Cooking Quality Learning with FLEXspace Recipes for Designing Academic Spaces

People, environments, teaching: Towards an integrated model for innovation
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MERLOT
Multimedia Educational Resource for Learning and Online Teaching

SKILLS COMMONS
open for learning

CALIFORNIA STATE UNIVERSITY LONG BEACH

FLEXspace®
Flexible Learning Environments Exchange

TE4CHING LEARNING @UNIPD

Persone, Ambienti, Didattica:
verso un modello integrato per l'innovazione

UNIVERSITÀ DEGLI STUDI DI PADOVA

18 e 19 maggio 2023

MISSION:

- Empower the continuous development of skills for teaching and learning;
- Strengthen the sustainability of teaching through the implementation of dedicated resources, tools, spaces, and facilities;
- Overcome the transmissive methodological paradigm of knowledge;
- Enable digital integration;
- Enhance the culture of quality in the student, teaching and technical staff

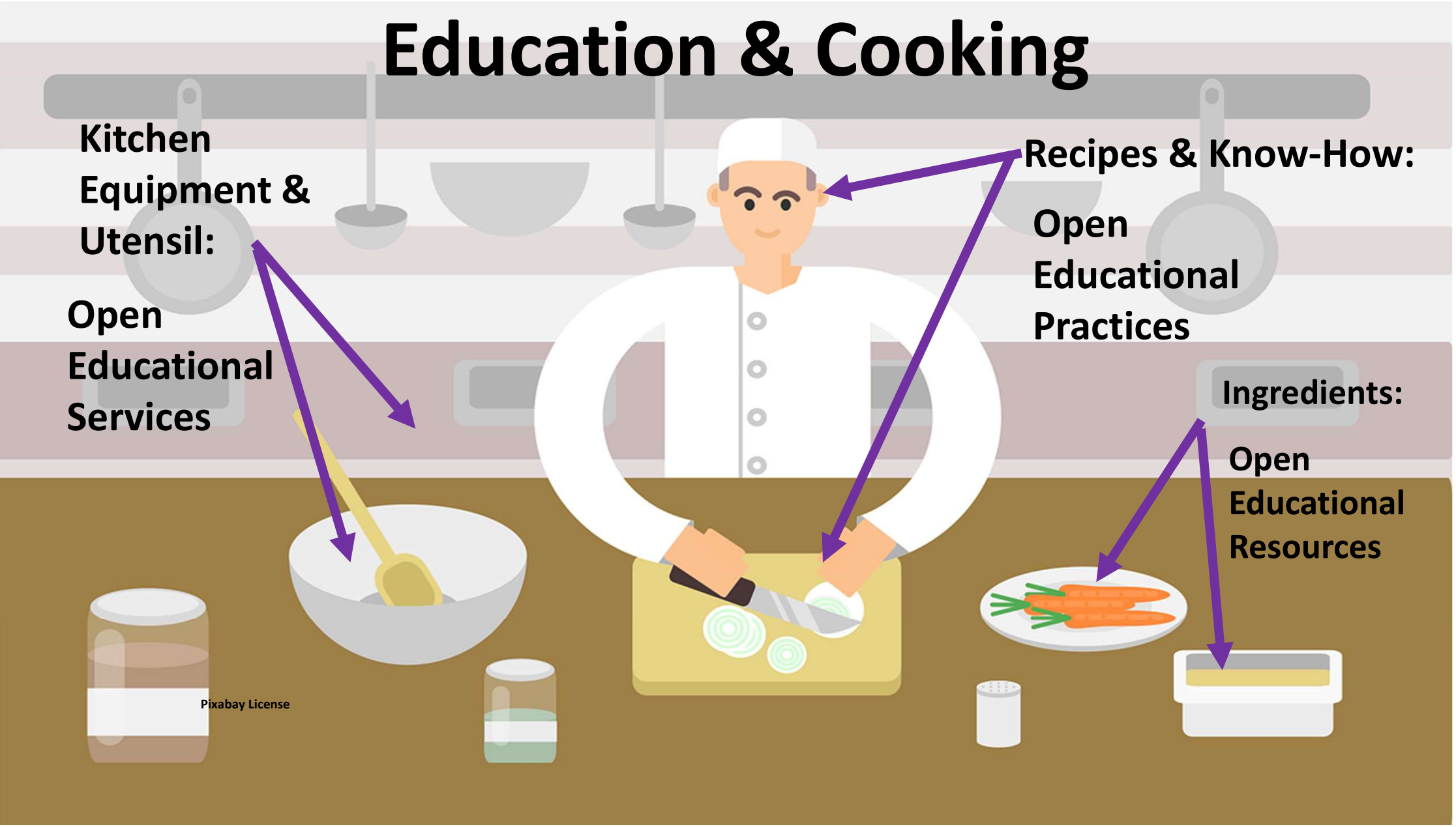
STRATEGIC PRIORITY (for this presentation)

- Design and re-design of support spaces, tools, and resources to enable the implementation of integrated learning environments aimed at developing multimedia and multimodal teaching processes.

