Online Courses

Increasing Learning Effectiveness

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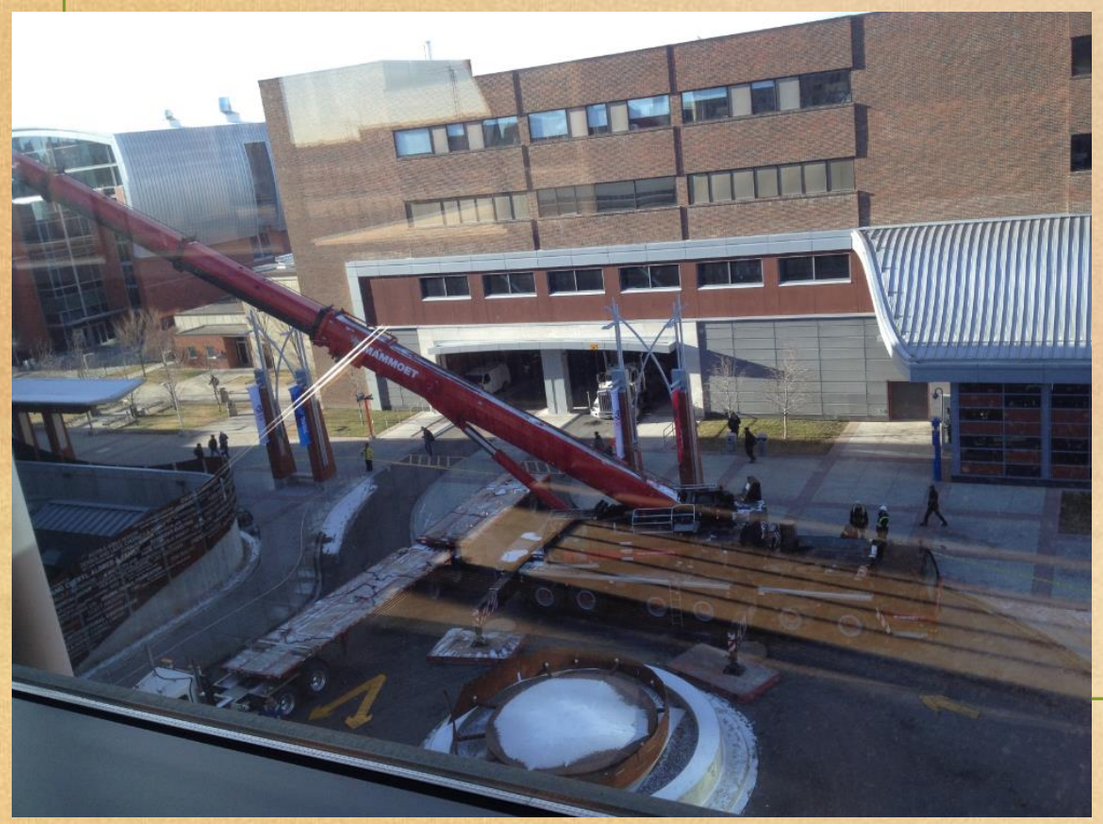
Some background

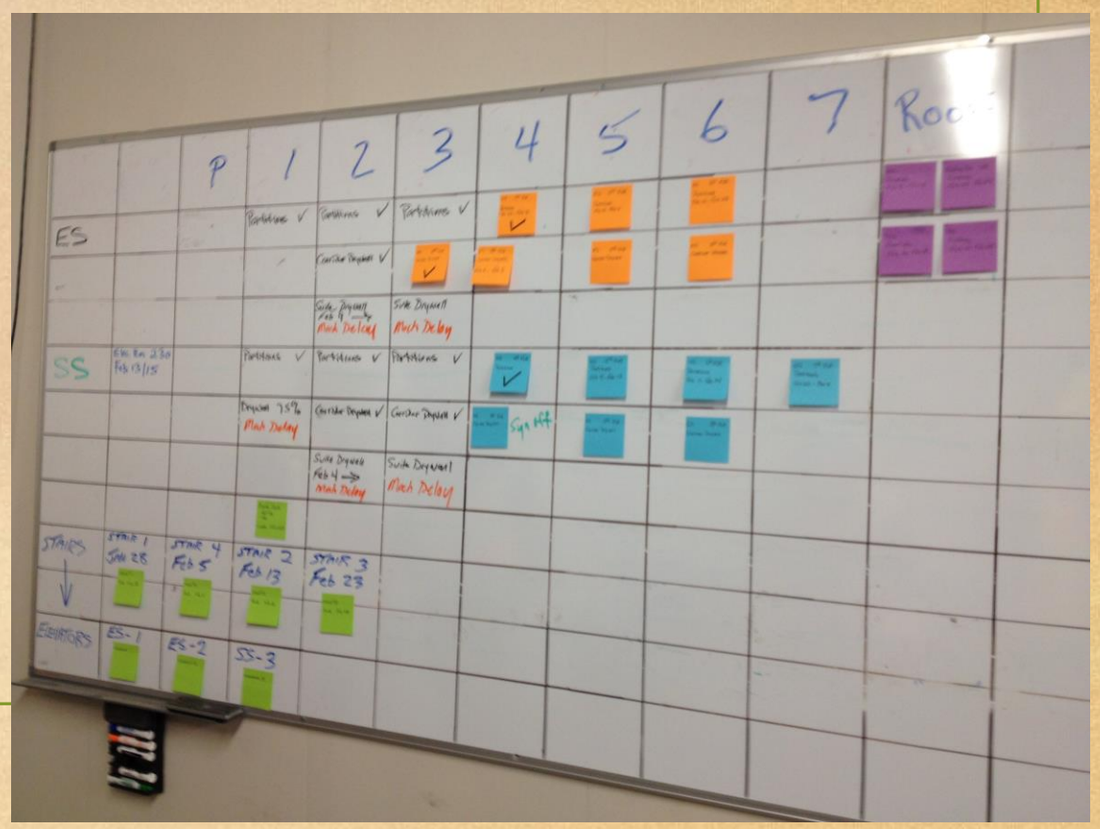
- School of Construction, Southern Alberta Institute of Technology
  - SAIT's focus is on applied education - development of the hand and the mind through innovation, leading programs and best-practice pedagogy
  - SAIT's vision is to be global leader in Applied Education
  - Student Success
    - Leveraging online opportunities

