

Human-Computer Interaction

# Educational Technology

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# Today's Agenda

- » Topic overview: Educational Technology
- » Discussion
- » Bonus lecture: How to Conduct Online Studies
- » General Q&A

projects assignment

What is educational technology?<sup>1</sup>

**Definition:** The study and ethical practice of facilitating learning and improving performance *< task learning* by creating, using, and managing appropriate technological processes and resources.<sup>2</sup>

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<sup>1</sup>Image source

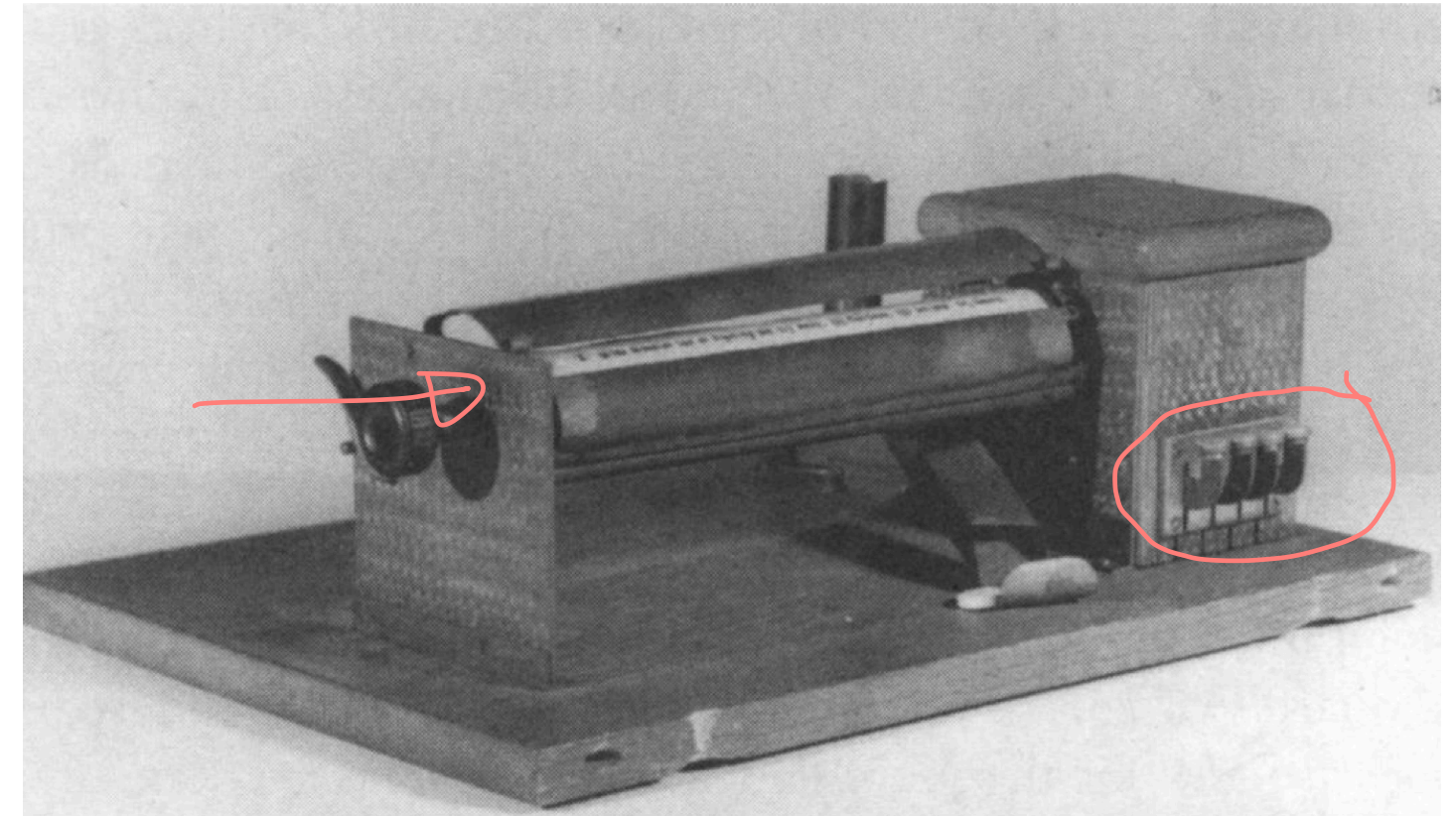
<sup>2</sup>Richey, 2008, Reflections on the 2008 AECT Definitions of the Field





*Some history: **Milestone 1: Teaching machines**<sup>3</sup>*

Mechanical devices, first developed in the 1920s by Sidney Pressey, presented educational materials and taught students. Early machines administered tests involving sequential multiple-choice questions.



