From Disruption to Redesign: Reconceptualizing Education

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Agenda

• Contentions
• Changes to our professions
  • Professions are evolving as “smart machines” augment human capabilities
  • Our professions and education will be impacted
• Implications for higher education
  • Need for better diagnostics and navigation skills
  • Augmented capabilities (human + machine)
  • Lifelong learning and upskilling
• Discussion
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Contentions

• Professions are being reconfigured by “smart machines” leading to challenges for higher education
• “Smart machines” are leading to new fields such as computational psychometrics
• Both the delivery and substance of education will change
• Learners will need improved capabilities to diagnose and document their skills and navigate their careers
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Smart Machines

• A range of technologies (AI, machine learning, robotics, IoT, etc.) are catalyzing an era of “smart machines” or “augmented intelligence”

• The estimated impact of smart machines is massive:
  • Economically: Global GPD will increase 14%
  • Professionally: One-third of employees will need to learn new skills and ~10% of labor demand will be in new, as-yet undefined occupations
  • Division of labor: Percentage of “task hours” done by machines vs. humans will reach 52% by 2025
  • Educationally: Average worker will need 101 days of retraining and upskilling by 2022


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Professions Are Being Reconfigured

- Occupations will evolve alongside increasingly capable machines
- Work will be unbundled and re-bundled
- Tasks will shift from higher-skilled professionals to lower-skilled ones
- Professionals will need the right skills to complement new technologies
- All professionals will need “digital dexterity” and the ability to use information “as a second language”

As machines can do more, we will need new skills to capitalize on those capabilities

Learning and Assessment Are Being Redefined

Tools for today’s learning and assessment
- Learning science
- Multimodal analytics (e.g., audio, video, gestures, cognitive load)
- Artificial intelligence, machine learning, deep learning, natural language processing
- Interfaces (e.g., mobile, voice-based assistants)
- APIs
- Data lakes

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Education Will Evolve

• Digital skills will be required in all disciplines
  • Human + technology skills are integrated in professions
  • Using data, large datasets and algorithms will become more important
  • Value of digital approaches must be balanced with risks, benefits and ethics
• Insights from AI, machine learning and analytics will augment our approaches to learning, assessment and career navigation
• Frequent re-skilling and up-skilling will be needed
• The “cadence” of education will change, with macro-learning interspersed with micro-learning

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Diagnostics and Navigation: RAD API

Augmented Capability: Chatbots

Chatbots can augment human capabilities

- Teacherbots (chatbots as TAs): Georgia Tech AI course (“Jill Watson”)
- Intelligent virtual assistants:
  - “Pounce” at Georgia State reduced summer melt by 20%
  - Wayne State’s use of virtual assistant to help students “learn college”
  - “Genie” at Deakin University
Augmented Capability: Alexa as a Coach

• Text to speech and translation
• Conversational assessment and tutoring
• Use of natural language and Alexa as a coach and virtual learning assistant
• Voice-based assistants can advise, recommend and participate in ongoing learning conversations
• Companion App Speech/Translations
  • https://vimeo.com/310852667

Augmented Capability: Collaborative Problem-Solving

• Crisis in Space: A tool to understand the skills and communication patterns that represent collaboration, such as
  • Leadership
  • Coordination
  • Information sharing
  • Teamwork
• Gameplay and communication analyzed by AI and ML tools
• Provide basis for intelligent tutoring systems
• Collaborative problem-solving video
  • https://vimeo.com/user50660253/review/363922661/aebf01fb15
Lifelong Learning and Upskilling

**Challenges:**
- Time for re-skilling and up-skilling is limited
- Learning and forgetting curves compete
- Performance and confidence are important

**Micro-learning:**
- Learning can come in all sizes, not just course sizes (e.g., micro-learning)
- Micro-learning and spaced practice reduces forgetting
- Macro-learning and micro-learning will be interspersed throughout a career

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Micro-Learning

**Cell-Ed:**
- Designed to reach and upskill low-literate workers
- Micro-lessons fit the lifestyle of time-constrained adults
- Real-life scenarios provide relevance

**How it works:**
- Anytime, anywhere access with any phone (without Internet or data charges)
- 3-minute, bite-sized lessons; text back to demonstrate understanding
- Automated and live or on-demand coaches
- 84% faster skill gains from 3-minute lessons

https://www.xprize.org/prizes/adult-literacy/teams/cell_ed
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Question

Professions are being changed by “smart machines”
Question

My profession is being changed by “smart machines”
• It is not being changed
• It is being changed now
• It will be changed in the next few years

Question

To adapt to the emerging environment, higher education should:
• Adopt more refined diagnostic and assessment tools
• Develop cross-cutting skills such as problem-solving
• Focus more on lifelong learning
Question

Which approaches should your institution be considering?
• Continuous assessment and diagnostics
• Chatbots to augment human capabilities
• Shorter learning experiences (e.g., micro-learning)

Implications for Higher Education

• Future-ready skills require a combination of “human” and “machine” capabilities
• Assessment and diagnostics will be fundamental navigation tools for learning
• Technological assists will allow instructors to teach more complex skills, such as problem-solving
• Lifelong learning will go beyond courses to include micro-learning and alternative credentials
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