Source: SAIT, 2015-2020 Strategic Plan

Cisco e-learning research

- Adult learners - Applied education and technical courses
  - Research focus - What is perception of the students and instructors about online learning?





Online learning and effectiveness

- My research
  - Cisco e-learning chair
  - Applied education and online learning
- Personal experience
  - As a faculty
  - As a student

Background review

Online education

- Please select one of the options about your experience in online education.
  - I have taught one or more online courses
  - I have taken one full credit online course
  - Both
  - None

Graduation rate of online students

- Virtual School - High school graduation rate
  - 87% are low-grad-rate schools
- Average graduation rate 40 %

School type	Below 67%	Above 85%	Average
Regular	7	64	85
Charter	30	44	70
Alternative	57	8	52
Virtual	87	4	40

Source: Building a Grad Nation: Annual Update 2016 - available online from http://gradnation.americaspromise.org/

Online learning

- "Analyses yield robust negative estimates for online learning in terms of both course persistence and course grade, contradicting the notion that there is no significant difference between online and face-to-face student outcomes—at least within the community college setting. Accordingly, both two-year and four-year colleges may wish to focus on evaluating and improving the quality of online coursework before engaging in further expansions of online learning (Xu & Jaggars, 2013)."

Source: Xu, D., & Jaggars, S. S. (2013). The impact of online learning on students' course outcomes: Evidence from a large community and technical college system. Economics of Education Review, 37, 46-57.

Online learning – Quality concerns

- [We do not claim that our results are definitive]…..
  "our findings indicate that much more experimentation is necessary before one can credibly declare that online education is peer to traditional live classroom instruction, let alone superior to live instruction (Figilo, Rush & Yin, 2010)."

Source: Figlio, D. N., Rush, M., & Yin, L. (2010). Is it live or is it Internet? Experimental estimates of the effects of online instruction on student learning. (NBER working paper no. 16089) Cambridge, MA: National Bureau of Economic Research

Online learning – Quality concerns

- The proportion of academic leaders that rated online education as good as or better than face-to-face instruction was 57.2% in 2003. The relative view of online quality has improved over time, with a pattern of slow but steady improvement in the relative view of online learning outcomes from 2003 until 2012, where 77.0% of the respondents rated online as good or better. Results since then, however, have shown been less positive, with the results for 2015 showing only 71.4% rating online as good or better.

Source: Allen, Seaman, Poulin & Straut (2016), Online report card: Tracking online education in the United States available at http://onlinelearningsurvey.com/reports/onlinereportcard.pdf

Online education

- Compared to face-to-face learning, quality of online learning is
  - Higher
  - Similar
  - Lower
  - Can't say

Online courses

- Quality online courses are well-organized into learning units; have clear learning goals and objectives; include materials and activities that directly support the learning goals and objectives; engage the learner through interaction with content, other students and the instructor; and offer rich and relevant resources for students. Most of all, online courses should be fun, engaging, pedagogically sound, and relevant.

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Increasing effectiveness – Online learning