An Invitation to “OPEN” DOORS for ALL TO LEARN

- Open Educational Resources (OER)
- OpenCourseWare (OCW)
- Open Enrollment (MOOC’s)
- Open TextBooks
- Open Access Journals
- **Open Learning Space Designs**

Education & Cooking



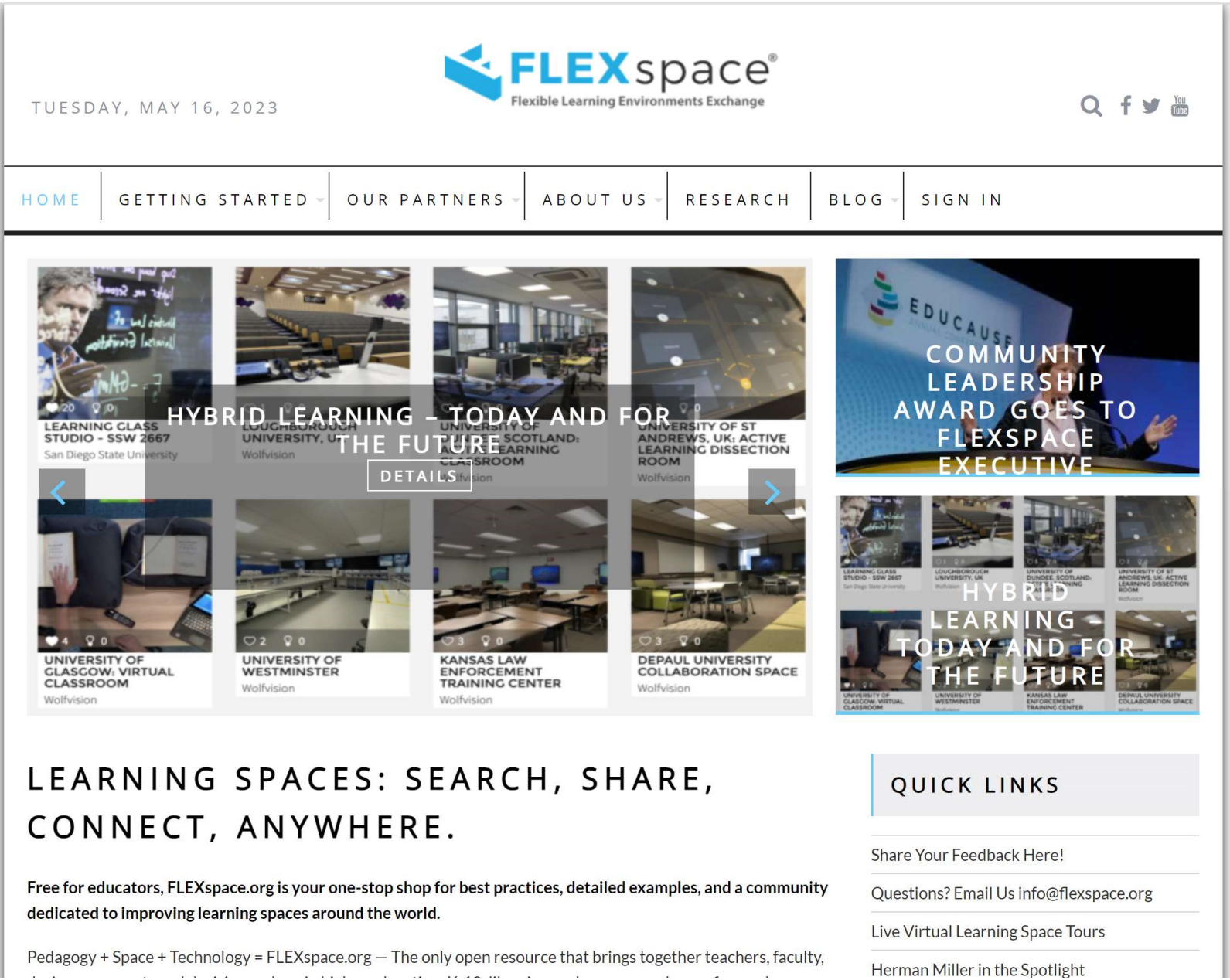
FREE & Open Educational Resources, Practices, and Services Enable Us All To:

- Learn From Each Other
- Effectively & Efficiently Collaborate with Others
- Accelerate Innovations
- Become Real LEARNING ORGANIZATIONS

Imagine an open digital library for educators to explore the designs, uses, and impacts of different learning environments used around the world…

You could…

- See new and different classroom spaces instead of just imagining them.
- Create a common understanding of complex learning spaces among different stakeholders by sharing common descriptions of the spaces
- Successfully discuss and collaborate with different people about how teaching and learning could be implemented in innovative spaces
- Cost-effectively and efficiently plan for innovations in your learning space



Let's get an overview

https://flexspace.org

719 Published Spaces

Institution Type	Published Spaces
AV Integrator/Consultant	1
Community College	26
Corporate/Business	47
Designer/Architect	1
K12	19
Non-profit	2
Private College/University	123
Public College/University	**494**
(blank)	6
Grand Total	**719**

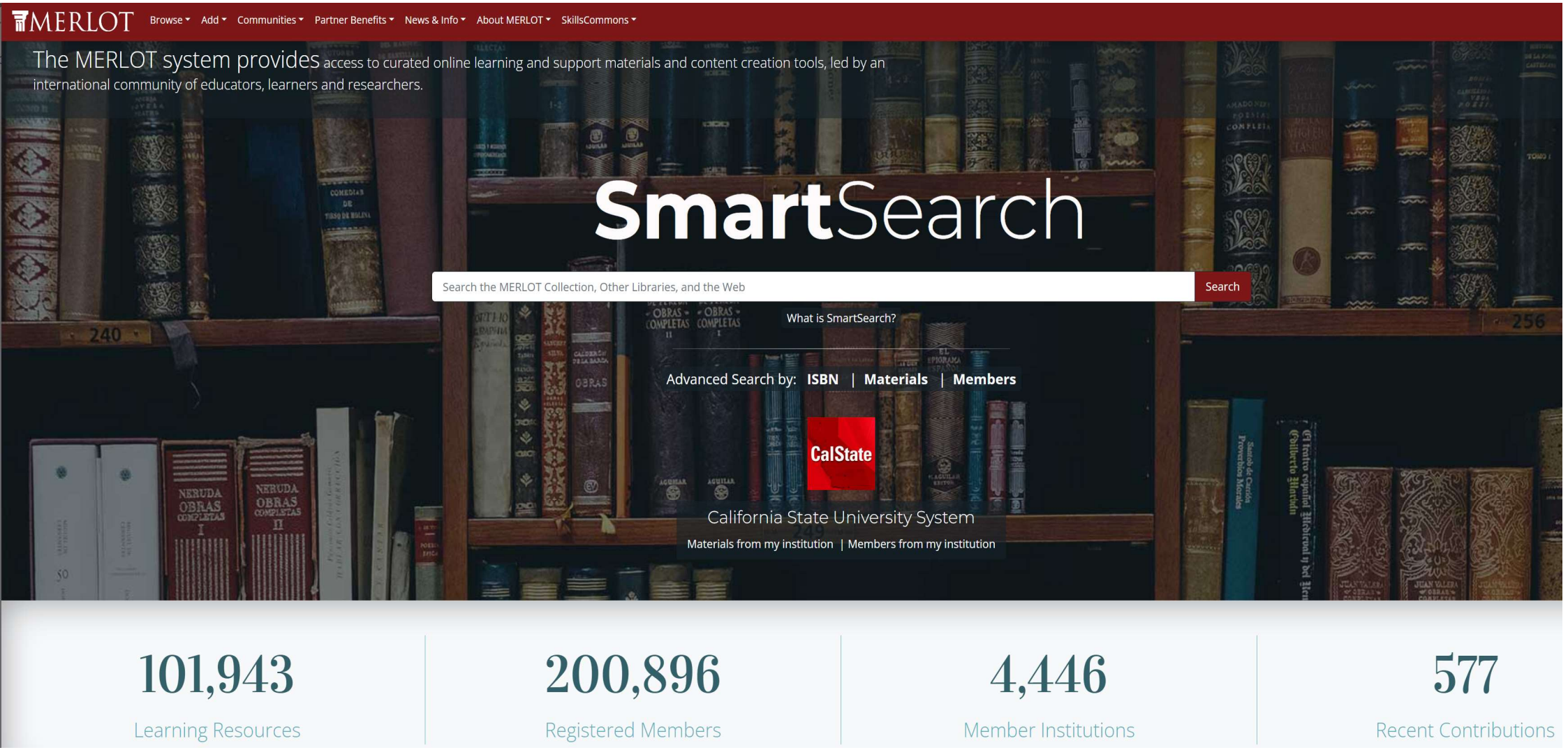
Space Type	Spaces
Active/Flexible Classroom	294
General Purpose Classroom	135
Lecture Hall / Auditorium	60
Media/Computer Lab	45
Other	36
Group Study/Meeting Room	34
Maker/Build Lab	20
Recording/TV Studio	16
Science / STEM Lab	13
Learning Commons / Information Commons	9
Esports	7
Transitional Area	6
Outdoor Space	2
Performance Space	2
Art Studio	1

