# Developing a Variation of Problem-Based Learning

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## Introduction and Goals

The TCU & UNTHSC School of Medicine was awarded preliminary accreditation in October 2018 and matriculated the inaugural class in July 2019. In the years prior, the university built a team of clinicians, educators, and researchers to build an active learning curriculum centered on training students as empathetic scholars. This includes critical thinking, lifelong learning, empathy, compassion, professionalism, and self-identity, developed through the lens of constructivism. Constructivist theory integrates learners' experiences into the learning process and supports transfer of knowledge[1]. In Phase 1, which is 14 months and includes core pre-clinical concepts, students spend 20 hours per week in an active learning classroom.

**Phase 1 Standard Weekly Schedule**

*Applies to Foundations; Behavior, Hematology, Immunology and Skin; Homeostasis; Neuromusculoskeletal; and Metabolism and Life Cycle*

| | MON | TUES | WED | THURS | FRI |
|---|---|---|---|---|---|
| 8-9 | | | | | |
| 9-10 | Patient-Centered Content Framing | | Content Application Session | Content Application Session | Content Application Session – PIBL |
| 10-11 | Content Application Session – PIBL | | | | |
| 11-12 | | | | | Content Application Session |
| 12-1 | | | | | |
| 1-2 | | *Scholarly Pursuit and Thesis OR Phase 1 LIC | *Clinical Skills OR Preparation for Practice | | |
| 2-3 | | | | | Quiz or Exam |
| 3-4 | | | | | |
| 4-5 | | | | | |

**Patient-Centered Content Framing:**
- Patient panels
- Patient presentations
- Interactive introductory content
- Other applicable modalities

**Content Application Session:**
- Patient-centered inquiry based learning
- Team-based learning
- Case-based learning
- Simulation
- Role playing
- Other applicable modalities

Each student will have approximately 15 hours of assigned independent study and 5 hours in preparation for self-directed learning per week. These expectations can be met at any time during the week other than the scheduled sessions as depicted.

- **Assigned days for these courses will vary per student for longitudinal courses.*
- *Purple indicates sessions that occur on TCU campus.*

**To meet our curricular goals and fulfill the LCME 6.3 requirement on self-directed learning within the organ system courses, the university elected to use a structured inquiry learning process, by which students investigate a faculty-presented question by a defined procedure.** A task force was formed to accomplish the following goals:

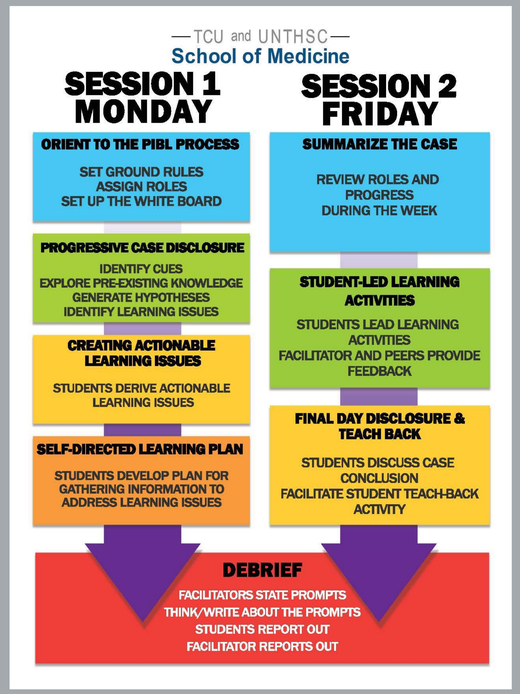
- Develop a problem-based learning process that matched the curricular vision
- Identify variables and develop strategies with key stakeholders
- Write student and faculty standard operating procedures
- Work with the deans of Faculty Development and Assessment to draft, test, and refine faculty training modules and an assessment rubric based on the school's educational program objectives.

Ultimately, we determined the goals are closer to inquiry-based learning with a focus on deeper understanding of a real-world problem and the learning process, rather than problem-based learning with a focus on solving a real-world problem with many solutions. As our comprehensive model thus became investigative, patient-centered, and empathetic, it was renamed **to Patient-Centered Inquiry Based Learning (PIBL).**

We evaluated the benefits and challenges of variables in different models of problem-based learning in order to craft the PIBL process to match the curricular vision.