- Defining objectives for online learning

Learning Objectives

- Content for online learning

Content

- Delivery – Instructor – learner interaction

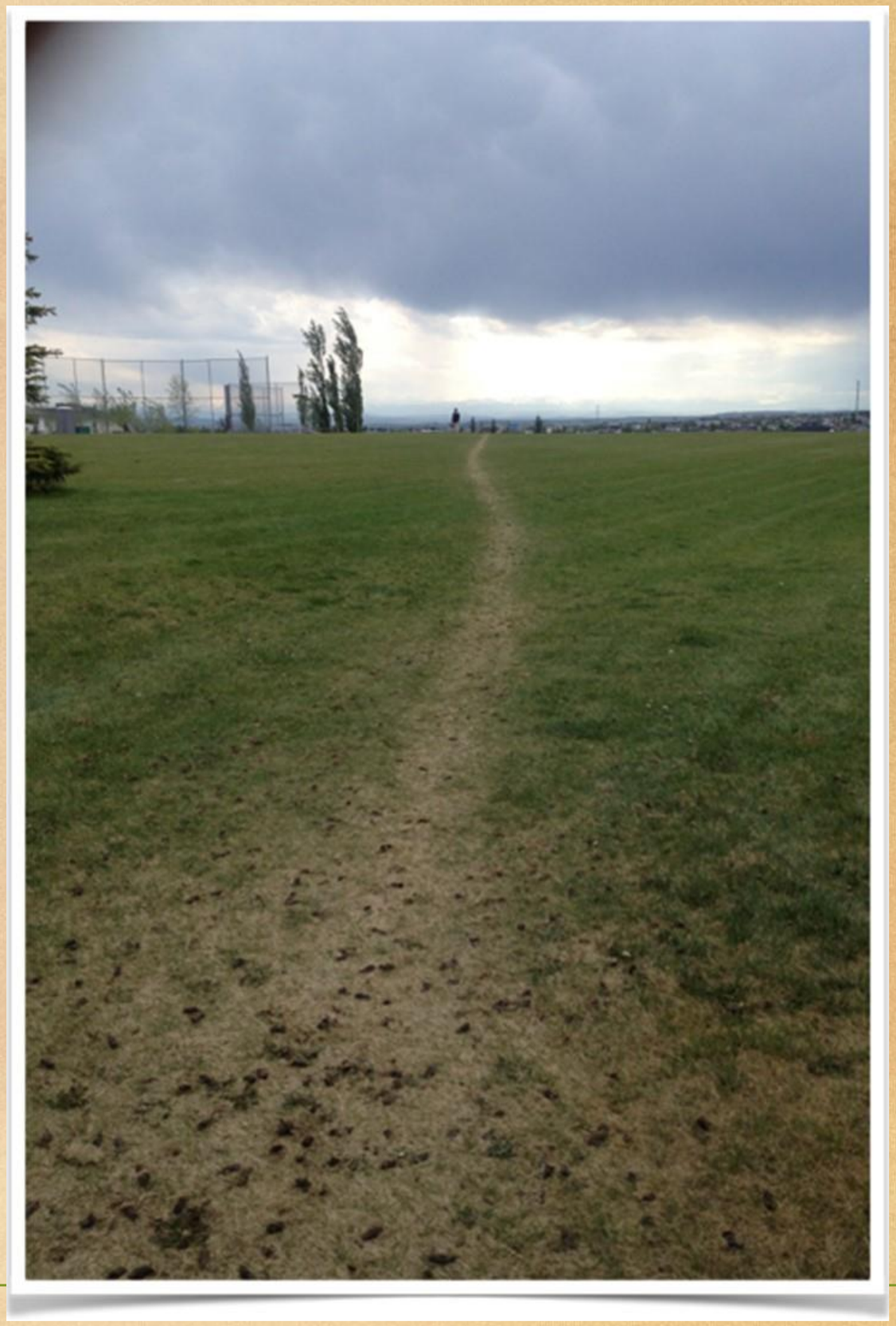
Delivery

Learning Objectives

One destination, one trail

A clear objective leads to the most efficient path of learning

Setting the goal right !



Learning Objectives

- Curriculum design is one of the factors affecting academic performance (Tyler, 1971)
- Course objectives increased students' academic performance (Stecker, Fuchs & Fuchs, 2005)
- In distance teaching and education, we should shift the main focus from inputs to outcomes (Gaskell & Mills, 2014)

Bloom's taxonomy

- How familiar are you with Bloom's taxonomy?
  - Yes, I've used it in course development
  - Yes, I've heard about it
  - No, this is something new to me

Defining Learning Objectives

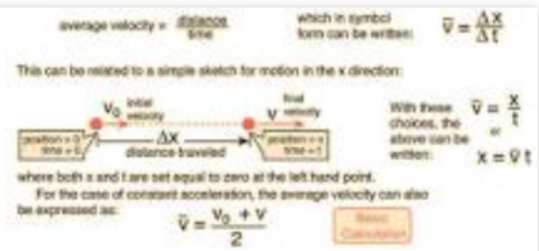
- Bloom's taxonomy
- Outcomes in the domain of knowledge, skill and attitude
- Organized into categories – simple to complex and concrete to abstracts
- Focus is on verbs – Memorize, Recite, Solve

Objectives - Beyond the verbs

- An example
- By the end of this course, students should be able to:
  - Solve problems involving motion in one dimension

About 247,000 results (0.44 seconds)

Description of Motion in One Dimension. Motion is described in terms of displacement (x), time (t), velocity (v), and **acceleration** (a). Velocity is the rate of change of displacement and the **acceleration** is the rate of change of velocity.



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https://www.khanacademy.org/science/.../one-dimensional-motion Khan Academy
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theory.uwinnipeg.ca/physics/onedim/node1.html
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30 pages document

3-4 pages document

4 chapters

Layers of website

Search results from Google.com

Objectives - Beyond the verbs

- By the end of this course, students should be able to:
  - Solve problems involving motion in one dimension

1.2 Examples of Motion in One Dimension

To gain some experience with solving equations of motion in a physi
some physically relevant examples of one-dimensional motion.

1.2.1 Uniform force

With $F = -mg$, appropriate for a particle falling under the influenc
tional field, we have m n:

$$\int_{v(0)}^{v(t)} dv = \int_{0}^{t} ds\,(-g)$$

etc

With $v = \dot{x}$, we solve d

$$\int_{v(0)} dv = \int_{0} ds\,(-g)$$

From Daniel Arovas' Lecture notes on Classical Mechanics

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Average velocity: $\bar{v} = \frac{\Delta x}{\Delta t}$ Average acceleration: $\bar{a} = \frac{\Delta v}{\Delta t}$

where the Greek letter Δ indicates the change in the quantity following it.

