

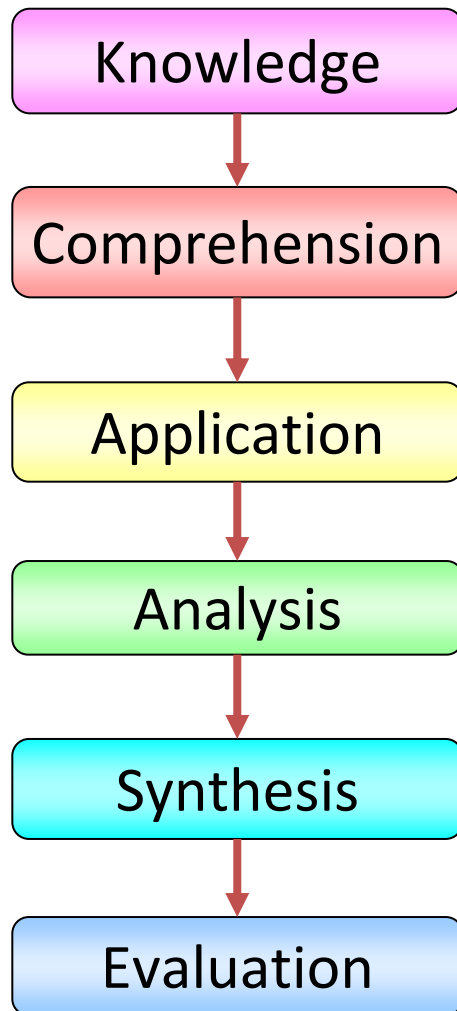
Learning Technology in 2nd Year Mechanical Engineering



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Outline

Bloom's Taxonomy



Multiple choice quizzes

- computer scanned
- IF AT (scratch cards)

Narrated videos (*Camtasia*)

Discussion via Google Doc

Multiple Choice (Computer-Scanned)

- Uses
 - In-class quizzes
 - In-class exercises
 - Midterm and final exams
- Equipment
 - Apperson scanner (~\$800)
 - Scanner sheets (\$30 / 500 sheets)
- Outputs
 - In-class: real-time assessment of student understanding
 - Excel file, (almost) ready for marksheet



Key Verify Rescore

Advantage
APPERSON EDUCATION PRODUCTS

Marking Instructions

USE NO. 2 PENCIL ONLY

- Example **A** **B** **C** **D**
- Make Dark and Complete Marks
- Erase Completely to Change
- Make No Stray Marks

Student ID Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50																
	1	A	B	C	D	E	61	A	B	C	D	E	12	A	B	C	D	E	23	A	B	C	D	E	34	A	B	C	D	E	45	A	B	C	D	E	56	A	B	C	D	E	67	A	B	C	D	E	78	A	B	C	D	E	89	A	B	C	D	E	90	A	B	C	D	E

Student Name _____
School Name _____
Apperson Education Products, 2004-2011
www.apperson.com

Multiple Choice (IF AT Cards)

- Uses
 - Team quizzes
 - Others have used for midterm and final exams
- Equipment
 - Epstein IF AT cards (~\$100 / 500 cards)
 - Come in many different styles and answer keys
- Outputs
 - Students get immediate feedback
 - Students / teams self-score

IMMEDIATE FEEDBACK ASSESSMENT TECHNIQUE (IF AT®)
Name _____ Test # _____
Subject _____ Total _____
SCRATCH OFF COVERING TO EXPOSE ANSWER

	A	B	C	D	Score
1.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
2.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
3.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
4.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
5.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
6.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
7.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
8.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Solution Videos (Camtasia)

- Uses
 - Creating narrated solutions of test and class problems
 - Can be made semi-secure (e.g. you control access on Vista)
- Equipment
 - Software (*Camtasia*, ~\$300)
 - Tablet PC (if writing on screen)
 - Microphone
- Output
 - Video for posting to Vista or web site

