Promoting self-directed learning in a remote teaching setting

Educamp 2021
13 July 2021
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Yuval Noah Harari: the world after coronavirus

This storm will pass. But the choices we make now could change our lives for years to come.

Yuval Noah Harari | MARCH 20 2020

Humankind is now facing a global crisis. Perhaps the biggest crisis of our creation. The decisions people and governments take in the next few weeks could shape our lives for years to come. They will shape not just our current state of affairs, but our future...
Many short-term emergency measures will become a fixture of life. That is the nature of emergencies. They fast-forward historical processes. Decisions that in normal times could take years of deliberation are passed in a matter of hours. Immature and even dangerous technologies are pressed into service, because the risks of doing nothing are bigger. Entire countries serve as guinea-pigs in large-scale social experiments. What happens when everybody works from home and communicates only at a distance? What happens when entire schools and universities go online? In normal times, governments, businesses and educational boards would never agree to conduct such experiments. But these aren’t normal times.
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Will remote teaching become a fixture of life?
TEACHING & CLASSROOM

America’s great remote-learning experiment: What surveys of teachers and parents tell us about how it went

By Matt Barreto and Claire Bryan | Jun 28, 2020, 12:13pm EDT

America’s schools underwent an unprecedented experiment: tens of thousands of students were thrown into remote learning, and instead began receiving
How higher education leaders tried to stave off disaster in 2020
The Results Are In for Remote Learning: It Didn’t Work

The pandemic forced schools into a crash course in online education. Problems piled up quickly. ‘I find it hectic and stressful.’

Lucia Ćuratolo-Boylan supervises the online schooling of her four children, ages 4 to 10, in Staten Island, NY. KEVIN HAGEN FOR THE WALL STREET JOURNAL

Heddy and Lee Hawkins
Remote Learning Is a Bad Joke
My kid can’t handle a virtual education, and neither can I.
AUGUST 18, 2020

Emily Gould
Author and essayist
Remote learning has been a disaster and it can't continue

Randy Feldman
Published 5:30 a.m. ET Jun. 9, 2020

Perspective. Few public policy issues are about one's own personal predisposition to live with risk and uncertainty than how we approach the coronavirus pandemic in the coming months. Scientific facts notwithstanding, how each of us evaluates the probability of contracting or spreading coronavirus reflects the weight of our cognitive perspective.
Remote Learning Is a Catastrophe. Teach Share the Blame.

By Jonathan Chait
Why Emergency Online Learning Got Low Grades From Many College Students

By Robert Ubell (Columnist)  Mar 8, 2021
Research Shows Students Falling Months Behind During Virus Disruptions

The abrupt switch to remote learning wiped out academic gains for many students in America, and widened racial and economic gaps. Catching up in the fall won’t be easy.
Online distance learning for schools and colleges has been a great disaster.

Research Shows Students Falling Months Behind During Virus Disruptions

The abrupt switch to remote learning wiped out academic gains for many students in America, and widened racial and economic gaps. Catching up in the fall won’t be easy.
Was it really *that* bad?

Research Shows Students Falling Months Behind During Virus Disruptions

The abrupt switch to remote learning wiped out academic gains for many students in America, and widened racial and economic gaps. Catching up in the fall won’t be easy.
Higher Education with Purpose

Prepare to make a positive impact with our unique approach to university education.
Higher Education with Purpose

An online university helping individuals achieve success.

Find your degree
1 before (and just after) pandemic
Team based

before (and just after) pandemic
Project based

1 before (and just after) pandemic
Intrinsic motivation before (and just after) pandemic
Setting learning goals

Grant Wiggins and Jay McTighe, *Understanding by Design* (Prentice Hall, 2001)
Backward design

Grant Wiggins and Jay McTighe, *Understanding by Design* (Prentice Hall, 2001)
Backward design

Grant Wiggins and Jay McTighe, *Understanding by Design* (Prentice Hall, 2001)
Backward design

- desired outcomes
- acceptable evidence
- instructional approach

Grant Wiggins and Jay McTighe, *Understanding by Design* (Prentice Hall, 2001)
Course goals

- self-directed learning
- content mastery
- team work
- professionalism

1 before (and just after) pandemic
before (and just after) pandemic
information transfer
faculty-centered

before (and just after) pandemic
before (and just after) pandemic
interaction
student-centered

before (and just after) pandemic
no lectures
no exams

before (and just after) pandemic
before (and just after) pandemic
Solution

turn out-of-class component also into a social interaction!