<sup>3</sup>Petrina, 2004, Sidney Pressey and the Automation of Education, 1924-1934



Some history: **Milestone 2: Programmed learning**<sup>4</sup>

Teaching machines, developed by B. F. Skinner in the 1950s, directed at a broad range of students on a broad set of topics that provided positive reinforcement to facilitate learning.



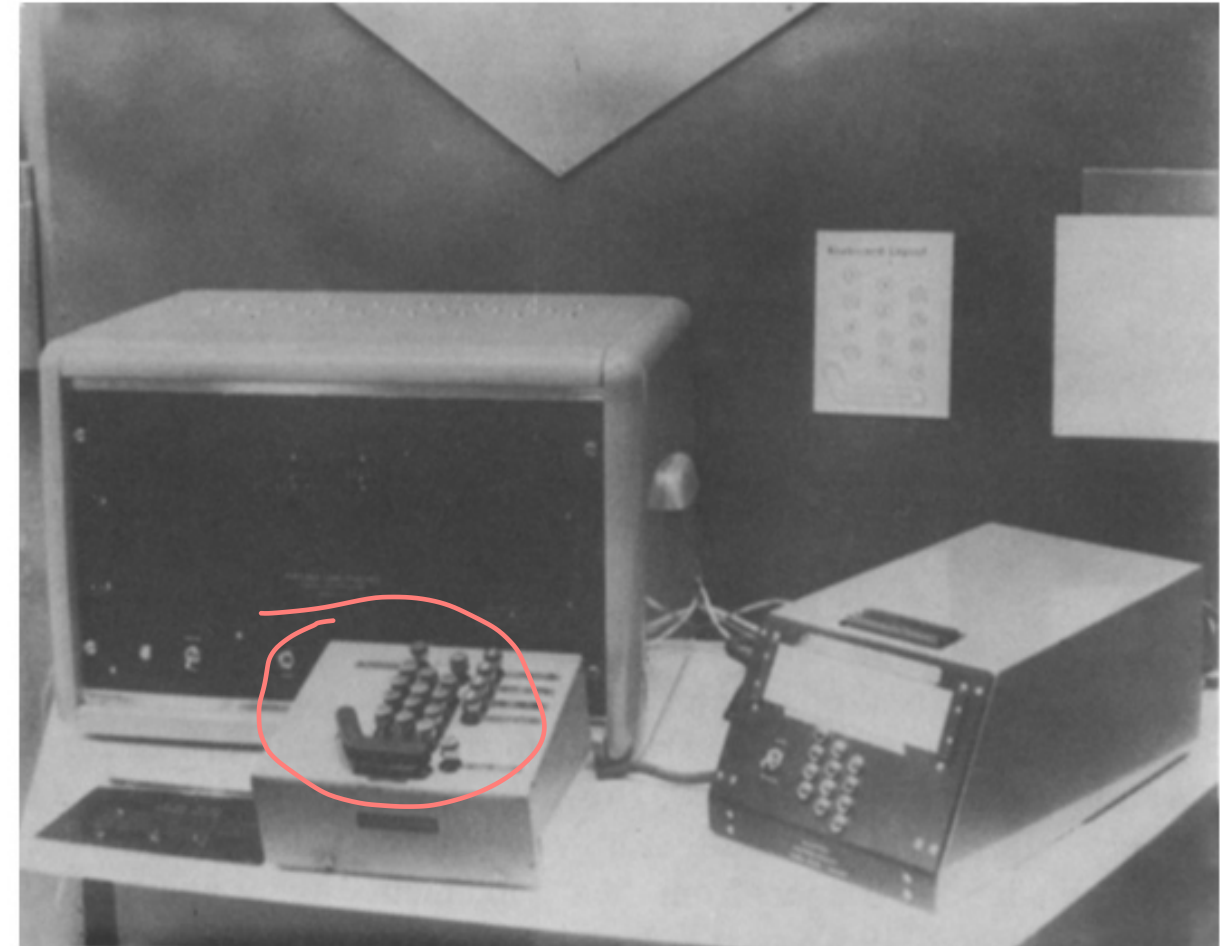
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<sup>4</sup>Image source



Some history: **Milestone 3: Adaptive teaching machines**<sup>6</sup>

Adaptive teaching machines, e.g., self-adaptive keyboard instructor (SAKI) developed by Gordon Pask in 1956, adjusted questions to the accuracy and response time of the student.



