Information and Communication Technologies in Education & Digital Literacy Implications for Universities and Academic Rankings

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The past and the present

A Sumerian classroom from 2000 B.C.

Source: Classroom design - pages from history https://www.ethicalpolitics.org/ts/history.html
The past and the present

A 15th Century classroom

• No significant changes in basic principles of teaching

Source: Classroom design - pages from history https://www.ethicalpolitics.org/ts/history.html
The past and the present

Mental Calculations.
In the school of S. Rachinsky by Nikolay Bogdanov-Belsky. 1895.
The past and the present

- No significant changes in basic principles of teaching

A classroom from the 1930s

Source: Classroom design - pages from history https://www.ethicalpolitics.org/ts/history.html
The past and the present

• Basic components of the setting are similar
  • Dedicated rooms
  • A teacher lecturing
  • Students learning

• The methodology is similar
  • Complete the courses
  • Pass the exams
  • Graduation

• Cognitive expectations from the students
  • Memory retention, recall and transfer
The past and the present

• "Text books will be replaced by movies"
  (Thomas Edison in 1903)

• "Lectures will be replaced by radio programs"
  (the 1930s)

• "Lectures will be replaced by TV programs"
  (the 1960s)

• "Lectures will be replaced by online courses
  and MOOCs – Massive Open Online Courses"
  (since the 2000s)

  • MOOCs may not replace traditional settings easily
  • Credibility of the graduation certificate
  • Attendance rates (less than 10% recently)
Teaching and learning in the ICT era

Recent findings

• Do students learn/remember better when they read from a tablet compared to reading on paper?
  • No clear answer

• Do students learn better from animations compared to learning from books?
  • No clear answer

• Mixed findings: Learning is a complex cognitive activity

Source: http://modules.ilabs.uw.edu/module/foundations-of-literacy/reading-is-a-complex-process/
BUT there are expected changes!

• An opportunity for personalized and self-paced learning
  • Students’ tendency to learn from MOOCs

• A likely outcome: More popular lecturers in the MOOCs (cf., youtubers vs. MOOCers?)
  • Higher quality lectures in MOOCs than the lectures in traditional settings
  • A loss of reputation of traditional classroom teaching (due to the lower quality of teaching)
Universities on ICT

• Developing blended learning methods
  • Good lecturers should be convinced to teach online courses

• Human-in-the-loop learning models for assessment (for personalization and self-paced learning)
  • Physiological measures for assessment

• ICT infrastructure in campuses
  • ICT infrastructure will play a significant role in preferences of prospective students
Universities on ICT

• A competition for providing better technological infrastructure to students

• International students will play a major role in shaping the future of higher education
  • A high-tech campus will be a center of attraction for students and faculty

• Also supported by demographic predictions: An expected increase in population of developing countries in the next 20 years
  • A flow of international students to more developed countries
Interdisciplinarity

• The development of technology may lead to changes in the job market
  • Future jobs: Impossible to predict
  • A recent development: The market is volatile (easier to change or to lose a job)
• The students' need: Broaden their perspective in multiple fields of expertise
  • Current implementation in higher education: Double major and minor undergraduate programs
• The challenge:
  • Universities are slow to make changes in curricula
• An expected outcome:
  • More involvement (e.g., part-time lecturers) from the industry
Industry collaboration

• An interface for the inclusion of industry leaders in teaching: Science parks
  • Example: Silicon valley, US (founded in the 1950s)
• The idea
  • Universities as leaders of innovation to support their country in global competitiveness
  • To turn a scientific idea into a product
  • Graduates and faculty setting up their own business
  • Guiding role of universities in science parks (technoparks): Technology incubators for entrepreneurs

Source: https://venturewell.org/industry-and-university-collaboration/
The present and the future: University rankings

- Recent indicators of research performance
  - Number of publications
  - Impact of publications (citations at an international level)
  - Quality of publications
  - ...
- An expected outcome: More weight in the following indicators (an effect of ICT in rankings)
  - Patents received
  - Intellectual properties
  - Number of spin-off companies
  - ...
- Another expected outcome: More focus on field rankings (cf. the perspective of prospective students)
University Rankings: The future

- University rankings may play a more significant role than today (for prospective students)

- The responsibility of ranking institutions: We should develop open and objective ranking methodologies that aim at representing the stability over the years, as well as changes in performance
THANKS

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