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CSUSB Pedagogy Forum 2021: "Students' Perception of COVID-19 Shock on STEM Laboratory Courses"

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CSUSB Pedagogy Forum 2021

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START – 00:00:00

Well, hello, everyone.

Welcome to the panel discussion,

and our topic is student
perception of COVID-19 shock

on STEM laboratory courses.

This is actually a research our
team did in the spring quarter,

when we first converted
to this fully online mode,

and my name is Yunfei Hou.

I'm from computer
science and engineering.

Joining me today is Fadi
Muheidat and Wagner Prado.

Professor Wagner Prado
is from Kinesiology,

and Professor Fadi is

from computer science.

So we conducted a survey to
evaluate student perception

Hello. Good afternoon.

of the online courses.

Yeah, so, I'm
just going to

Virtual teaching mode.

I'm from California State
University, San Bernardino.

So, well oh, yes, one
more thing I will tell you is

that we recently presented
this paper at this conference,

IEEE Global Engineering
Education Conference,

and we actually received a
best paper award for this,

which is kind of a
pleasant surprise.

I wanted to, you know, brag
a little bit about this.

So about this research
at the time when

so what we did is
that, at the beginning,

for this COVID-19 interruption,

e thought it actually
might be a good opportunity

to evaluate the online
teaching for STEM courses

that contains a lab component.

The reason for this is really in
the computer science department

and the many STEM-related
fields, we are hesitant

when it comes to
promoting online courses.

So many of our courses
have this lab component,

which are either
having some hardware

or some specialized software
that's really required

lab setting.

And it's kind of easy to imagine
for physics, for chemistry,

for kinesiology, you
really need the equipment

to do all those experiments.

So before this COVID-19
interruption,

we were really kind of
cautious about moving things

to online setting, and
then we have been forced

into having everything online.

We thought, well,
maybe we can take

of this connecting an
evaluation on how things were,

and this can help us to
make further modifications

to our courses, may or may
not be in the online fashion.

But little did we know at that
time the COVID-19 interruption

really last for over
a year, so this kind

of an interesting study,
then, from the perspective

of the COVID-19 impact overall,

but focusing on the
initial stage.

And so, secondly, for
this survey that we sent

to students asking for their
experience on these lab courses,

we focused on three aspects.

The first one is really
about teaching presence,

or put a different way, we
were curious about the quality

of the lecture, the
students' perception

of our instructional technique.

And the second aspect we look
into are converting to online.

So the second thing we look into
is for the cognitive presence,

which really is just to talk

about how are we
engaging our students.

Are we motivating
our students enough?

Are they being stimulated
for the course material,

such that they can reflect
deeply on the content,

and have some critical
thinking on the context?

So cognitive presence
and the last piece

of the questions we asked
is about online modality.

This really is the issue
related to the technical tools,

the online functionalities.

And later, we extended
online modality session

with the equity issues.

Some of our students may or
may not have the equipment

and the necessary support to
really do the online learning,

like the study environment,
like the broadband access,

like the equipment,
computing resources,

so all those type of things.

And now, for our
survey, we kind of come

up with 25 recommendations
that's really

I know, so 25 seems
to be excessive.

But this is really a
collection of all the feedback

that we collected from various
courses that we reach out

and come back with the feedback
from both faculty and student.

We are about let me show

you some interesting results

from our survey.

All right.

So maybe I will take
a shortcut here,

and let my slides play itself.

Let me know you can if you cannot hear it.

Now I want to show you some
of the interesting results,

or main results that
we collected

from the student survey.

One thing to mention is that we
sent this survey to the College

of Natural Science, which
we have about 5000 students,

and the response we collected
are about 600, 660 or so.

And they are from various
department, and the majority

of our research is really
focusing on the STEM

or related courses, specifically
with lab components,

or the projects-based
learning components.

And again is we
think converting

to online teaching is probably
hard for those STEM field

because of the difficulties
with the lab components.

So let me play my recorded
presentation for the results,

so that I'll make sure I
finish within 10 minutes.

>> Please note, this
survey was taken

at the initial stage
during the pandemic,

and we expect student perception
might have changed and evolved.

And we're currently working on
a second round of our survey.

Some of our initial results
are not that surprising.