Constant acceleration equations.

1. $x = \bar{v}\,t$ More Detail $\bar{v} = \frac{v_0 + v}{2}$
2. $v = v_0 + at$
3. $x = v_0 t + \frac{1}{2} a t^2$ Show

A bar above any quantity indicates that it is the average value of that quantity. If the acceleration is constant, then equations 1,2 and 3 represent a complete description of the motion. Equation 4 is obtained by a combination of the others. Click on any of the equations for an example.

From C R Nave's Hyperphysics (2012) website

Objectives - Beyond the verbs

- An example
- By the end of this course, students should be able to:
  - Solve problems involving motion in one dimension

$$\int_{v(0)}^{v(t)} dv = \int_{0}^{t} ds\,(-g)$$

$$v = v_0 + at$$

$$x = v_0 t + \frac{1}{2} a t^2$$

Objectives - Beyond the verbs

- An example
- By the end of this course, students should be able to:

- ~~Solve problems involving motion in one dimension~~
- Use the equations

$$v = v_o + at; x = x_o + v_o t + \frac{1}{2}at^2$$

to solve problems involving one dimensional motion with constant acceleration

One destination, one trail

A clear objective leads to the most efficient path of learning

Increasing effectiveness – Online learning

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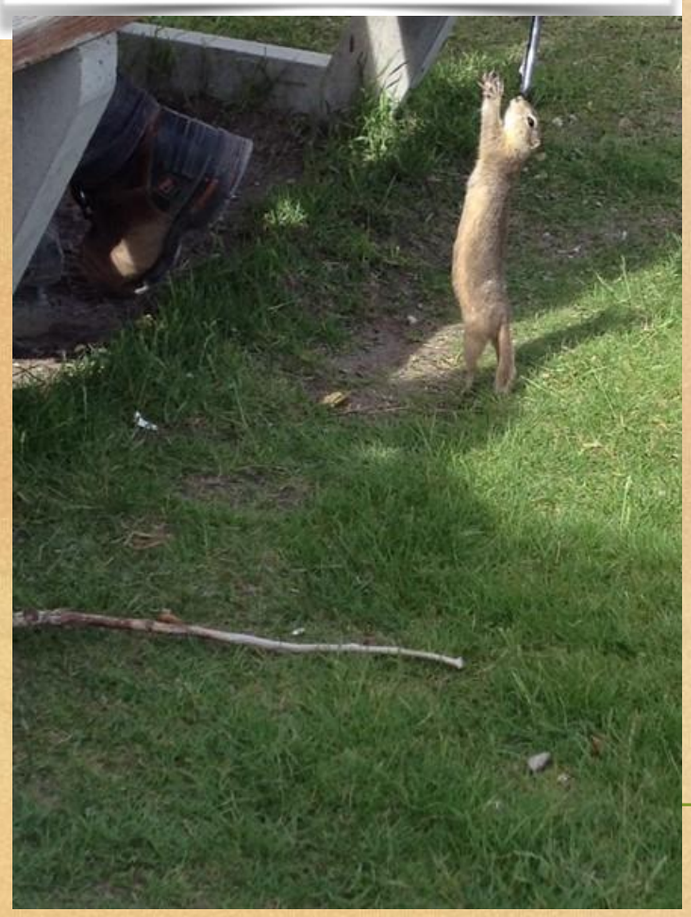
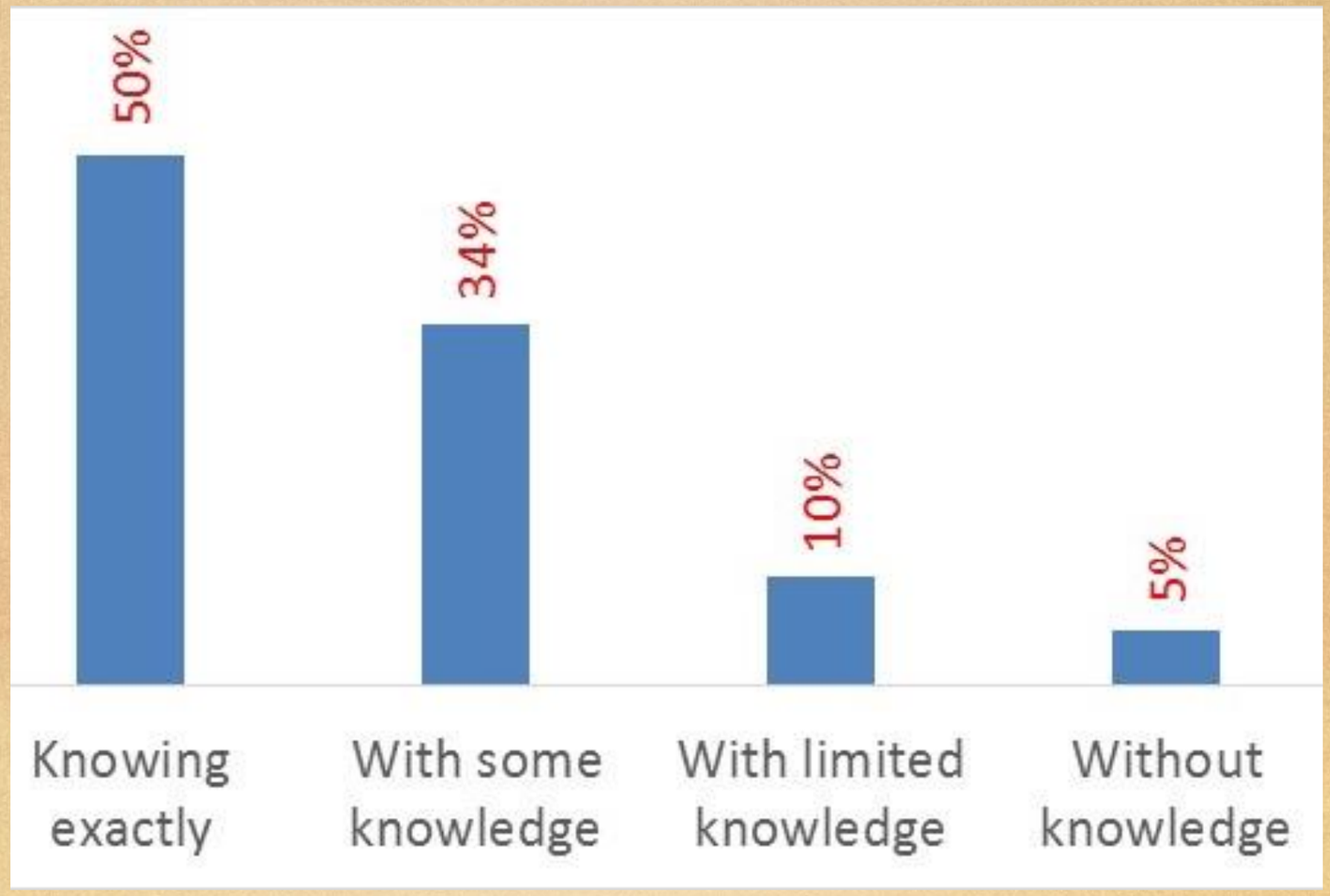
Content