31. Belt Tension



- Pulley 3 has a diameter of 15 cm and is used with a flat belt (wrap angle 180°). A motor is connected to the belt and it transmits power of 2.5 kW at speed 2500 rev/min to Pulley 3. The initial belt tension is 400 N and there is a hoop tension of 50N due to centrifugal force. The shaft rotates in the direction shown. Determine the belt tensions F_{top} and F_{bottom} (8 marks)

$$D = 0.15 \text{ m} \quad H = 2500 \text{ W} \quad n = 2500 \text{ rev/min}$$

$$T = \frac{H}{\omega} = \frac{H \cdot 60}{2\pi n} = \frac{(2500 \text{ W}) \cdot 60}{2\pi (2500 \frac{\text{rev}}{\text{min}})} = 9.55 \text{ Nm}$$

$$F_1 = F_{bot} = F_i + F_c + \frac{T}{D} = 400 \text{ N} + 50 \text{ N} + \frac{9.55 \text{ Nm}}{0.15 \text{ m}}$$
$$\boxed{F_{bot} = 514 \text{ N}}$$

$$F_2 = F_{top} = F_i + F_c - \frac{T}{D} = 400 \text{ N} + 50 \text{ N} - \frac{9.55 \text{ Nm}}{0.15 \text{ m}}$$
$$\boxed{F_{top} = 386 \text{ N}}$$