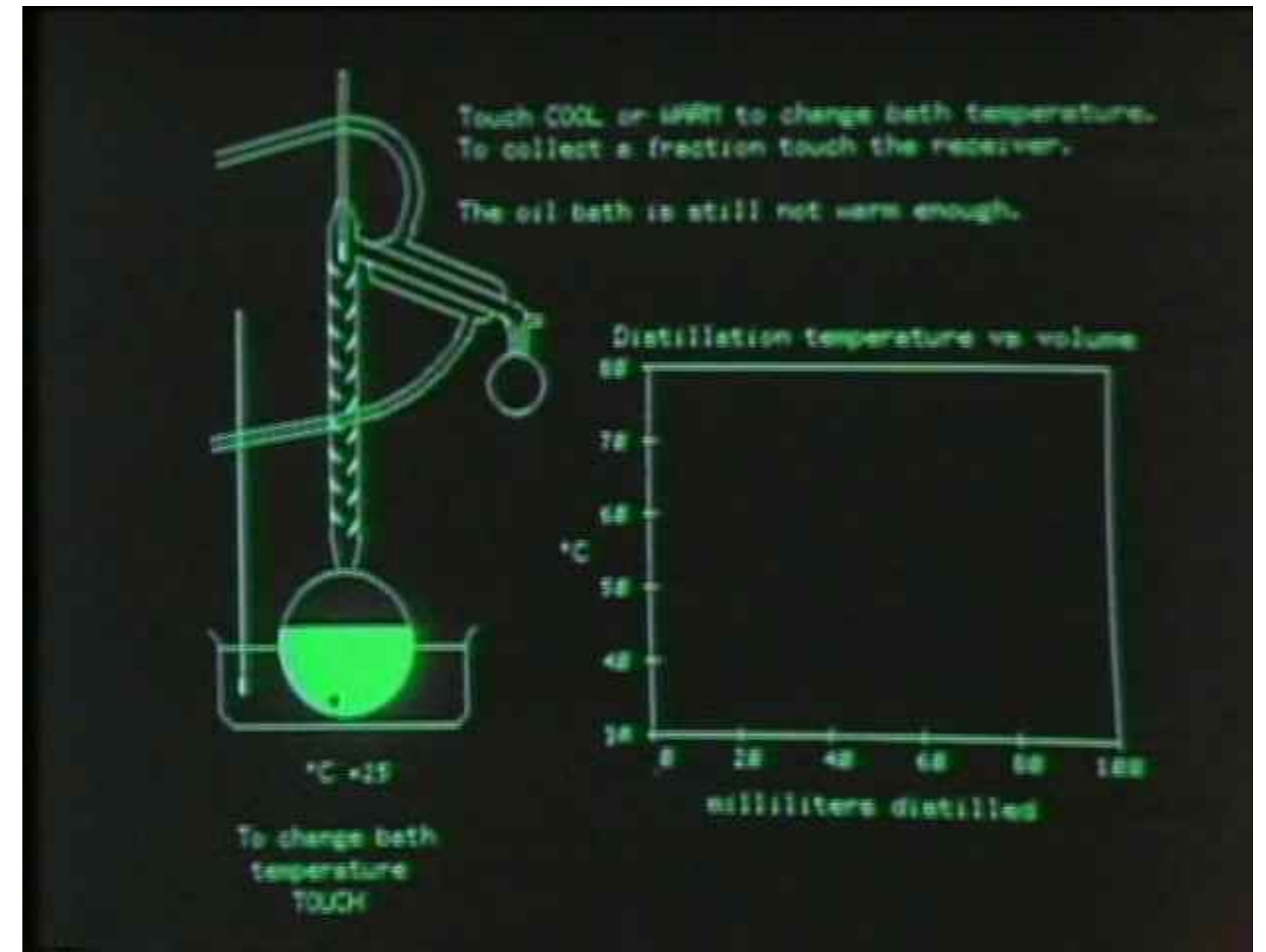
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<sup>6</sup>Watters, 2015, Gordon Pask's Adaptive Teaching Machines



Some history: **Milestone 4: Computer-aided learning**<sup>7</sup>

Generalized computer-assisted instruction systems, e.g., the PLATO system developed at UIUC in the 1960s, offered comprehensive instruction on a range of topics.



<sup>7</sup>Image source)



# PLATO

CHANGING HOW THE WORLD LEARNS

*Some history: **Milestone 5: Educational programming**<sup>9</sup>*

Computer programming and robotics are used as learning instruments, e.g., to teach proceduralization, debugging, etc. Logo and Turtle were developed by Seymour Papert in 1967.



<sup>9</sup>Image source



## Some history: **Milestone 6: Pervasive use of computer-aided learning**<sup>10</sup>

Pervasive, personal computers designed for education at schools and at home, such as the BBC Micro released in 1981.



### The BBC Microcomputer Is Here!

**A WONDER FOR THE MONEY.** Even before its introduction in the U.S., the BBC microcomputer was acclaimed as a "nononsense computer" (BYTE magazine), "a remarkably friendly machine" that "will set the standard for home computers for quite some time" (POPULAR COMPUTING), and "the most versatile, small general-purpose computer I've seen . . . a wonder for the money" (COMPUTERS & ELECTRONICS).

