Leveraging Technology Innovations in Teacher Education

Lisa A. Dieker
University of Central Florida

Michael J. Kennedy
University of Virginia

Sean Smith
University of Kansas

Eleazar Vasquez III
University of Central Florida

Marcia Rock
University of North Carolina at Greensboro

Cathy Thomas
University of Missouri

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The future belongs to those who believe in the beauty of their dreams.

_Eleanor Roosevelt_
Transforming Ideas for Today’s Learning Environments

- Podcasts
- Video Case Studies
- Online Delivery of Content
- Supervision and Feedback
- Teaching Simulations
- Future – Known and Unknown
Podcasts
Podcast Defined

A podcast is an audio recording of a topic that individuals upload to the Internet for dissemination. An enhanced podcast is an audio track supplemented with visuals (i.e., text, images, or both).
Research

- CAPs combine typical podcast with visual supports
- *Satisfaction research stronger than outcome*
- 10 studies showing impact
- *Provide understanding of concepts*
Implications and Innovations

Easy to create, consume and length not clearly defined

Consider content use for:

- Review
- After instruction
- Complete other course information

Use for a “flipped classroom” model
Implications and Innovations

- Content Acquisition Podcasts are an emerging EBP
- Technical report provides lots of information related to creation of CAPs
- Online repository
- BYOD and other tools impact the future of this type of activity
Video Cases
Case Studies Defined

Case studies are stories of real classroom-, student-, or school-based environments used in an instructional format to help pre- and in-service teachers apply new knowledge within a scaffolded yet authentic environment.
Video Case Studies Defined

Video case studies are interactive. They engage the learners in activities while putting them at the center of their learning.
Research

- Multimedia in nature
- Early form of “flipped classroom” model
- Allows for personalized learning (review)
- Brings concepts “to life”
  - Misconceptions
  - Misunderstandings
  - Gaps
Research Cont.

- Can be used across classroom instructional types – small group, large group, whole class and individualized learning
- Paired with discussion
- Research inconsistent - cases and use vary widely
- Fitzgerald and colleagues found anchoring in other activities most effective
  - Scaffolding
  - Guided discussions
Implications and Innovations Cont.

- Consider learning objective
- Control length for purpose
- Check for understanding or misconceptions
- Consider expanding to teachers own practice (create your own – pair with BYOD movement)
- Shared experiences - PLE
- IC Provides step for creation
Emerging Trends

- Storage
- Repository
- Access (e.g., captioning ease)
- Emerging EBP
  - Knowledge as effective
  - Transference less clear
- New tool to consider
In order to transform schools successfully, educators need to navigate the difficult space between letting go of old patterns and grabbing on to new ones.

Deal 1990
Supervision and Feedback
Supervision Defined

Supervision is typically provided via a master teacher or administrator in the field who oversees performance and provides specific feedback. Feedback is information given to teacher candidates so that they can compare their performance to pre-determined standards.
Rock and colleagues (2014) defined eCoaching as “a relationship in which one or more persons’ effective teaching skills are intentionally and potentially enhanced through online interactions with another person” (p. 2).
Bug in the Ear
Research

- Engage in longer term supervision – more not less
- Four types of feedback
  - instructive, corrective, encouraging, and questioning
- Coaching should occur for both general and special educators alike
Implications and Innovations

- Intentional in use
- Consider skill level of student being coached
- Sufficient repetition for practice and coaching
- Equipment used described in the IC

**Future**
- Widespread use
- Blending with other tools such as simulation
- Blending with multi-tiered supports
Online Instruction
Online Defined

The term *online education* is defined as an educational program in which students learn at least partially through the online delivery of content and instruction with some element of student control over time, place, path, and pace.
Research

- Not as rich as past distance learning
- Most work is on how to design, develop, and use tools
- Findings currently fall short in transference of online learning to teacher practice and student outcomes.
Research Cont.