For example, 71% of our students
prefer traditional classroom

lecture, and in comparison,
there are less

than 15% prefer online teaching.

Another interesting
result we find is

so when we ask students

and we've also seen
students indicating

that their learning sufficiency
has been significantly impacted.

Here's an interesting
result in this slide.

When we asked the students,
"How do you rate the perception

of the lab component and the
overall satisfaction for the lab

and project courses,"

we actually find more
positive results when compared

to online teaching in general.

In here, you can see that the
satisfaction with online lab

and project courses were split
relatively evenly among those

students who are satisfied,
neutral, and dissatisfied.

So in our most concerned
component, the lab courses

and project courses, we
are cautiously optimistic

from the students' perception.

Would you agree that here
are some background information.

This is kidding me.

Another interesting
result we find is

so when we ask students,
"Would you agree

that this lab learning
has been reduced"

I'm sorry.

I don't know which slide is
playing, so that's the issue.

So for the maybe I'll
just go this way, then.

So for the first observation

let me show you some

is that well, in this
slide, we're really looking

at the student perception
for the lab courses,

and the result is that
we're doing all right.

So there's an even split on
students that are satisfied

versus that are not satisfied.

And in comparison, when
we asked the students

about which one would you
prefer, online classes

and traditional classroom,
it was really one-sided.

A significant, large portion

of students prefer the
traditional way of lecturing.

But when it come
to the online lab,

it seems that we
are doing all right.

Another interesting
result we find is

so when we ask students,
"Would you agree

that this lab learning has
been reduced after switching

to online courses," we find
that this lab efficiency rating

from computer science students
were significantly higher,

or more than other majors.

So it is bigger.

We can see that the computer
science rating is flatter

compared to the all

other majors in general.

This seems to indicate

that computer science
students are better prepared

in technology literacy.

Also, by the use of
software-based simulation

in computer science programs,

programming simulations could
make it easier for students

to adapt to online courses.

An important question we
want to ask students is

which teaching mode will
they prefer, the synchronous

or asynchronous teaching.

So in here, for synchronous
teaching,

we meant that this
will be a scheduled,

live Zoom meeting
with the professor.

As to asynchronous, we meant
this is the pre-recorded

lectures, and then students
can them at their own pace.

Well, in this study, when
considering the preference

for online courses, we find that
the choice between synchronous

and asynchronous teaching
was evenly divided.

And when we look further,

we find there was no significant
correlation by different majors.

Throughout the College
of Natural Science,

we find that there's really a
tie between those two modes.

We also asked students for their
opinion on what are the pros

and cons of synchronous
and asynchronous teaching.

The results are in line
with the previous studies

in the literature.

For synchronous teaching,

the major advantage is the
interaction with the lecturer.

The challenge for synchronous
teaching is there are too many

distractions when
using computer.

When it comes to
asynchronous teaching,

the advantage are being
self-paced learning,

and the major disadvantage

for asynchronous teaching is
the lack of instant feedback.

In addition to that, motivations
for learning, the requirement

for self-discipline are
frequently mentioned

as the disadvantage for
online teaching in general.

When it comes to evaluations
on the engagement of students

in learning, we are
particularly interested

in how the COVID-19
affected their perception

of the learning.

So we asked this question.

"In what ways has the
COVID-19 affected your study?"

In the response, most

of students selected
study environment.

This is kind of obvious,
but it's worth noting

that there was no single option
was chosen significantly more

often than others.

We believe this indicates

that our students are
really facing a variety

of challenges during
the pandemic.

In regards to the
evaluation on online modality,

generally speaking, our
students were satisfied

with the technology tools
provided by the university.

So for online conference
tools, we are using Zoom,

and for learning
management systems,

we are using Blackboard.

At the same time,
the Google Cloud,

Adobe Creative Cloud are also
available for our students.

The correlation analysis also
shows no significant difference

when it comes to the
satisfaction rates.

There's no difference among
majors, class standings,

and financial aid status.

Well, so far in this study,

we know that our
STEM students do not

like online classes in general.

One of our concerns is that,

because of this rapid deployed
classes due to this pandemic,

it might leave a negative impact
for online classes in general.

So we asked the question,
"Given that this transition

to online teaching is rushed,

will this leave a negative
impression on online teaching?"

