together so that students can communicate more information and gather suggestions from other members.
- Listen to others and ask clarifying questions.
- Explore multiple strategies and emphasize communication.
Step 1 (cont.): Sprint Planning (45 minutes)
According to the project due-date, students will create committed objectives (must be done) and stretch objectives (may be done if time permits).

<table>
<thead>
<tr>
<th>Time Range</th>
<th>Committed Objective</th>
<th>Stretch Objective</th>
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<tbody>
<tr>
<td>First week (9/3-9/7)</td>
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<tr>
<td>Second week (9/10-9/15)</td>
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Step 1 (cont.): Sprint Planning Reflection

What Went Well
- Risk management
- Participation
- All teams Together
- Vision first!
- Big undertaking
- Program view

What Didn’t
- Estimation was difficult in some cases
- Ran out of food!
- No vendor participation

Forms Needed for Sprint Planning Meeting

Sprint Planning Sheet

Group Observation Rubric
Step 2: Scrum Meeting (15 min weekly)

• What did you accomplish so far towards your committed objective?
• What do you plan to accomplish this week?
• What is getting in the way of achieving the team sprint goal?
• What is your latest estimate of how much time is left on your current task?
### Step 2: Scrum Meeting (15 min weekly)

<table>
<thead>
<tr>
<th>Task Name</th>
<th>The person who is working on</th>
<th>Status (In progress, done, to do)</th>
<th>When you will Complete the task</th>
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**Forms Needed for Scrum Meeting**

- **Weekly Scrum Meeting Sheet**
- **Group Observation Rubric**
Step 3: Student Presentation of Project

Forms Needed for Presentation

Presentation Rubric
Evaluation Form For the Team
Reflection Form
Step 3 (cont.): Project Reflection

<table>
<thead>
<tr>
<th>What went well?</th>
<th>What did not go well?</th>
<th>Appreciation</th>
<th>Some Ideas?</th>
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Agile Application Projects

- Trig Book Project
- Geometry/Calculus Interactive Notebook