Students in applied education

- Students join a program with knowledge about their career goal



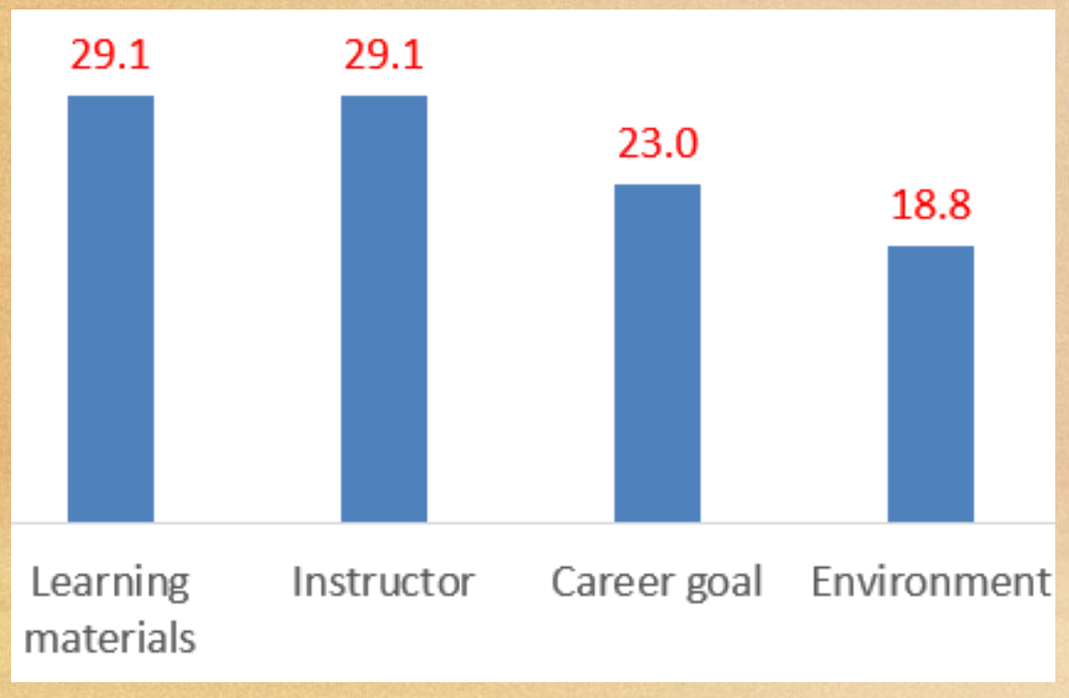
Students' motivation to learn

- No 1 factor that motivates a student to learn a course
  - Learning materials
  - Course's direct relevancy to their career goals
  - Instructor
  - Learning environment