Well, in our survey, 46%
of our students said yes,

and another 24% thought

it might.

So we're not very
optimistic for our students

to take online classes
after the pandemic.

Here's a relatively positive
study fact of the pandemic.

In this table, we're showing

that the class attendance
reported by the students

from different quarters.

It's interesting to note that
the overall class attendance

of the college actually
increased by about 10%

when compared to the
pre-pandemic quarters.

So spring 2020 is highlighted
in this green box here.

This seems to indicate our
students are spending more time

on their course work.

Well, after the study,
we had professors

from different disciplines
from our college come together,

and we come up with a total
of 25 recommendations.

Well, the focus is really by
answering three questions.

The first one is that
we're trying to figure

out what are the causes

of the low preference
for online courses.

This might be due to
the lab components,

due to the interactive parts.

And the second thing
we're wondering is,

so for those negative
impressions,

how much can we improve?

And finally, one of the things
we have been looking into is

if there's any significant side
effect with student equity.

>> I'm just pausing my
recorded presentation here.

So we're not going
really into the details

for all the recommendations.

I just want to give a quick
summary on what we did.

So overall, we kind of make
three type of suggestions

when it comes to how
can we better prepare,

how can we better present

for the STEM courses
with a lab component.

The first one is to have a
flexible course structure,

which we talked about
you might want

to try have both synchronous and
asynchronous materials available

to students, and keep track
on their learning process

through this kind of a

nowadays, this idea of
high-flex learning seems

to become more and more popular.

So that might be
a valuable action,

or something we should consider.

And the second kind of
suggestion we made is,

we made more preparations
for converting

to the online courses.

Again, this point
is also obvious,

given that our initial
transition

from the fully online
courses really being rushed.

So if we kind of better prepare
ourselves for the materials,

for the instructions,
for the homework,

this might get a better
response from the students.

And finally, just as
always, when it comes

to students' perception,
it's important

for providing better feedback,
and for giving feedback

on the online setting is
particularly challenging.

And we made a few suggestions
on that regard as well.

So I guess

Into the

let me yeah, so I
guess I want to maybe leave you

with these slides, and Fadi
and Wagner can maybe lead us

with some discussions, when
it comes to what you think

about our kind of initial
survey for student perception,

and what kind of a
challenge and ideas you would

like to share with us.

That's all I have for now.

Thanks.

Well, thank you,
Fei, having shared that.

Actually, I would like to
play the role of a moderator.

I have kind of questions I will
ask, and possibly maybe you

and Wagner, and, you know,
the audience can answer.

What do you think about that?

Sure, sure.

Okay. Well, actually,
I couple of questions.

For example, I know you did
the survey, and this was

during initially
during the transition.

Now, while during
the transition,

after the transition, is there
anything you have changed

in the way you teach?

Well, from my
side so I was

I've been teaching
computer network

and circuit analysis course.

So computer networking
is relatively new.

Maybe I can answer from the
circuit analysis course.

So originally, our
circuit analysis course has

two components.

One is the lecture, kind of

the rules, and do
the calculations,

solving the circuit, and
second part is a simulation.

In the lab, we have
this software.

You can use it to create a
PCB board, and it's also

supports kind of
analog simulation

that we've been working on.

So because the lab component
is really simulation-based,

so our first conversion
mainly is a

the main challenge
is using and setting

up the software environment.

And in the initial
stage, we really run

into quite a few problem.

The software we've been
using has a software license,

and there's issue with
their educational licensing.

And we also have

we had troubles accessing
our virtual lab with

which have those software

so those are kind of the
main issues we encountered

at the beginning
of this conversion.

For changes that I made, I
really just kind of, I guess,

slowed down on the initial field
lab assignment, kind of slowed

down for having them
setting up the environment,

slowed down to have
more sessions to talk

about the introduction of the
software, getting familiar

with the simulation environment.

And maybe have more recorded
lab component, so in addition

to what we have during
the virtual lab hours.

So that's kind of what
happened with my classes.

I know, Wagner, you are

from computer science
and engineering.

You are from kinesiology, where
your labs have different kind

of structure, different
requirements.

How did you handle that?

Fadi, yeah, in kinesiology,

we have mainly the
biomechanics lab,

and for exercise testing lab,
the human performance lab.