IS FREE & OPEN FOR YOU!

You could…

- Browse the library to get inspired
- Use the “ingredients” of different designs to develop your own “recipes” for innovative teaching and learning practices. FLEXspace is YOUR KITCHEN!
- Share your “family recipes” for innovative classroom designs in the FLEXspace “cookbook” so others can enjoy good teaching and learning strategies

CREATE AN ACCOUNT AND YOU ARE READY TO FLEXspace!



www.merlot.org

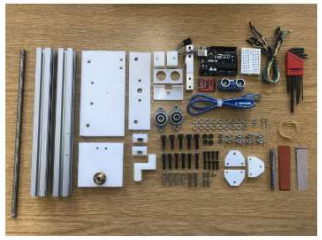
Biomechanics Takehome Labs: Build-Your-Own Test System

The Take-Home Lab Kits

Lab Goals

1. Give students the opportunity to construct their own miniature tensile testing systen
   - Learn the key components of materials testing systems and how they work t
2. Collect force and deformation measurements from physical specimens to visualize
3. Apply numerical analysis techniques and mathematical models of ideal material bel
   - Provide experience processing and interpreting noisy data
   - Fitting mathematical relationships to noisy data, and extracting meaningful q
   - Practice conducting error analysis and troubleshooting engineering systems

Students were split into self-selected teams of three to complete three Lab Assignments. E
own desktop tensilse testing system.



Each lab kit contained all of the individual components required to conduct the take-home tensile test device.

The lab kits were acc
both written and il
instructions for assem
harwdare

Using the components and instructic
construct their own test systems. Onc
were ready to begin collecting data.

Lab Activities

Lab 1	
1. Lab kit assembly 2. Calibrating the force sensor 3. Measuring force and deformation data for a linear-elastic spring	1. Charact a *linear-* 2. Charact for *visc* rates 3. Qantify material model t system

For each lab, the students submitted:

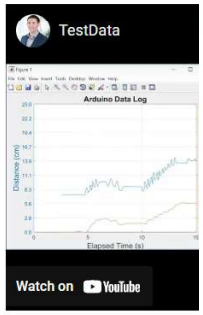
- Plots of their data, as instructed in the lab handouts
- Answers to post-lab questions
- Written to help students draw connections between the data they co

Labs were assigned in the last month of the semester, after the material ha

- Students were given two weeks to complete each lab

Labs in Action

Students could see real-time force and deformation data plotted to their MA



LIT Results and Findings

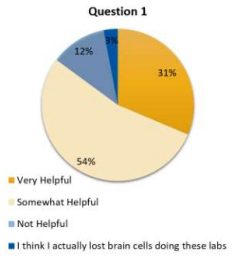
LIT Redesign Impact on Teaching and Learning

- How has the course redesign strategies affected your instruction an
  course?
- Describe how your students mastered the student learning outcome
- Did you experience unexpected results after teaching the redesigne
- Consider attaching a more in-depth report describing the impact of
  including samples of students' work that reflect the impact of the red

Assessment: Overall Course Performance

- The final course grades for the pre-redesign class (Spring 2018, t
  significantly different pre- and post-redesign. However, this finding is
  of the semester, and they were not introduced until the second half

Question 1: *"In your opinion, how helpful were the lab activities at s*
Question 2: *"How helpful were the labs in increasing your understan*



Student Quotes:

"The real-time graphs generated in MATLAB helped me understand
the "real-world" in my learning process."