## Results – Developing PIBL

| Variable | Resolution |
|---|---|
| **How to maximize time for PIBL, knowing we will have 2 in person sessions?** | Virtual disclosure – One to two pieces of additional information about the case are disclosed on Canvas. |
| **How to facilitate discussion outside of class?** | Online discussion board. Canvas was used initially then transitioned to other online note-taking platforms based on group preference. |
| **Are faculty-derived learning objectives released, and if so, when?** | Students share their actionable learning issues on discussion board. Faculty-derived LOs not released |
| **Should case disclosure be progressive or requested?** | Progressive disclosure to ensure all students received all cues and information. |
| **What are the expectations for Friday?** | Students with the "presenter" role that week use learning activities to guide discussion and application of actionable learning issues. |
| **What is the role of the facilitator?** | Guide process, not content. Facilitators have a list of potential prompts related to process and Monday/Friday debrief. |
| **How do we incorporate debrief?** | Every Monday and Friday at the end of the session. Prompts are based on the metacognitive cycle of planning, monitoring, and evaluating. |
| **How do we incorporate the empathetic scholar?** | Friday sessions include a case resolution and teach-back, in which students explain a concept in the case to a specific audience, consider the patient's perspective, or reflect on other non-biomedical aspects of patient care. |
| **In was ways can we direct students while learning the process?** | Students will receive case goals on the first disclosure page. |
| **Who is responsible for actionable learning issues?** | All students are responsible for tackling all learning issues, and should come prepared to apply their knowledge during the Friday session. |




Assessment

We developed 6 process-specific objectives for PIBL which are assessed at the mid and endpoint of each course using a rubric developed from our educational program objectives.

1.Evaluate, synthesize, and apply basic science knowledge in a clinical context.
2.Engage in critical thinking and problem-solving based on referenced material.
3.Critically appraise medical literature, including assessing credibility of information sources.
4.Effectively communicate with others and participate in shared decision making.
5.Assess and refine one's self-directed learning.
6.Give, receive and incorporate feedback.

The mid-point assessment is formative. Students meet individually with their facilitator to review comments and incorporate feedback for the second half of the course. The end-of-course assessment is summative. Cumulatively, students must earn "meets expectations" on a percentage of the rubric, increasing to 100% by the end of phase 1. As we perform holistic assessment of the students, they do not need to earn meets expectations within every course, but should on average across all courses.

## Results – Modifications to PIBL Through the First Year

We recognized the need for flexibility and adjusted in response to student and facilitator feedback. Some of the modifications to PIBL over the first year of the program, include:

- **Discussion Board:** The discussion board was created in Canvas as a place for students to share notes, actionable learning issues, and resources. However, the format within Canvas was not user-friendly for the students. To meet them in their space, students were allowed to start using other online note-taking platforms and invite their facilitator to view the document.
- **Case Goals:** In the first few courses, students were provided case goals at the beginning of the case to serve as guide for the overarching focus of the case. Case goals were eventually phased out as students became more experienced with PIBL and developing broad hypotheses.
- **Assessment:** The rubric used for PIBL was designed to capture students' progress on milestones related to the school's educational program objectives. These milestones are focused on the educational program objectives associated with lifelong learning, communication, responsibilities, professionalism, and personal/professional formation. Facilitators provided feedback that the language in the rubric could be clearer to provide greater consistency and value of the assessment tool. Modifications will be made for the next class, pending approval.

## Results – Modifications due to COVID-19

In response to the COVID-19 pandemic, all curriculum that was normally in-person classroom instruction, including PIBL, was pushed online. The school's goal for PIBL was to preserve the process in the online environment, which has been largely successful.

- We use Zoom breakout rooms and online note taking platforms to simulate the in-person environment as much as possible.
- We acknowledge our school's FERPA guidelines restrict requiring the use of video in an online learning environment. Each group sets their ground rules about sharing video.

As we continue PIBL online, our students have upheld PIBL's value in our curriculum by staying engaged in the process and leading even more creative, virtual learning activities during the Friday sessions.

## Discussion and References

We developed a hybrid model of problem based learning with the following unique features:

- Virtual disclosure
- Discussion board / OneNote – whiteboard during class and discussion during the week without the need to meet.
- Teach back, where students explain a concept in the case to a specific audience, consider the patient's perspective, or reflect on other non-biomedical aspects of patient care.

Key stakeholders were highly engaged in the development of PIBL, and expressed high satisfaction with the speed to which students oriented to the process and developed critical thinking skills. Similarly, students saw value in the skills acquired during PIBL.

References

1. Bruner, J. (1960). The Process of Education. Cambridge, MA: Harvard University Press.