🌐 before (and just after) pandemic
Perusall

every student prepared for every class

1 before (and just after) pandemic
what about class activities?
### 1. Before (and just after) Pandemic

**LC: Learning Catalytics**
- Instructor poses question
- Answer alone
- Discuss in team
- Answer again

**Tutorial**
- Work on worksheet with team
- Explore concepts
- Discuss with staff

**EA: Estimation Activity**
- Estimate quantities
- Develop individual strategy
- Discuss and solve as team

**EDA: Experimental Design Activity**
- Conduct experiment with team
- Take measurements
- Analyze data
- Carry out simulations

**Problem Set & Reflection**
- Work problems alone BEFORE class
- Discuss with team, mark up
- Self-assess & turn in

**RAA: Readiness Assurance Activity**
- Part 1: solve problems alone
- Open book, open internet
- Part 2: solve with team

- **Total Time**
  - LC: Learning Catalytics: 90 min
  - Tutorial: 60 min
  - EA: Estimation Activity: 30 min
  - EDA: Experimental Design Activity: 90 min
  - Problem Set & Reflection: 90 min
  - RAA: Readiness Assurance Activity: 90 min

**Blended Learning**
A blend of 6 scaffolded "best practices"
before (and just after) pandemic
before (and just after) pandemic
instructional continuity between first and second half?

before (and just after) pandemic
instructional continuity between first and second half?

86% agreed

before (and just after) pandemic
Moving online

“How can I transfer online what I do in the classroom?”
Moving online

“How can I transfer online what I do in the classroom?”
(challenge)
Moving online

“How can I transfer online what I do in the classroom?”

(challenge)
Moving online

“How can I transfer online what I do in the classroom?”
(challenge)

“What can I do online that I cannot do in the classroom?”
(opportunity)
Changes implemented

- Minimize sync/instructor-paced
- Personalize instruction
Changes implemented

• Minimize sync/instructor-paced

• Personalize instruction

• Specifications Grading
Minimize sync/instructor-paced

synchronous  ↔  asynchronous
Minimize sync/instructor-paced

synchronous ↔ asynchronous

everybody together at the same time
Minimize sync/instructor-paced

synchronous ↔ asynchronous

instructor-paced ↔ self-paced
Minimize sync/instructor-paced

synchronous ↔ asynchronous

instructor-paced ↔ self-paced

everybody together at the same pace
Minimize sync/instructor-paced

lecture

synchronous ↔ asynchronous

instructor-paced ↔ self-paced
Minimize sync/instructor-paced

recorded lecture

synchronous ↔ asynchronous

instructor-paced ↔ self-paced
Minimize sync/instructor-paced

reimagining course

recorded lecture

synchronous \( \leftrightarrow \) asynchronous

instructor-paced \( \leftrightarrow \) self-paced

1.5x!
Minimize sync/instructor-paced lab

synchronous <-> instructor-paced

asynchronous <-> self-paced

2 reimagining course
Minimize sync/instructor-paced

homework/study

synchronous ↔ asynchronous

instructor-paced ↔ self-paced
Minimize sync/instructor-paced

synchronous  asynchronous
instructor-paced  self-paced
Minimize sync/instructor-paced

synchronous → asynchronous
instructor-paced → self-paced
Minimize sync/instructor-paced

synchronous  →  asynchronous

instructor-paced  →  self-paced

more time to help students where it really matters!
Personalize instruction instead of all students coming to instructor’s room...
Personalize instruction

instead of all students coming to instructor’s room...

...instructional staff visits each team’s own room
Personalize instruction

80 students in one room → 20 rooms with 4 students

2 reimagining course
Personalize instruction

every student on front row

reimagining course
Personalize instruction
every student on front row & address each by their name
Personalize instruction every student on front row & address each by their name

Shuffle teams reimagining course
Personalize instruction

Use Slack to provide (nearly) continuous support
Personalize instruction

Use Slack to provide (nearly) continuous support

2 reimagining course
Specifications grading

Inside Higher Ed, Yes, Virginia, there is a better way to grade
Specifications grading

Does work meet specifications outlined for type of work?