"Generating the graphs from the data was a bit confusing because I
MATLAB/Excel. . . . .But once the graphs were generated, it was extr

"I enjoyed working through the post-lab questions with friends as I w
setting up the lab as it made us feel like we were actually "engineerin

"I feel like since we worked in groups, I didn't get a full grasp on the s
physically did the experiments and answered post lab questions, but
part. But that's the nature of group work."

"I thought it really help enforce some of the ideas in class, when actu
the end of the semester and it was on top of all the other projects an

Question: *Compared to a traditional "in-class" lab, did the "take-hom*

Question: *Compared to traditional "in-class" labs, how effective were*

Instructor Reflection

The LIT program was a great experience, and I am looking forward to expanding on these take-home labs for this class and beyond. Based on some excellent feedback from the LIT group during the final presentation, I will be incorporating some in-person and video instruction into the take-home labs when they are assigned again next Spring, and am excited to see how these sessions are received by the students. There were also some suggestions to connect with our MakerSpace labs here on campus to use these kits as examples of designs and systems students can build for other engienering (and other STEM) course and research projects. I will definitely be pursuing this option as a first step to getting the systems disseminated to the wider scientific, engineering, and education communities.

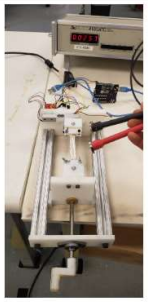
I had two great students working on this project with me, and they did a fantastic job designing the kits, assembling them for the BME 167 students, and then providing technical assistance to the students as they worked on the labs. Our next steps are to put together a manuscript documenting the system they designed, and using the LIT experience as a showcase for how this system can be implemented into educational settings. I am working with these students to prepare this mansucript this Summer, and I have already recruited an undergraduate research student to perform additional validation work in the Fall.

A Few Highlights to Share

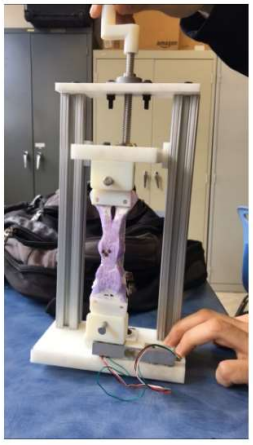
A few students in the class saw some extra potential in the take-home lab kits, and decided to incorporate them into projects for other courses, and even their Senior Design projects.

In the picture and video on the right, we can see the system in action. This student's project aimed at characterizing the resistance of stretchable circuits, and was conducted in conjunction with a high-end contract manufacturing company:

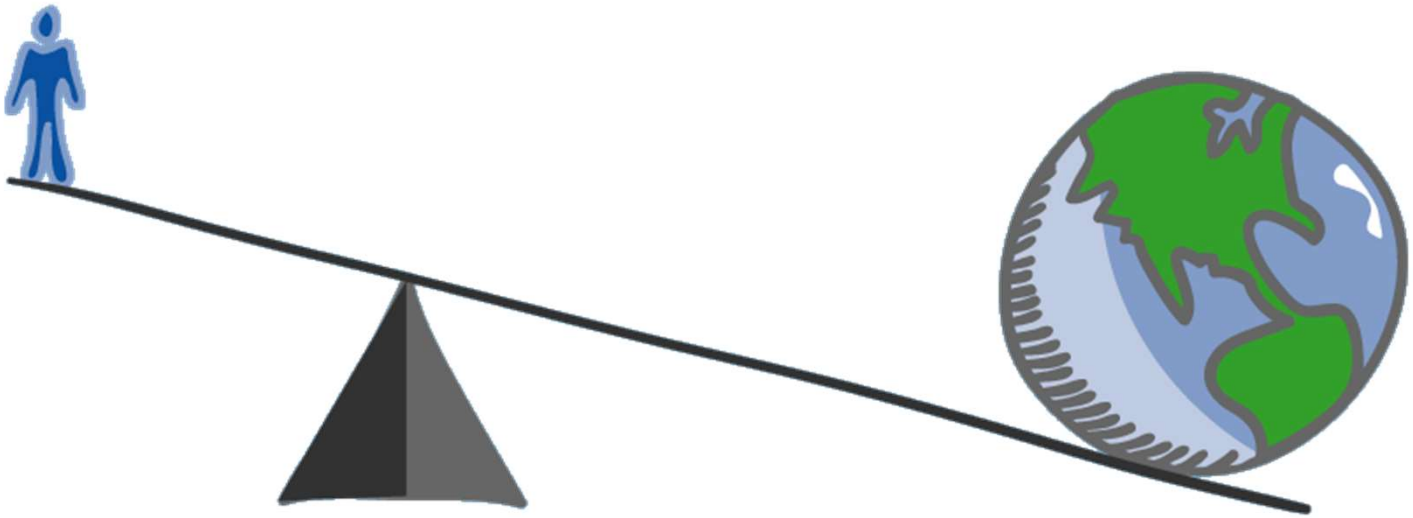
"I took [the test system] to Jabil (company where he is an intern) when I was working on my senior project. We almost considered using it for our tests, but the Instron kept malfunctioning so in the end we were not able to."



