A Digital and Blended Learning Ecosystem for the Workforce of the Future

OAS: INTER - SECTORAL WORKSHOP ON “SKILLS FOR THE FUTURE: COORDINATION BETWEEN MINISTRIES OF EDUCATION AND LABOR”, Santiago de Chile
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At a time when the workforce is facing changing demands, and employment is being usurped....
Augmented Reality Program

- **SAFETY**: Highlight critical safety information in a challenging work environment
- **OPERATIONS**: Bring the ship to life in a new way by revealing data while it is in context
- **MAINTENANCE**: Enable every sailor to become a quick expert on complex systems
- **TRAINING**: Train new operators by overlaying instructions on complex equipment
The Future of the CLO

Trainer → Transformer
Three transformations

**Goals**
- Compliance → Enablement
- Skills → Capabilities and culture
- Order-taking → Partnership

**Methods**
- Personalized
- Small bits, Just-in-time
- Digital + Blended
- Simulation, Scenarios
- Multi-modal
- Peer learning
  - Instruction, Introspection, Immersion

**Learning Unit**
- Smaller, more agile
- Creation → Curation
- Experience design
- Peer/expert teacher enablement
- New staff roles
- Performance focus
Disruptive Innovation for Quality @ Scale

**Supply**
- Digital Learning
- Innovation across supply chain of education
  - Lectures, Labs, Credentials
- Learning Science
  - Cognitive Tutors for Adaptive Learning
- Alternate Pathways
- Data used to improve learning
- The Open Movement
- A new ecosystem for learning

**Demand:**
- Worldwide demand for well-educated workers
- Cost of education
- Rapidly changing knowledge and skills
- New Generation of Diverse learners
  - Non-Traditional Displaced

Changing the World of Learning  Changing the World through Learning
Every element of teaching/learning is transforming
Interactive Simulations (Physics)

TEALSim Exploration: Point Charges

This simulation illustrates the field pattern created by two point charges with opposite signs of charge. In this simulation, the position and charge of each particle can be modified in real time, and the field configuration will update itself accordingly.

All three field visualization techniques can be applied to show the overall electric field of the two-charge configuration: vector field, field lines, and "grass seeds".

(Please be patient - the simulation may take ~20 seconds to load)
Virtual Game-Like Laboratory
Interactive Auto-graded Problems

Why Solid-State Chemistry? Learning Sequence
Modern Chemical Concepts and Periodicity of the Elements Learning Sequence
The Electron and Light Learning Sequence
Additional Study Material
Problem Set 1
Homework due October 28

Week 1

S1E1: NEwTON’S LAw

The next three segments cover review material that 3.091x will rely on over the course of the semester. Check your understanding with each exercise, and see the screencast at the bottom of the page if more information is necessary.

A ball of mass 2.5 kg is pushed along a frictionless surface with a constant force of 15 N applied. Calculate the acceleration of the ball. Express your answers in m/s².

May use randomization, tolerances can be specified

Check  Save  Show Answer
The Science of Learning

1. Mind-wandering
2. Retrieval practice
3. Spaced practice
4. Hands-on
5. In-person tutoring
Judicious Blending

- Do online where online is better
  - Training versus education: video
  - Retrieval, spaced, interleaved training
  - Practice, simulations, games, practice, mastery

- Do onsite where what are better onsite
  - Feedback
  - Hands-on
  - Peer-to-peer and discussion
MicroMasters Credential

- New *mezzanine* credential for working professionals
- Fully online, credential issued by edX/MITx
- If admitted to MIT, credit for a semester of Masters
- Other universities signing up for follow-up master’s
- Recognized by industry leaders (Walmart, GE, IBM, Volvo, Fidelity, Ford, Bloomberg, Equifax, etc.)

https://micromasters.mit.edu/
Bootcamps

MIT Global Entrepreneurship Bootcamp
Start a company in a week
LEARN MORE

MIT Internet of Things Bootcamp
Solve big problems using tiny computers
APPLY

Abdul Latif Jameel World Education Lab
News: New pathways for learning/credentials

MOOCs + Bootcamp = MicroMaster’s + Semester = Degree

Online Prof Ed + Bootcamp = Professional Certificate
A new landscape is emerging

Hacking virtual reality
Contributing to a culture of pioneers, MIT students explore the technical, philosophical, and artful dimensions of VR.