NO

YES

Inside Higher Ed, *Yes, Virginia, there is a better way to grade*
Specifications grading

Does work meet specifications outlined for type of work?

YES

NO

if specifications not met, can try again

Inside Higher Ed, Yes, Virginia, there is a better way to grade
Specifications grading

Inside Higher Ed, *Yes, Virginia, there is a better way to grade*
Specifications grading

Inside Higher Ed, Yes, Virginia, there is a better way to grade

68 micro units

Inside Higher Ed, Yes, Virginia, there is a better way to grade

2 reimagining course
Specifications grading

Does work meet specifications outlined for type of work?

Yes

Is there evidence of conscious effort to meet specifications?

Yes

Does work go significantly beyond specifications?

Yes

Exemplary. Work exceeds expectations by a wide margin and could be used as classroom example.

No

Revision needed. Effort to meet specifications is evident, but significant gaps remain. Needs further work and/or revisions.

Not assessable. Work is fragmentary or contains significant omissions. Not enough information is present to determine effort given.

Course grade determined by number of units for which specifications were met.

Inside Higher Ed, Yes, Virginia, there is a better way to grade
Did it work?
Fall Content Learning Gain

![Bar Chart]

- **FCI**
- **Score (%)**
- **F16/17**
- **Pre**
Fall Content Learning Gain

![Bar chart showing learning gain for FCI between pre and post-F16/17. Score (%) on the y-axis, F16/17 on the x-axis. The bar for post is significantly higher than the pre-bar.]
Fall Content Learning Gain

<table>
<thead>
<tr>
<th>Score (%)</th>
<th>F16/17</th>
<th>F20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Post</td>
<td>60</td>
<td>60</td>
</tr>
</tbody>
</table>

FCI

- in person
- remote

3 results
Fall Content Learning Gain

![Chart showing learning gain for FCI with data for F16/17 and F20, comparing pre and post scores in person and remote settings.](image-url)
Fall Content Learning Gain

![Bar graph showing learning gain (%) for in person and remote FCI results.](image)
Spring Content Learning Gain

![Bar chart showing learning gain in person and remote for CSEM.]

- In person: 10% gain
- Remote: 30% gain
Self Efficacy

self efficacy

3 results
Self Efficacy

belief in ability to succeed in a certain domain
Self Efficacy

![Graph showing self-efficacy results for F16/17]

- Self efficacy
- Pre
- F16/17

3 results
Self Efficacy

![Graph showing self-efficacy pre and post-F16/17, with a higher post-value.]
Self Efficacy

SE *down* in lecture courses!
Self Efficacy

Results for F16/17 and F20 show a comparison between in-person and remote settings. The graph indicates a trend towards increased self-efficacy post-intervention for both settings, with the in-person setting showing a slightly higher increase.
Self Efficacy

Results for F16/17 and F20 show a comparison between in-person and remote self-efficacy. The graph indicates a post-pre comparison, with F16/17 showing a slight increase in self-efficacy for both in-person and remote scenarios. F20 shows a significant increase in self-efficacy for the remote scenario compared to the in-person scenario.
Self Efficacy

![Bar chart showing self efficacy results for F16/17, F20, and S21 classes. The chart compares in-person and remote learning conditions, with post-test scores indicated for each category.]
Self Efficacy

![Bar chart showing self-efficacy results for in-person and remote learning, comparing pre and post F16/17, F20, and S21.](image)
Doubling of

- content learning gains
- physics self-efficacy gains
What do students say?

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Agile Feedback Survey (Talbert)

1. I was challenged intellectually
2. I had plenty of support
3. I am closer to mastering the ideas of the course now
4. I made progress because of my own efforts and choices
5. I felt I was part of a community of learners
Agile Feedback Survey (Talbert)

1. I was challenged intellectually (challenge)
2. I had plenty of support (support)
3. I am closer to mastering the ideas of the course now
4. I made progress because of my own efforts and choices
5. I felt I was part of a community of learners
challenge vs. support
challenge vs. support

challenge

sd  d  n  a  sa

3 results
challenge vs. support
challenge vs. support
challenge vs. support

![Diagram showing a target in the lower right quadrant of a challenge vs. support chart.](image-url)
challenge vs. support

The graph illustrates the agreement levels for challenge and support in a study involving 20 participants (S20). The green area represents the in-person agreement results.
challenge vs. support

![Bar chart showing agreement levels for in person (S20) and remote (F20,S21) settings for challenges and supports.]
self-determination

1. I was challenged intellectually (challenge)
2. I had plenty of support (support)
3. I am closer to mastering the ideas of the course now (growth)
4. I made progress because of my own efforts and choices (auton.)
5. I felt I was part of a community of learners (relatedness)
self-determination

3 results
self-determination

What do you predict?