And for biomechanics, it
was a little bit easier,

because the students were
also able to record videos

for people doing movements, and
to analyze it using software.

So it's changed a little bit,
because the student needs

to have access to those
software that, in the past,

they only have access on campus.

And for the human
performance lab,

it was a little bit
more challenging,

because they need
to touch each other.

It's completely they
need to use the equipment,

and it's not possible to have
this in-person interaction.

So we have developed
a virtual tour

to our human performance lab in
order to provide the students

at least a sense of they
were able to see the spaces

and virtually interact
with the equipment.

And so, it was one good thing,
because we prepared this.

And even when we are
back to in-person course,

the students will be able to
use this tool to help them

to increase their skills.

But I believe what
changed most

our course is the more prompt
feedback to the students.

Because since we
are not on the lab,

they were always sending us
e-mails, message, and we tried

to answer these questions
as quick as possible

in order they keep motivated
to engage with the material.

Ask also our audience
what about Dr. Blue?

What do you think about the have you changed your perception

about online learning,
given that the transition

between face-to-face
to virtual

now we're going to be back
to face-to-face in the fall,

from your perspective?

So, I'm very excited to
get back to face-to-face,

very excited about it, as
are most of my students.

I teach in the nursing
department,

so some of the courses that
I've been teaching do not lend

themselves to online learning.

I have provided virtual
reality experience,

interacting with patients,
and other resources

that we've found, virtual

reality simulations

that we're using.

But it's not the same as
that action of touching,

moving around a patient and
the equipment, and all that.

That was one of the reasons I
was interested in your session.

One of my most difficult
classes was health assessment.

Well, I'm sitting here
in front of a computer.

How do I show them how to listen
to lungs, look in people's eyes

and ears, and all the things?

And that's we were able

to get some exceptions
for a couple of days.

I can get in the
lab and show them,

because there's no
real way to do it.

And high-risk things, like
an abdominal assessment,

where you can actually
hurt somebody

if you do it incorrectly.

So we were able to get some
exceptions, but overall,

our courses, especially
the clinical components,

do not allow are not really
doable in an online format.

Theory, we've adopted so
many, and gone through a lot

of the workshops offered
through the university,

with good results.

But we know from our students
that they want to be back

in the classroom,
because it's not the same.

And I think the students
that enrolled

in our school have a learning
style that lends itself

to that face-to-face
interaction.

If they wanted an
online program,

that's what they
would've enrolled in.

So anyway and that's but
I just haven't found a way

we did things for
some of our skills,

like getting these
mini-mannequin models

that we distributed to students,

so they could practice alongside
their instructor on a Zoom.

And that helped a bit, but
the cost is prohibitive.

Our students don't have
the money to invest $250

to have this little box
with the head, and the nose,

and the throat and stuff on it,

so they can practice
these skills.

They don't have the money
to be able to do this.

That's what I've noticed.

Thank you for asking.

Sure. I know you touched
based on the virtual reality.

I know Wagner was involved,

and I know Professor
Hou also involved

in virtual reality
and courseware.

So anybody has, like,
any insights of

I know there's also
accessibility issues

with having, you know, the
headsets, or, you know

it's very expensive at the
same time, the software.

Did you work with the ATI
on any projects for nursing,

or you were looking
at the simulated

an existing simulation
packages online?

We did both.

So about three or maybe
four years ago now,

we started requiring our
students to purchase, at $99,

which isn't excessive, a program
with a virtual reality client.

It's offered through
one of our book vendors,

and they can have conversations.

Back when I used this program
in my coursework, I was typing

in all my conversations.

Now, they've got the
voice recognition

to where they can actually
have more like a conversation.

And it takes them through,
and shows on the patient,

but it's not actually
touching the patient.

That's the disconnect.

One of our faculty worked on
one simulation with the goggles,

and but it was so time and
labor-intensive to create one

that it was prohibitive
to do it across all

of the disciplines
we use in nursing.

But recently, one of our vendors

who has electronic
health records

and prepackaged simulation
products that we used

on our mannequins now they've collaborated

with a headset, Oculus, company.

And that's one of the
things we're looking at even

when we're back on campus,
to maybe use these as well

when the power goes down.

Because we have mandates through
our accreditation that all

of our teaching has
to be synchronous

for a specified number of hours.