Camtasia Studio Example

Solve for x given

$$\textcircled{1} \quad x - y = 2$$

and

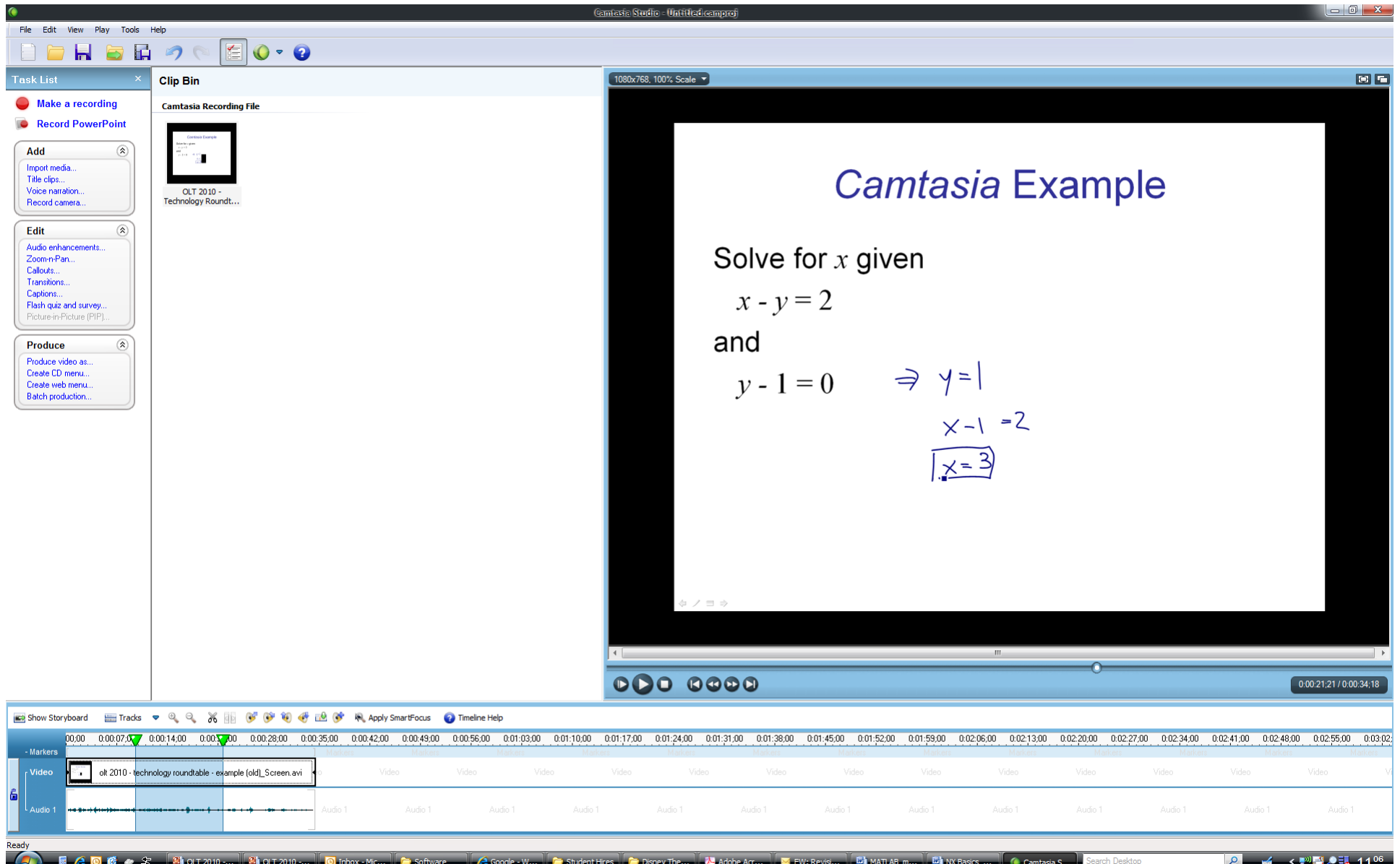
$$\textcircled{2} \quad y - 1 = 0$$

$$y = 1$$

$$x - 1 = 2$$

$$x = 3$$

Edit Video in *Camtasia Studio*



Google Docs for Class Discussion

- Uses
 - Reporting / displaying work from multiple teams
 - Forum for many teams to simultaneously contribute to discussion
- Equipment
 - Google Docs (free)
 - Students must have one laptop per team
- Output
 - “Living document” projected to screen for class to see
 - Record of class discussions

File Edit View Insert Format Form Tools Help					
	A	B	D	E	F
1					
2	Team	Cost	Actuator Type	Transmission Type	Questions for this team
3	A1	\$212.17	AC Motor w/ On-Off-Rev. Switch	Worm and Spur Gears	
4	A2	\$150.12	AC Electric motor	Power Screw	From B1: Motor straight to power screw?
5	A3	\$155.00	DC Electric Motor	Cable and Springs	From A4: did you include a square ball nut and switch
6	A4	\$109.23	Electric motor (AC)	Power Screw	From D5: Motor size? (does it have enough power?)
7	A5	\$293.42	Electric Motor (AC)	Spur Gears	From A1: How is power screw so cheap?
8	B1	\$363.24	Electric Motor	Worm/Spur Gears	From B1: Is this direct drive?
9	B2	\$156.41	Electric Motor (AC)	spur gears	From C4: Does this include switches and other accessories?
10	B3	\$181.30	AC Electric Motor	Rack & Pinion	From C2: Did you include a coupling? How many DOF?
11	B4	\$179.98	enclosed dc electric winch	cable	
12	B5	\$368.61	Electric Motor (AC)	Rack and Pinion and Worm Gear	
13	C1	\$179.03	Electric motor	Threaded rod	
14	C2	\$196.48	AC Motor	Timing belts/pulleys	
15	C3	\$137.15	Electric motor	Power Screw	
16	C4	\$244.61	AC Electric Motor	Rack and Pinion	
17	C5	\$440.09	Hydraulic Motor	direct connection	From C1: What was the power output of your motor?
18	D1	\$348.38	DC Electric Motor	Lead screw w/ collar	
19	D2	\$132.79	AC Electric motor	Lead screw	
20	D3	\$247.40	DC Pump	Air Cylinder	From C1: What type of pump did you spec?
21	D4	\$388.55	AC Electric motor	power screw	
22	D5	\$371.68	AC Electric Motor	Rack and Pinion + Slider	

Further Information

- Scanner: www.appersonedu.com
- IF AT cards: www.epsteineducation.com
- Camtasia Studio: www.techsmith.com
- Google Docs: www.docs.google.com