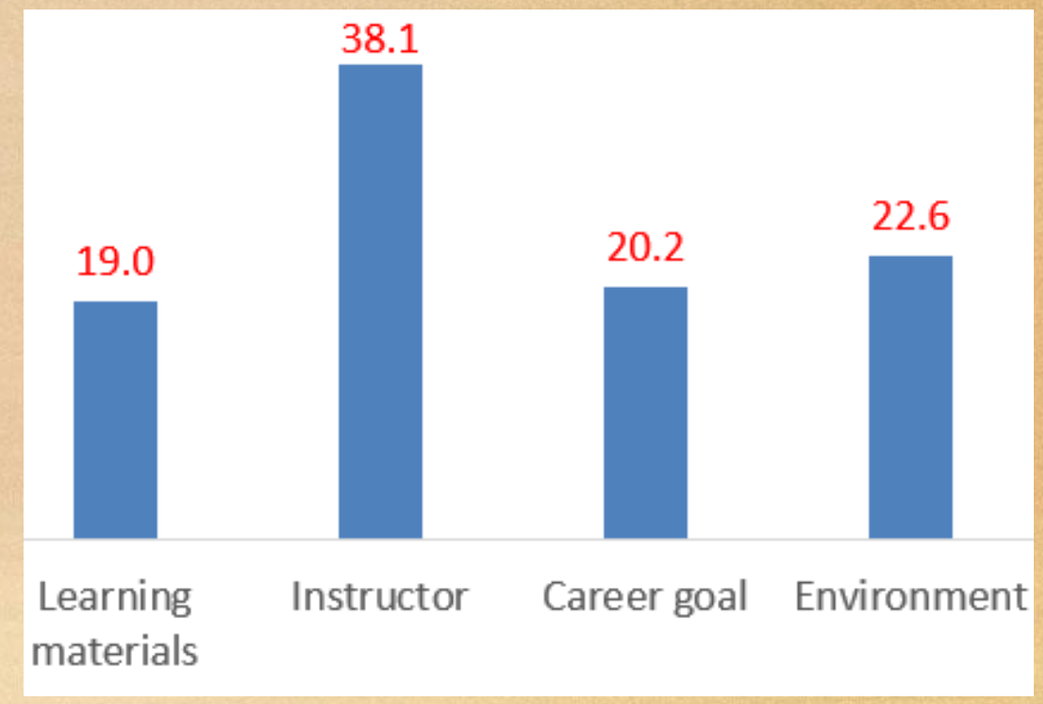
Research – Questionnaire Survey

- No 1 factor that motivates a student to learn a course

Students



Instructors



Design of Wood members from this week

From tomorrow, we'll start designing structural me
sustainability and energy efficiency. Wood looks w

Construction Canada published a brief note this we
further.

Please take some moment to go over this fascinati

Field reports and Project work 3

Quiz 3 1
Begins February 10

Quiz 3 (Feb-13, 2015)

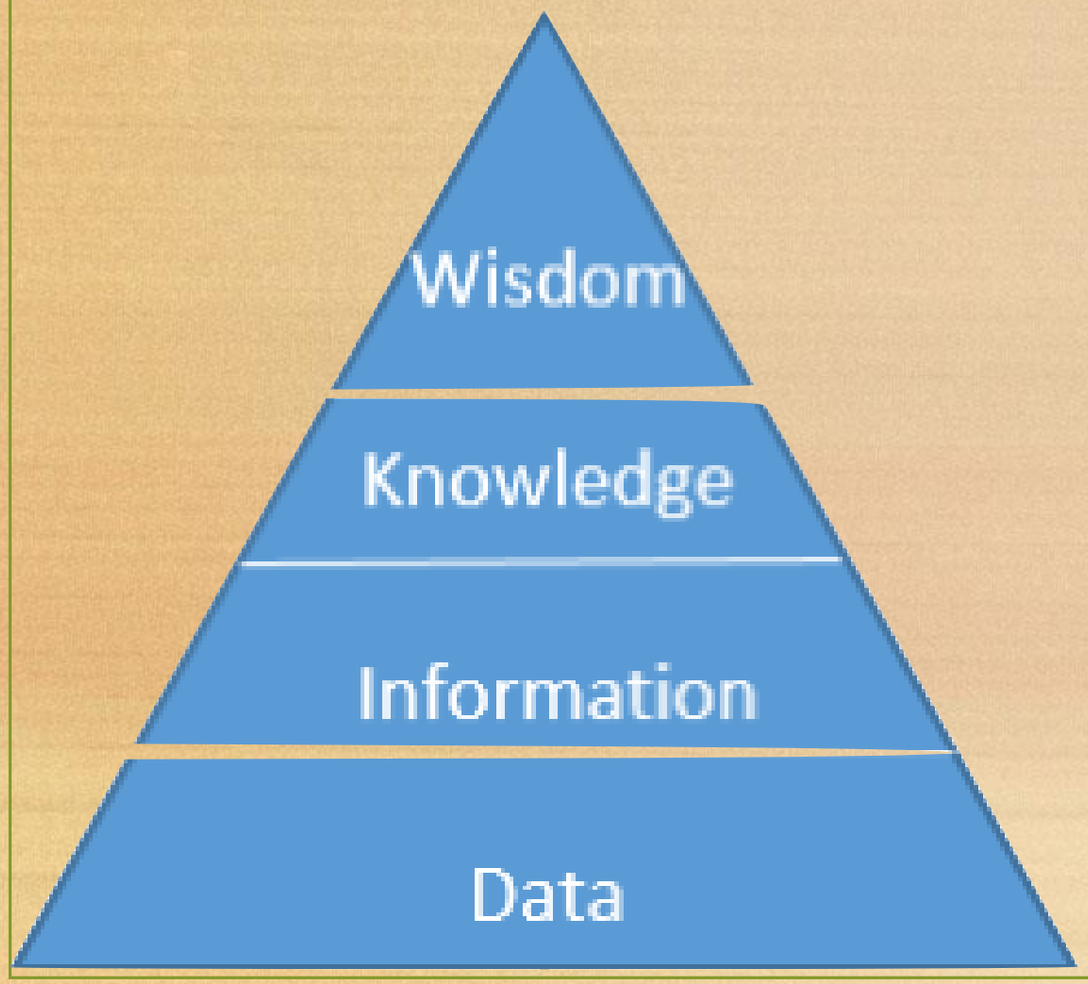
as an 'or' meaning you can solve either Q. 5 or Q.