We can't just do half
and half or something.

We have very specific
accreditation requirements

for our program.

So but we're thinking things
like when the power's off,

and the university's shut down
because of winds or whatever,

then we could be using this
other technology online as well.

And even in-person in the
classroom with students able

to see on the screens

in the room what the persons
participating are seeing while

they're there with their little
hand things, and looking around,

and trying to move around
their patient and stuff.

So it's opened us up
to more technologies,

in a face-to-face setting, which
I think was a nice little bonus.

Okay. Anybody want to

anything, or I can go
to another question.

I just wanted to follow
up with Dr. Blue here.

I have a I was hoping,

or I was expecting there
might be some benefit

after this fully

online over a year.

For example, in computer
science,

we have accumulated many of
those online learning materials,

which might be easier if we're
interested in converting to

our offerings on online
programs in the future.

And I'm expecting probably not
in nursing, or physics labs,

or chemistry labs, but
for some of those courses

without a lab requirement, this
might be a kind of a benefit.

Or since we have already
committed this many information,

maybe there's and
I think the university

and many others are
strategically position them

to push forward with online
learning in the future.

So there might be opportunities
for developing further

or developing more
online courses as well,

especially after
everything go back to normal.

>> Yeah, and I should
probably clarify that, too.

This is our pre-licensure,

where they have never taken
care of patients before.

We've also got nurses coming
back for their bachelor's degree

in nursing, and their
master's degree.

These are hybrid all the
time, with clinical experience

that have to happen,
inpatient care settings.

So for those, yes, what
you're talking about

it has definitely boosted
our hybrid courses' ability

to be more effective, that our
instructors have the pedagogy,

and the tools to be able
to deliver the content

in a better way, and not
just makeshift what was

in the classroom, now
we're putting it online.

That you're right about that.

Actually, you answered my
next question, which I was

Oh [laughter].

does this transition
change your perception

about online courses, and
are you thinking of offering

or modifying the content of
face-to-face to online now,

since you think you know,

I think we developed the skills
we need, and we have the tools.

And the students got adjusted to
that, especially some students

who are a parent, and the one
to bring food to the table,

where the hybrid model is
a better option for them

than being on campus,
especially, you know, commute,

or, you know, flexibility
in class offerings.

So if that's the case, are we
willing to kind of offer some

of those courses now
to be an online course,

compared to a face-to-face?

And yeah, I have a follow-up
question after that, if

Oh, okay.

yeah, after this.

We have this delivery system,
and our curriculum is set.

We've had one, two, three
curriculum changes since 2016,

mandated by accrediting
bodies, the first two,

and then the semester
conversion.

We don't want to fix
anything else right now.

We actually need to sit
with what we've got,

and see if it's working or not
a little bit before we make

changes again.

But what on the other side of
that, what I have thought about,

and am actively kind of
reflecting on to move forward,

is do I just go back
to what I used to do?

I don't think I can.

I have found that the a
lot of these online techniques

or whatever that
I've learned turn it

into a more active learning
environment, and I'm planning

to bring those back into
the classroom with me.

Because I think it does
engage the students more.

It's adjusted my
attitude towards lecture,

lecture, lecture.

Yunfei, what do you think?

Well well, again,
I'll pass for this question.

I was thinking something
else, so

Okay.

Can I, Fadi?

Yeah, go ahead.

I believe that this is
exactly what we are talking

in kinesiology.

We realize that it's impossible

to have our labs online.

We don't want to
have our labs online,

but we are really excited
to use the online tools

as an extra learning
opportunity for those students

that like this teaching style.

So we are working to increase
the quality of our virtual tour

and other tools that
we are developing,

trying to improve the quality

of the time these students will
spend in our in-person labs.

Yeah.

So we are we
definitively don't want

to be an online course,

but we want to use every
day more online tools,

but as an extra learning
experience.

Exactly.

I agree.

All right.

I have one more question.

What best worked for you
to engage your students,

and what modifications you
have made to your syllabi?

Like, you know, about mandatory
attendance, and your procedure

for check-in, percentage
of total grade

you know, what kind of things?

And, if I need to add,
what about the line exams,

and how you ensure equity?

I know there are issues about,
you know, browser lockdown,

and some of those things around.

