Blueprint for Problem-based Learning Implementation and Outcome
Today’s Speaker

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Disclosure

The presenter declare **NO** conflicts of interest
Objectives

➢ Discuss detailed planning and implementation of PBL in a predoctoral dental program.
➢ Analyze a video example of a PBL student assessment from a predoctoral dental program.
➢ Discuss the outcomes of PBL implementation in a predoctoral dental program.
“If you can define the problem correctly you can almost have the solution.”

-Steve Jobs
What is a problem-based learning (PBL)?

An open-ended problem triggers thinking and a process to arrive at a solution.

Images: www.dreamstime.com
Traditional dental education model

An overview of traditional education (the 3C model)

- Communication
- Cerebration
- Casting

How can we make out problem to fit to one of the solutions?
Improved dental education model

Newer models for student-centered and autonomy-based approaches (the 4C model)

Communication → Cerebration → Creativity → Casting

“I want you to think 7.048239 inches outside of the box.”

Image: www.glasbergen.com
PBL in dental education

PBL learning (the 5C model)

- Critical thinking
- Collection
- Consideration
- Communication
- Collaboration

Realistic problem
Knowledge integration and application
Student-centered
Active learning
Critical thinking

Images: www.dreamstime.com
What are the advantages of PBL?

Non-linear

Original

Student-center

Guided

Higher level of thinking
PBL experience: A Blueprint

"Experience has taught me all I know, and many things I never wanted to know."

"Why do you need my advice, my son? You're on top of the world!"
PBL in Predoctoral Pediatric Dentistry

2019-2020

First class to take INBDE 2023

Integrated National Board Dental Examination (INBDE)
Student’s ability to…

➢ Perform a comprehensive evaluation
➢ Recognize normal and abnormal growth and pathologic conditions
➢ Determine caries risk status and develop a treatment plan
➢ Communicate treatment plan and anticipatory guidance effectively
➢ Guide and manage anxiety and pain
➢ Understand management traumatic injuries of various dentition
➢ Recognize malocclusion and the need for space management
➢ Recognize need for consultation or referral
PBL format

➢ PBL integrated in traditional curriculum
➢ Pediatric component:
  ✓ Didactic: PD1
  ✓ Preclinical: PD2
  ✓ Clinical: PD3 (PBL integration)
➢ Implementation: 2019-2020 cohort
➢ Compare with 2018-2019 cohort

“We need to make some big changes around here. The kind of changes where many decisions are made but nothing actually happens.”

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Scope of PBL application

- Pediatric cases (Avatars) from age 1 day-18 years
- Focus was general dental practice
- Three main topic for case development
  - Odontogenic pain or infection
  - Pediatric pathology
  - Traumatic dental injuries
- Orthodontic cases (not included)
- 6-8 cases on each main topic

Faculty moderator
6-8 students in a group
What was included with a case?

- Clinical information (HIPAA compliant)
- Deidentified extra- or intra-oral photographs
- Deidentified intra-oral, extra-oral, and soft tissue radiographs
- Biopsy results
- CBC with differential
- INR, PT PTT values
- Cardiac or other medical notes
- Medical consults
“It is so much easier to suggest solutions when you don’t know too much about the problem.”

-Malcolm Forbes
Sample Case

➢ 3-year-old male patient reported to your general dental clinic for NPE
What do the students learn during PBL sessions?

- Methodical approach
- Comprehensive planning
- Evidence-base knowledge
- Higher cognition
- Communication
- Wholistic view of care
First PBL publication in Pediatric Dentistry

ORIGINAL ARTICLE

Perception and outcomes after implementation of problem-based learning in predoctoral pediatric dentistry clinical education

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PBL Blueprint

Won’t get any info unless you ask for!
Grading rubrics

- Data collection and Med. consults
- Radiographic reco. and diagnosis
- Formulation of problem list
- Tx, behavior management, and referral
- Prescription or lab script writing

- 0 point: critical error
- 1 point: student possesses basic knowledge
- 2 points: student’s knowledge clinically acceptable
- 3 points: outstanding diagnostic and planning skills

"I love my teacher. She doesn’t give numerical or letter grades. She gives emoticons."
Critical errors

➢ Direct actual or potential harm to the virtual patient
➢ Overdosing of medications
➢ Not collecting information on allergies
➢ Not addressing systemic signs of odontogenic infection
➢ Not knowing pediatric tooth numbers
➢ Recommending excessive number of radiographs (ALADA)
➢ Not recommending advanced behavior management
➢ Not evaluating oral airway before recommending sedation
Triple Jump Assessment
In addition to MCQ and OSCE

DEFINITION OF PROBLEM
SEEKING INFORMATION
SYNTHESIS AND FORMULATION
SEEKING INFORMATION
Triple Jump Assessment Recording

OSCE EXAM

FERPA and HIPAA compliant
Study overview (retrospective)

DDS student classes
(predoctoral dental students and advanced standing program)

- Traditional Clinical Education
- Problem-based Clinical Learning

Competency Evaluation

- First Pass Rate
- Learning Perception

(n=120)
First pass rate

### Patient-based

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<th>Diagnosis and Treatment Planning</th>
<th>LA and Pediatric Restorative Dentistry</th>
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### Case-based

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<th>Space Maintenance</th>
<th>Pediatric Pulpal Therapy</th>
<th>Special Healthcare Needs</th>
<th>Infant Oral Exam</th>
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Attempts: 3 2 1
Caveats of PBL

➢ Clinical hand skills (needs more investigation)
➢ Long-term impact on education is undetermined
➢ Small group discussion framework may not be viable

Caveats of PBL-study

➢ Faculty perceived effectiveness was not evaluated
➢ Impact on NBDE scores not evaluated
➢ Impact on performance in other courses not evaluated
References

1. MD HSB, BScN RMT. *Problem-Based Learning: An Approach to Medical Education.* Springer Publishing Company; 1980.
References


Questions
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Statistical analysis support:
Center for Research Outcomes in Children’s Surgery (ROCS),
Children’s Hospital Colorado, Aurora, CO.
Thank You!

✔ Please complete the post-event survey

✔ Recording available within a few business days at adea.org/eLearn

✔ Stay tuned for ADEA Micro-credentialing (March 2022)!