mped system, the pressure that causes the fluid
..... and ..... (1)

ressure for the following system (4)

Content

- Data – Information – Knowledge - Wisdom



Source: Ackoff, 1999; Bernsetin, 2009

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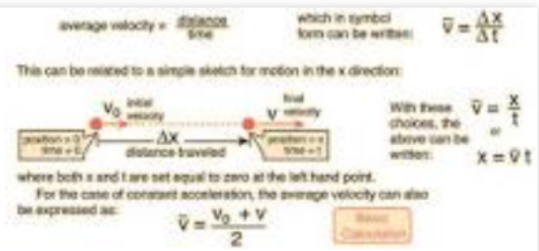

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30 pages document

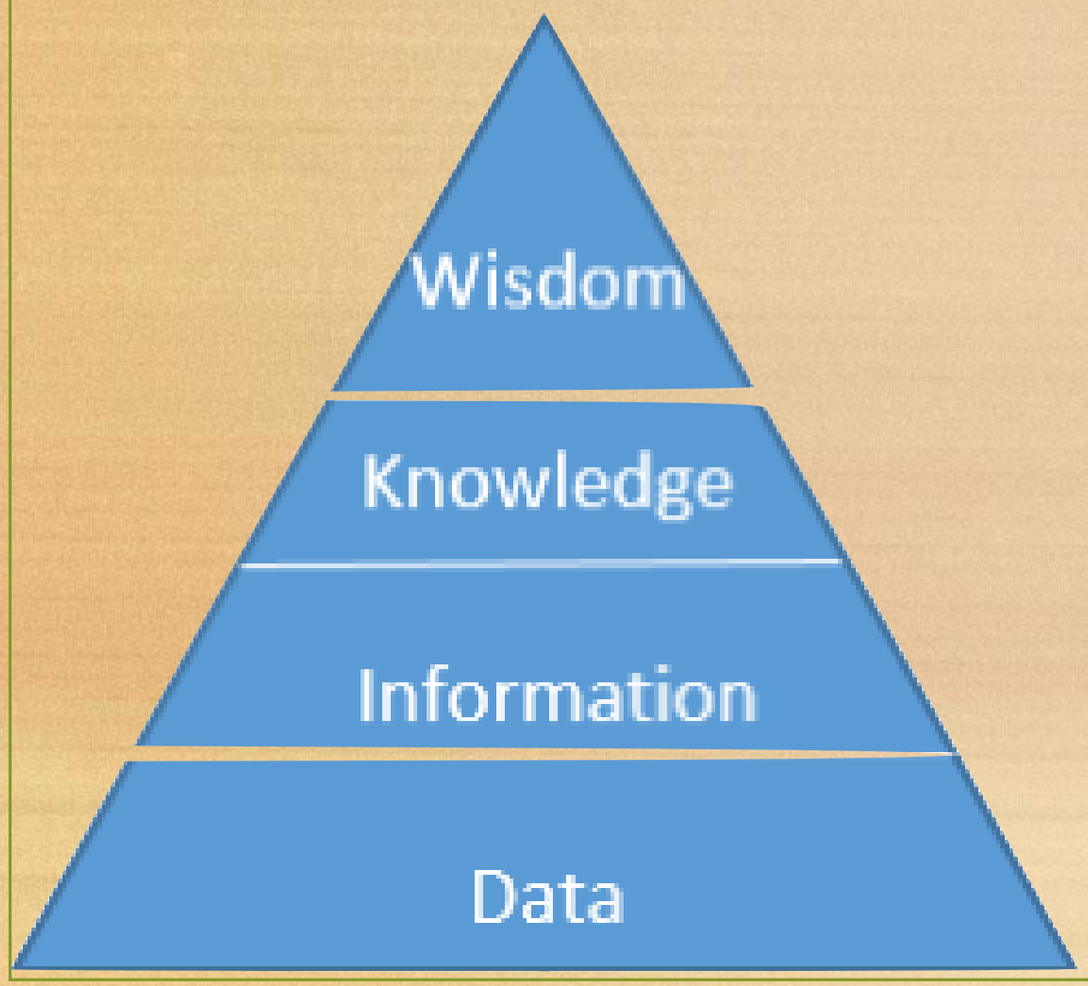
3-4 pages document

4 chapters

Layers of website

Content

- Availability of information doesn't mean that information is available