So I'd really like to hear
your perspective on that.

Our endgame is our
students have to sit for a test

to actually get licensed.

The university gives them a
degree, but they have to sit

for this the NCLEX, the
boards to get licensed.

So we did not feel it
would serve our students

to relax our testing policies,
which are quite rigorous,

with the goal of
getting them competent

in this testing environment.

Which was really
helpful when our grads

from last spring finished
into the summer and fall.

They're taking the boards,

but there was all
the new procedures.

Our students were
comfortable in the environment,

and did very well on their
boards, where nationally,

a lot of schools saw
their pass rates dropping.

It doesn't do us any good
to give them a degree

with an expensive
bill attached to it

if they can't pass the boards
and practice, and earn the money

to pay those loans
and things back.

So we've kept the lockdown
browser, in spite of all

of the flaws in it, and the
ability for students to cheat.

We've Googled it.

We know they can get around it.

We've just tried to make it
as difficult as possible.

The other side of it is
integrity in nursing.

It is crucial.

Your nurse needs to give
you your medicine on time,

and they need to give you what
they were supposed to give you.

And if they're not, do
you want that nurse?

Do you want the nurse that
will hide the mistakes,

or who will admit,
"I made a mistake,

and this is what I'm
doing to fix it"?

Of course, you'd prefer
they didn't make a mistake,

but we're human.

Things are going to happen.

So that integrity,
too, and all the

and huge increase in cheating
during this online time has been

very and it's demoralized
us in a lot of ways.

We always did active proctoring
in our classrooms on the tests

with a lot of test security
involved, and it's been,

for the faculty, a
big punch in the gut

about all the cheating
that's been going on,

and trying to keep our
students with that idea

of how important their integrity
is, bottom line for them.

It is in everything, but when
you're talking life and death

for patients, it
reaches a new level, too.

So we didn't change it.

We actually added
the lockdown browser,

and tormented our
students further.

They're very highly motivated.

They want this, and
they make it work.

And I give them, the
students, kudos for that.

All right.

Yunfei?

>> Well, I take a
different approach.

So back to my analog
circuit analysis course

I'm giving a higher weight for
homework and lab assignments.

So as long as they're keeping
up with the assignments,

that will consist for
60% of the total score.

And when it comes to exams, I

have take-home exams instead

of so these will be
open-book, take-home, right?

But I guess it's also
a subject matter.

So for my questions, I will
just give them a circuit.

You go figure out what will
be the voltage or currents

on the certain component.

It's like solving a
mathematics problem,

so where you're just
giving different problems

for them to solve.

So I wouldn't it won't be
a concern if they're looking

up for different from their
textbook for the equations,

or the rules, but rather it's
really the problem-solving

process that we're testing.

So, so far, I think we're
I'm doing all right.

Our students are doing all right
for my kind of open-book exams,

and the higher weight for the
homework and the lab assignment.

And generally speaking,

I'm receiving relatively
positive feedback when it comes

to students kind
of appreciate that,

or recognizing they have facing various challenges.

We're giving them more
flexibility for courses,

for assignments, for evaluation.

So in my case, I will
just do open-book exam,

and have more emphasize on
the everyday assignments.

Thank you.

Wagner, what's your approach?

In my case, for this
course, exercise testing

and prescription, I never
use tests or quizzes,

because we have these in
one of the previous classes,

that is exercise physiology.

So this course is
much more hands-on.

So for this online experience,
they had one virtual client

that could be someone
from their family,

that live in the same house,

or I have three students
supporting me

as teaching assistants or lab
techs, and they were available

to be the other students'
patient or client.

And so, they work together

all the semester doing all the

activities together, and they
recorded every time small videos

to see how professional
they are in talk

with the patient, the client.

So we move forward most part
of the time only with videos.

So they have not to do
the unless to be there,

and to say the things
that they have to say.

All right.

Do we have time, by the way?

I just want to

I think our time's up.

We're supposed to
finish at 2:45.

all right.

We start late, so
all right, well,

thanks for joining us.

I think this will be
all for our session.

Thank you very much, guys.

It was great to think
about this out loud.

All right.

Appreciate it.

Bye. Thank you.

Bye-bye.

Bye-bye.

Bye.

END – 00:42:27