- Studies comparing tools emerging
- Media, instruction, and curriculum are frequently confounded
- Ensuring outcomes align with online course content
- Include tools such as videos, podcasts, and other materials.
Implications and Innovations

- Interactivity construct
- Reflection
- Usability construct (UDL)
- Ensure technology doesn’t impair learning
Implications and Innovations

- Balance between content information and pedagogy consider how to use the previous 2 strategies in collaboration

FUTURE

- Ability to have a range of dimensions in learning
- Supervision and feedback
Teaching Simulations
Simulations Defined

Simulations use technologies as tools to make situations and participants look like, feel like, and act like they would in real-life scenarios.
Research

- Simulations are really Case studies (just live)
- Simulation use in education can range from a low-tech online game to a more immersive environment like Sim School, Second Life (SL), or Active Worlds
- Sim School
- Secondlife
  - system,
First Person Simulation Research

- All small n or case studies show some positive outcomes and some challenges
- Variables that impact use level of comfort, complexity of the environment, time in Full-scale simulation
- TeachLivE
- Military process – ARC Cycle
Simulation: Action Review Cycle
Implications and Innovations

- All environments Safe place to practice
- First Person Immersive
  - Enthusiasm waned over time
  - Embedded in other tools
- Fully Immersive
  - Data just starting to emerge in education
  - Targeted skills -- not flying the whole plane
- Horizon – HMD – Oculus Rift – Haptic
Lisa Dieker, Ph.D.
Lockheed Martin Eminent Scholar
Michael Hynes, Ph.D.
Pegasus Professor
College of Education
Charles Hughes, Ph.D.
Pegasus Professor
College of Engineering & Computer Science
Recent Recognitions

AACTE 2012

NTSA 2013

New Schools Summit 2014
TeachLivE Paradigm

- Realistic virtual classroom experiences
  - Classroom management
  - Pedagogy rehearsal
  - Content delivery
  - Meetings of parent-teacher and teacher-principal
- Integrated reflection tools
- Used at 50 U.S. universities and 4 school districts
  - Improves single target skill after four 10-minute sessions
- Already impacted over 12,000 teachers and indirectly over a half million students
TeachLivE™ is:

- A Mixed-reality classroom simulator
- Like a flight simulator for pilots
- Teachers practice teaching to avatars
Sandbox Technology
<table>
<thead>
<tr>
<th>Personalities:</th>
<th>Dependent</th>
<th>Independent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggressive</td>
<td>Attention-getter</td>
<td>Leader</td>
</tr>
<tr>
<td>Passive</td>
<td>Follower</td>
<td>Withdrawn</td>
</tr>
</tbody>
</table>

Kids Growing UP
Algebra I: Year 1 – 200 Teachers

50 Teachers
MDC Tools

50 teachers
MDC and Online PD

50 teachers
Online PD and TeachLivE

50 teachers
TeachLivE Only

Lesson Plans for Teachers
Learning activities should:

1. **expose** current thinking,
2. **create ‘tensions’** by confronting learners with inconsistencies and surprises, and
3. **allow opportunities for resolution through discussion.**
Grounded in the High Leverage Practices
TLE: TeachLivE™ MDC Tools

*Introduce the teacher to the lab*

map.mathshell.org
Ensure the teacher has a lesson to teach
Misconceptions

Too Good To Be True?

When is the equation \( 5 - x = 6 \) true?

CJ

Ed

Kevin

Maria

Sean

Both Amy and Ben have made a mistake. Describe where they have gone wrong.

Amy: She did solve the equation and got the right answer. Ben: But she did not do the opposite of subtracting 3 from 5 and add to C.
Identifying Misconceptions

Too Good To Be True?

1. Amy and Ben are trying to answer this question:

When is the equation $5 - x = 6$ true?

They decide to compare their work.

Amy:

\[
5 - x = 6 \\
so \ x = 6 - 5 = 1 \\
so \ it \ is \ True \ when \ x = 1
\]

Ben:

\[
5 - x = 6 \\
so \ x = 6 - 5 = 1 \\
so \ it \ is \ True \ when \ x = 1
\]

Both Amy and Ben have made a mistake. Describe where they have gone wrong:

Amy: Amy is wrong by saying $x=1$ because if $x=1$ it would be $5 - 1 = 4$ and make it impossible for the outcome to be 6.

Ben: Ben is correct by saying the equation came could never be true.

Show how you would work it out:

You write $11$ in place of $x$ and substitute it by $5$ & you would get 6 as the outcome came $5 - 11 = 6$ true.
TLE: TeachLivE™ Mathematics Lesson

Provide After Action Review (AAR)
What Happened in TeachLivE?

Four 10-minute sessions of TeachLivE had effects in TeachLivE and classroom.