- challenge
- support
- growth
- autonomy
- community
self-determination

![Graph showing agreement on self-determination]

- In person (S20)
- Remote (F2, S21)

- Challenges
- Support
- Growth
- Autonomy
- Community

3 results
“about you” exercise
“about you” exercise

“...this will be my very first physics class that I will have ever taken in my life,
“about you” exercise

“...this will be my very first physics class that I will have ever taken in my life, so that is both equally exciting
“about you” exercise

“...this will be my very first physics class that I will have ever taken in my life, so that is both equally exciting and also a bit anxiety-inducing
“about you” exercise

“...this will be my very first physics class that I will have ever taken in my life, so that is both equally exciting and also a bit anxiety-inducing, given that I have never felt too confident in my mathematical abilities...”
Our machine...
“Physics seems less “scary” to me now, because of the format of this course.
“Physics seems less “scary” to me now, because of the format of this course. I have really severe testing anxiety, but having no ‘sit-down exams’ has allowed me to actually learn physics because I want to, not because I need to do well on an exam...”
“...this semester is the first time — since high school — that I’ve been able to remember why I even wanted to go to college (to learn for learning’s sake)
“...this semester is the first time — since high school — that I’ve been able to remember why I even wanted to go to college (to learn for learning’s sake) ... over the past 3 years it’s mostly just been about how to scrape by academically and not let my testing anxiety ruin my GPA.”
“...this semester is the first time — since high school — that I’ve been able to remember why I even wanted to go to college (to learn for learning’s sake) ... over the past 3 years it’s mostly just been about how to scrape by academically and not let my testing anxiety ruin my GPA. I love this class.”
unsolicited comments
unsolicited comments

“this course is amazing because the goal is learning, trying to solve hard problems, and learning from mistakes. I enjoyed the struggle of facing hard problems whether I solved them correctly or not.”
unsolicited comments
“favorite course at Harvard”
unsolicited comments

“favorite course at Harvard”

“the critical thinking-focused learning from the class has been truly something that has changed the way I view the way I learn and approach problems”
unsolicited comments

“favorite course at Harvard”

“the critical thinking-focused learning from the class has been truly something that has changed the way I view the way I learn and approach problems”

“I wish my other classes had a similar structure”
course evaluation

3 results
course evaluation
course evaluation

evaluation

course    instructor

u  f  g  vg  e

m  nm
course evaluation

3 results
course evaluation

![Bar chart showing course and instructor evaluation results for in-person (S19) and remote (F20) formats.](chart.png)

- **Course Evaluation**
  - In-person (S19): VG
  - Remote (F20): NM

- **Instructor Evaluation**
  - In-person (S19): VG
  - Remote (F20): NM

**Results**: 3 results
Improved

- sense of growth and autonomy
- sense of support and community
- course evaluation

3 results

The abrupt switch to remote learning wiped out academic gains for many students in America, and widened racial and economic gaps. Catching up in the fall won’t be easy.
Improved

- sense of growth and autonomy
- sense of support and community
- course evaluation

It worked for students too!
Remote/online can be **better**!

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I did my best teaching ever remotely!

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I did my best teaching ever remotely!

So, now what?
Revert back?
Many short-term emergency measures will become a fixture of life. That is the nature of emergencies. They fast-forward historical processes. Decisions that in normal times could take years of deliberation are passed in a matter of hours. Immature and even dangerous technologies are pressed into service, because the risks of doing nothing are bigger. Entire countries serve as guinea-pigs in large-scale social experiments. What happens when everybody works from home and communicates only at a distance? What happens when entire schools and universities go online? In normal times, governments, businesses and educational boards would never agree to conduct such experiments. But these aren’t normal times.
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