A few students had a little fun around Easter, and decided to see how much a Peeps rabbit could stretch. While they chose the candy just for fun (unprompted by the instructor), it turned out to be an excellent opportunity for them to see the deformation behavior of a real-life (if slightly modified) biomaterial. Marshmallow is made of sugar and gelatin. Gelatin is just a reduced form of collagen, which is a major component to all soft tissues in mammals (tendons, ligaments, cartilage, bone, etc.)! While the students thought they were having a little bit of fun, the joke is on them. It turns out they were learning!



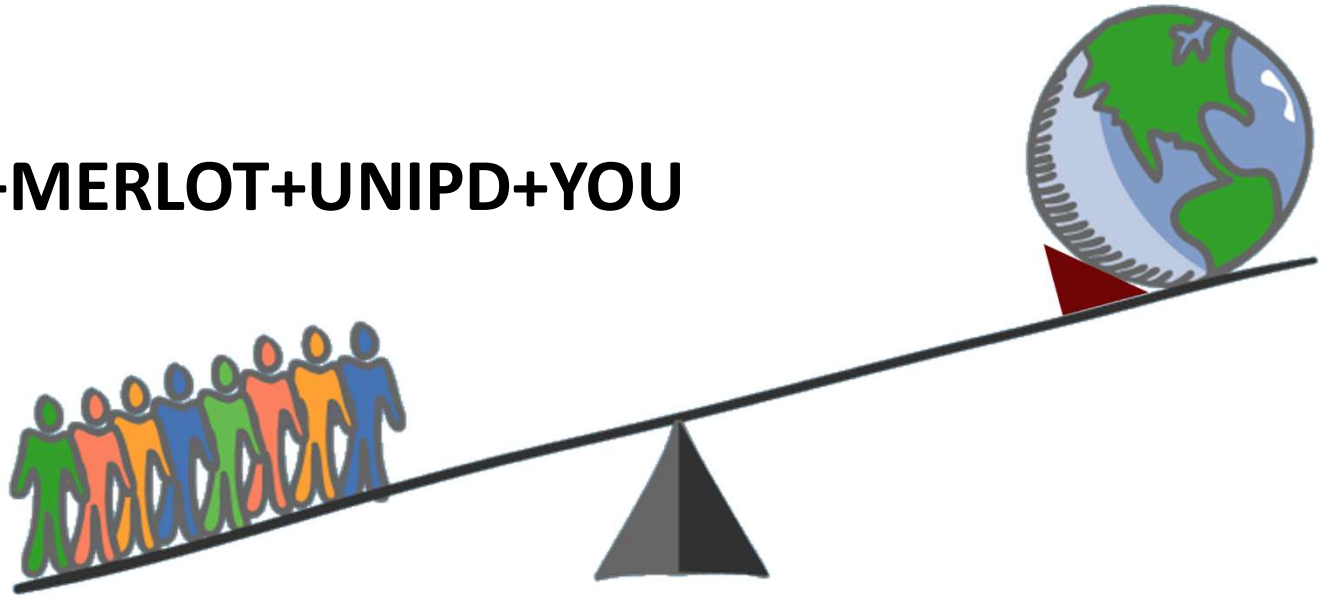
Innovations in Higher Education Can Feel Overwhelming and Impossible…



But Together We Can Lift The World of Education To Achieve More

Educational Innovations & Student Success

FLEXspace+MERLOT+UNIPD+YOU



QUESTIONS?

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