Tufts University School of Medicine

CTSE Center for Translational Science Education

Providing practical solutions to bring benchtop and bedside to desktop

Collaborative Digital Bioscience Career Awareness Curriculum and Teacher Professional Development

Berri Jacque

Our overarching goal

High School Students

Increase performance, engagement and career awareness

by

Bringing authentic life-relevant science into the classroom

How?

By partnering teachers with scientists

Bridging the bioscience STEM gap: challenges

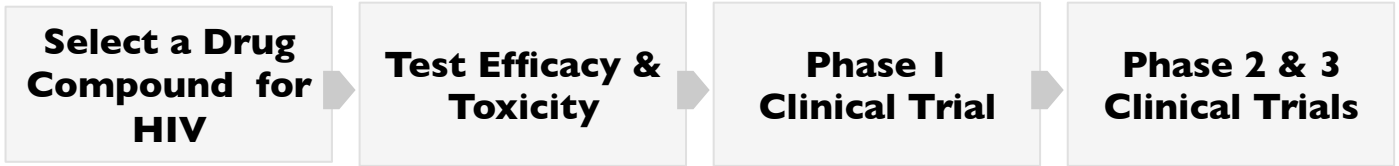
- Building career awareness, interest and goal setting
- Building competencies - teamwork and critical thinking in the context of biosciences
  - Formulating questions
  - Designing experiments
  - Interpreting data

Integrating career awareness and experimental design by collaborative digital case study learning

1) Create teams and assign roles of actual bioscience careers

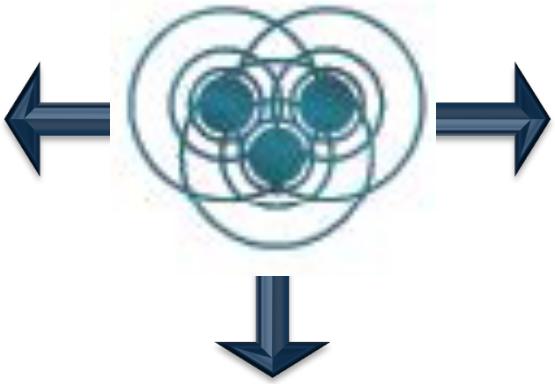
Integrating career awareness and experimental design by collaborative digital case study learning

2) Each team then participates in an HIV drug design project that spans:



Joint development and PD by collaborative curriculum design

Scientists
Novel content knowledge, evidence-based reasoning, authentic scientific practice "know-how"



Teachers
Pedagogical content knowledge, assessments, direct relationship with students

Technology development

Curriculum Development

Increased Student
Outcomes expectations, Self Efficacy
STEM Career Interest and Goals

Joint development and PD by collaborative curriculum design

6 Co-design teacher partners: Boston (4), Brookline, Medford MA

Design and Pilot at Tufts

Student led interviews

Reflect and re-design

Classroom Pilots

Reflect and re-design

Training teacher cohort 2 at Tufts

Student led interviews

Classroom Pilots

Design New Case Topics

Training teacher cohort 3 at Tufts

Student led interviews

PD by Modeling for Fidelity

- **<u>Best practices</u> for teacher professional development:**
  - Extended duration
  - Contextualized rich in content
  - Sustained mentor interactions

- **Modeling for Fidelity** supports and training:
  - Downloadable materials
  - In person trainings
  - Online trainings
  - Real-time mentoring

How do we measure success?

High School Students	1. **Performance:** ▪ Content mastery, problem solving 2. **Engagement** ▪ Attitudes, self efficacy − (Health Literacy) 3. **Career awareness** ▪ Efficacy, outcomes expectations
Teachers	1. **Content knowledge** ▪ Content mastery, problem solving 2. **Career awareness** ▪ **Efficacy, outcomes expectations towards students** 3. **Confidence** ▪ Teaching efficacy 4. **Change in classroom practices** ▪ Self-reporting of practices, observation
Scientists	1. **Knowledge of teaching** ▪ Inquiry based pedagogical approaches ▪ Curriculum design and evaluation 2. **Training of Scientist Educators**

Questions and thoughts?

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http://sites.tufts.edu/greatdiseases/

Acknowledgments

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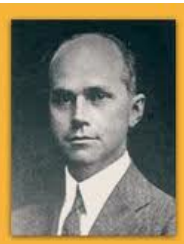

Richard Lounsbery

Tufts Collaborates!

CUBIST PHARMACEUTICALS

Supporting students in designing experiments and interpreting data: *QMDC*

	Experimental Design	Communication
Question	What question do you want to address?	What question does the experiment address?
Method	What method(s) can you use?	What method(s) are used?
Data	Predict what your data will look like.	Describe the data.
Conclusion	What conclusions can you draw from your predictions?	What conclusions can you draw from the data?