Virtual rehearsal in TeachLivE increased teachers’ frequency of:

- higher order questions and
- specific feedback to students
- Increase observed in classrooms

Biology Year 2 - 150 Teachers

75 Teachers

Science lesson (NIH and LDC)
Online video of effective inquiry-based science instruction

75 teachers

TeachLivE (50 total minutes)
Construction of a Viable Argument

http://im4students.wordpress.com/2013/10/31/happy-halloween/
Comparing Data

Estimated number of polio cases per year

Polio Timeline

- **3000 BC**: Egyptian paintings and carvings depict people with withered limbs and walking with canes
- **1928**: First iron lung used at Children’s Hospital in Boston
- **1952**: Worst polio outbreak in the United States history, with 658,000 reported cases
- **1955**: Jonas Salk’s injected polio vaccine introduced
- **1963**: Albert Sabin’s oral polio vaccine licensed
- **1979**: Last case of naturally occurring polio in the United States
- **2007**: The World Health Organization declares polio eradicated in the Americas, Europe, and the Western Pacific
- **2010**: Sustained transmission of polio in four countries, but outbreaks in 16 countries are reminders that polio anywhere is a threat everywhere

Source: PHL/Polio database
Session Report

Time spent at each Tracking Zone

- Kevin: 7%
- Cj: 13%
- Ed: 17%
- Maria: 11%
- Sean: 16%
- Front: 34%

Session Information
- Student: Michael Hopper
- Instructor: Knightro
- Start Time: 5:13PM
- Date: 6/25/2012

Total Session Time:
30 minutes, 31 seconds

Time spent standing at each student:
- Ed: 2 minutes, 16 sec.
- Sean: 4 minutes, 6 sec.
- Maria: 5 minutes, 12 sec.
- Cj: 3 minutes, 30 sec.
- Kevin: 5 minutes, 2 sec.

Time at Front of Class: 10 minutes, 25 sec.
Year 3 Projects

- Commercialization Activities
- Research activities in Year 3 will build upon our findings from Years 1 and 2 and take place in 3 areas of foci:
  - TeachLivE Stickiness for Teachers (UCF)
  - Innovations in TeachLivE Scenarios
  - K-12 Student Interactions with Avatars (UCF)
    - Beyond Z
    - Students with Intellectual Disabilities problem solving
    - Students with autism home use with families for social skills.

- Technology Development
  - Migration to Unity platform
  - Integration of ReflectLiVE reporting system
TeachLivE™ Components
(Client Set-Up)

Speakers (Audio of Virtual Students)

Webcam (To view Teacher)

Kinect (Camera-view)

Large Screen Display (View Classroom)
Students with Disabilities
Learn from Avatars
The Future
Austin
New High School with Students with Autism and ID
Other New Adventures

• Amities
  • New Company supported by New Schools Venture Funds
• MindUP with Goldie Hawn
  http://www.thehawnfoundation.org
• Wonder Grove Kids with Terry Thoren
  http://www.wondergrove.com
• UCF Student Services
• UCF Police
Sampling of Other Uses

VA Debriefing

CollegeLivE

Physical-Virtual Patient Bed

Physical-Virtual Avatar
Sean Goes 3-D
Newest Physical Virtual Avatar
Sean Goes 4-D

bot designed
ent. It is fully
making it a
and entertain.
Beyond the IC:
What are some areas teacher educators should have on their radar?
On the Horizon
A new way of thinking about success in life and the relationship of technology

Edmonds,
Micro-credentialing

http://www.digitalpromise.org/initiatives/educator-micro-credentials
Blending Micro-credentialing and TeachLivE

Co-planning

Positive statements

http://www.digitalpromise.org/initiatives/educator-micro-credentials
**Time to adoption: One Year or Less**

- Flipped Classroom
- BYOD

**Time to adoption: Two to Three Years**

- Makerspaces
- Wearable Technology

**Time to adoption: Four to Five Years**

- Internet of Things
- Adaptive Learning Technologies
**Solvable Challenges**
Adequately Defining and Supporting Digital Literacy
Blending Formal and Informal Learning

**Difficult Challenges:**
Complex Thinking and Communication

**Integrating Personalized Learning**

**Wicked Challenges:**
Competition from New Models of Education
Relative Lack of Rewards for Teaching
Where in the World is Carmen Sandeigo

France, with a population of about 55 million, is famous for its food, wine, fashion and art.
Reader Rabbit
"The illiterate of the 21st century won't be those who can't read and write, but those who can't learn, unlearn, and relearn."
Alvin Toffler