Digital Diploma debuts at MIT

AI powered Knowledge-on-Demand
Digital Diplomas at MIT

Using Bitcoin's blockchain technology, the Institute has become one of the first

- Students can share their diplomas almost immediately with whomever they please, free of charge, without involving an intermediary.
- Important for students who need to prove to an employer or another university that they have an MIT diploma.
- Third party can easily verify that the diploma is legitimate without having to contact the Registrar’s Office.
# GYAN: AI Powered Knowledge-on-Demand

<table>
<thead>
<tr>
<th>Knowledge on Demand</th>
<th>Intuitive</th>
<th>Pedagogical Overlay</th>
<th>Knowledge Marketplace</th>
<th>Self-Learning</th>
<th>Integrated Assessment Framework</th>
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<tbody>
<tr>
<td>Provide Knowledge-on-Demand on any topic and keep it updated real time</td>
<td>Intuitive visualization and non-linear learning model using Semantic Networks in addition to conventional linear text book style material</td>
<td>Pedagogical overlay reflecting ‘experts’ view of how to learn specific topics. Experts can easily compile a Gyan collection and overlay their expertise</td>
<td>Marketplace facilitates rapid and relevant publication and consumption of knowledge</td>
<td>Self-learning, adaptive engine that can tailor additional content by observing user performance</td>
<td>Comprehensive assessment framework for authors and administrators to assess content</td>
</tr>
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Jameel World Education Lab (J-WEL)

**Leverage MIT Resources**
- Digital Learning Assets
  - OpenCourseWare
  - MITx
  - MicroMasters
- MIT Integrated Teaching & Learning Initiative
- MIT pK-12 Activities
- MIT Faculty Creativity

**Explore Design Reform**
- Sustainable, High-Impact Transformation
- Of education across the world though research, policy, pedagogy and practice

**Engage Community of Collaborators**

Sparking a global renaissance in education for all learners
Applies systemic view to early education.

- STE(A)M Education
- Early Childhood Education
- Compassion and Social Emotional Supports
- Computational Thinking
- Teacher Professional Development & Leadership
- Literacy

Aims to transform institutions.

- Student achievement
- High impact research
- Healthy ecosystem
- Strong governance

Help adults to take charge of their career development

- Workforce 2025
- Design of the workplace learning organization
- Ed tech and platforms
- Specific content
The Billion Workers Initiative

Our Dream:
Provide the right skills
to the right people
in the right way
... at scale

Transforming:
Advice
Learning
Credentials
Industry/school linkages

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Our Goal: Provide the right skills to the right people in the right way – at scale.

- Sensing demand for skills and jobs
- Assessing worker skills
- Advising on good training and career paths
- Developing and curating courses: online, hybrid, experiential
- Personalized learning experiences
- Improving job matching

- Collaborating with schools, companies, and community institutions
- Building local capacity to execute and constantly improve the new processes
- Fostering a provider ecosystem
- Ongoing innovation and research to improve courses, experiences, outcomes
Research and Policymaking

Agency Policy

Real-time Demand Status
- Competencies
- Roles
- Policy
- Adherence

Infrastructure

Staffing

Course Design

Learning Science Research

Assessments

Local Customizations

Credentialing requirements

Learning Experience
- Online
- Onsite
- Hybrid
- Simulation
- Game
- AR/VR
Workforce Learning Focal Areas 2018-2019

Working Collaboratively with Industry and Society

Skills 2025
- New skills, Skills gaps
- Adjacent skills

Ed-tech & Platforms
- Enablers
- Disruptors

Design of the L&D Unit
- Org design, skills
- Measurement

Specific Content
- Tools
- Courses
Initial Vision

Employers

High demand Jobs and Skills

Skill Providers

Courses

Training

My interests My skills

Certifications

Assessments

Advice

Job Matching

My skills

My interests
Transforming workforce learning

APPROACH

Generate early results

Scale

Sustain and Extend
The architecture supports many essential functions:

- Personalization
- Education
- Certification
- Collaboration
- Optimization
- Innovation
- Policy support
Micromasters

Online learners that obtain the MITx MicroMasters credential in supply chain management now have a faster path to a master’s degree at MIT and also at Curtin University and the University of Queensland.

Twenty three universities adopt MicroMasters and launch 46 new programs via edX

Recognized by industry leaders (Walmart, GE, IBM, Volvo, Fidelity, Ford, Bloomberg, Equifax, etc.)
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Changing the World of Learning  Changing the World through Learning
Fly-by-Wire

Blended technology for scalable, differentiated instruction.
Fly-by-Wire

Scalable differentiated instruction through technology-enabled, competency-based, dynamic scaffolding

- Relate curricular content to student skills and outcomes
  - Modularity and curriculum mapping to create competency-based mappings
- Enable teachers to differentially guide students towards competencies
  - Fly-by-Wire" technology, inspired by aeronautics and control theory,
- Deploy these approaches at Scale to meet the needs of many learners cost-effectively.
  - Interoperable online technology architecture
MIT launches MITx MicroMasters in Principles of Manufacturing

New program offers alternative learning pathway to mastering fundamental skills needed for global manufacturing excellence and competitiveness.

January 9, 2018

Worldwide change takes global effort

The American University in Cairo is the first school to grant master’s credits to MITx Data, Economics, and Development Policy MicroMasters program learners.

January 5, 2016

GE offers to interview Mass. residents who complete MITx MicroMasters in supply chain management

Gov. Charlie Baker and industry leaders are promoting the MicroMasters program and digital learning to expand access to education.

December 11, 2017

A truly global supply chain of knowledge

After only online collaborations, four MicroMasters students meet in person for the first time — and go on to win a worldwide competition.