**EDUCATIONAL USES.** The BBC micro was designed as part of a national computer literacy project, one portion of which is "The Computer Programme" TV series being shown in the U.S. on more than 220 PBS stations. BBC micros now account for more than 75% of the computers being ordered by British schools under a government plan to put a computer into every primary and secondary school.

**THE SYSTEM.** The BBC micro is based on a 2MHz 6502 main microprocessor with a combined RAM/ROM address capability of 64K.

**HIGH RESOLUTION GRAPHICS.** The system features very high resolution color graphics in modes up to 640 x 256 (163,840 pixels). Text display can be 80, 40 or 20 characters by 32 or 25 lines.

**EXPANDABILITY.** The computer includes built-in serial and parallel interfaces, a floppy disc interface, a 1MHz expansion bus, analog/digital interfaces, econet interface which allows schools and businesses to link economically up to

254 computers in a low cost local area network, and a unique high-speed data channel called the Tube<sup>®</sup> for adding a second processor.

**SECOND PROCESSORS.** An additional 6502 microprocessor provides increased processing speed and an extra 64K of RAM. Alternatively, a Z-80B Second Processor can be joined to add 64K of RAM and allow running of CPM programs\*, which are extensively used for business applications. A third choice is a UNIX based 16032 16-bit processor with 32-bit architecture that provides 256K RAM.

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Dealer inquiries invited.

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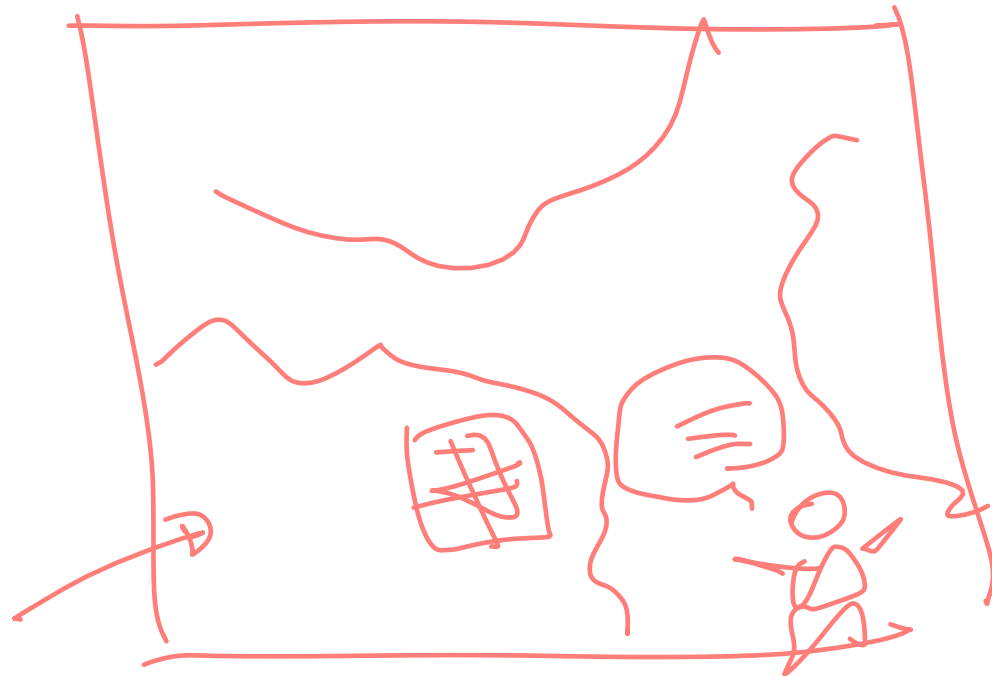
CIRCLE NO. 38 ON INQUIRY CARD

\*Registered trademark of Digital Research, Inc.

<sup>10</sup>Wikipedia: [BBC Micro](#)

*Some history: **Milestone 7: Online learning***

Virtual learning environments (VLEs), such as the Strathclyde Personal Interactive Development and Educational Resource (SPIDER) began in 1998,<sup>11</sup> provide a complete environment that facilitates learning management.



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<sup>11</sup>Wikipedia

*Some history: **Milestone 8: Mobile learning***

Mobile learning, or m-learning, involves learning across multiple contexts, through social and content interactions, using personal electronic devices<sup>12</sup>.

Earliest concept was Alan Kay's Dynabook.<sup>13</sup>



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<sup>12</sup> Crompton, 2013, A historical overview of mobile learning: Toward learner-centered education

<sup>13</sup> Image source



# Discussion Questions

- » Where are educational technologies today? What technologies do you use?
- » How does design-based research fit within the history of educational technology?
- » Where are educational technologies going? What are the most important challenges they must address?
- » What external resources did you find that might add to our discussion?
- » ...