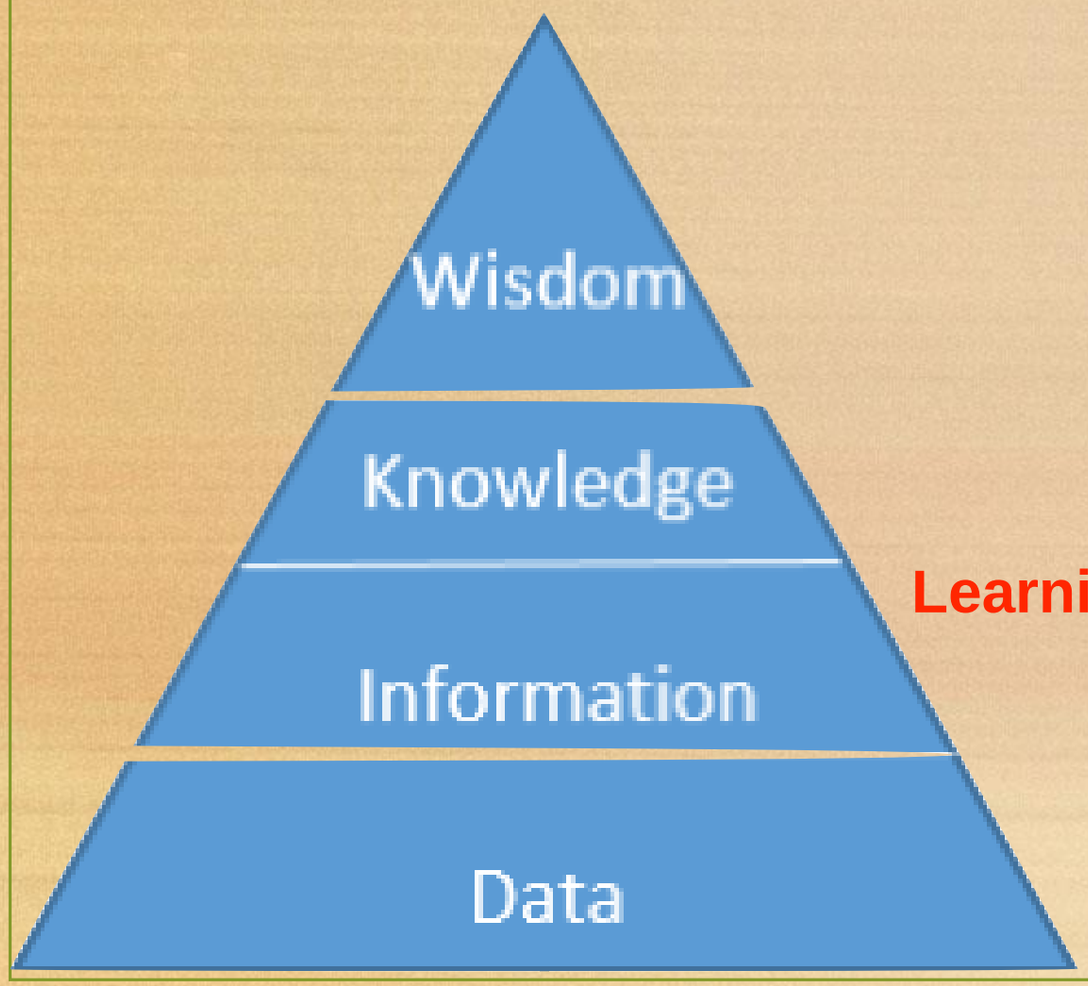
Information is who/what/where

?

Raw data/symbols

Content

- Availability of data doesn't mean that information is available



Information is who/what/where

Learning objectives

Organization of content

Raw data/information is available

Objectives - Beyond the verbs

- Relevant content

$$v = v_0 + at$$

$$x = v_0 t + \frac{1}{2} a t^2$$

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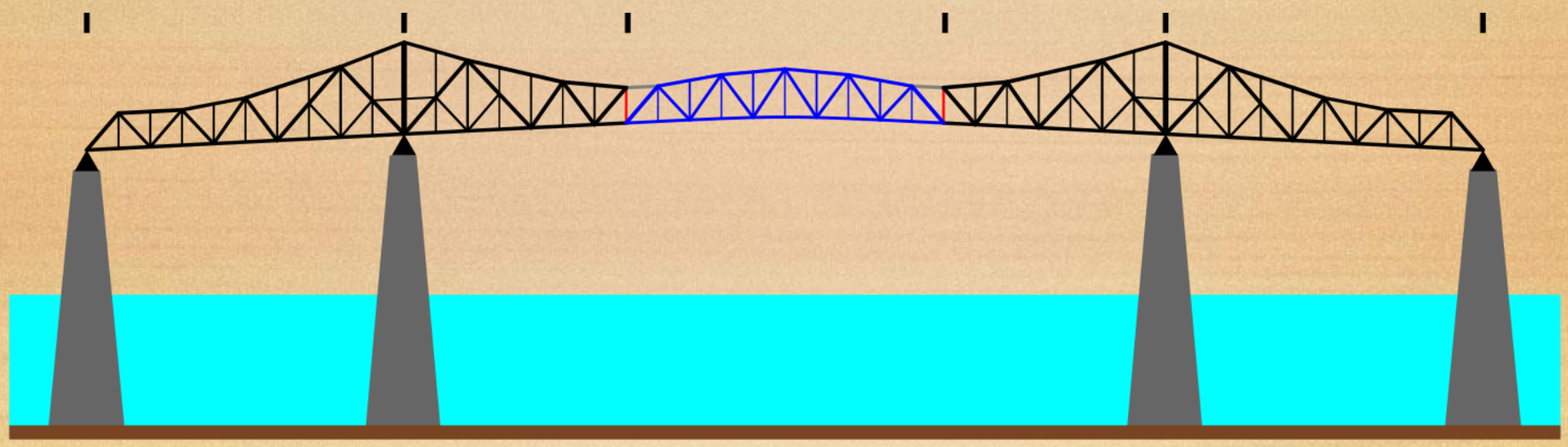
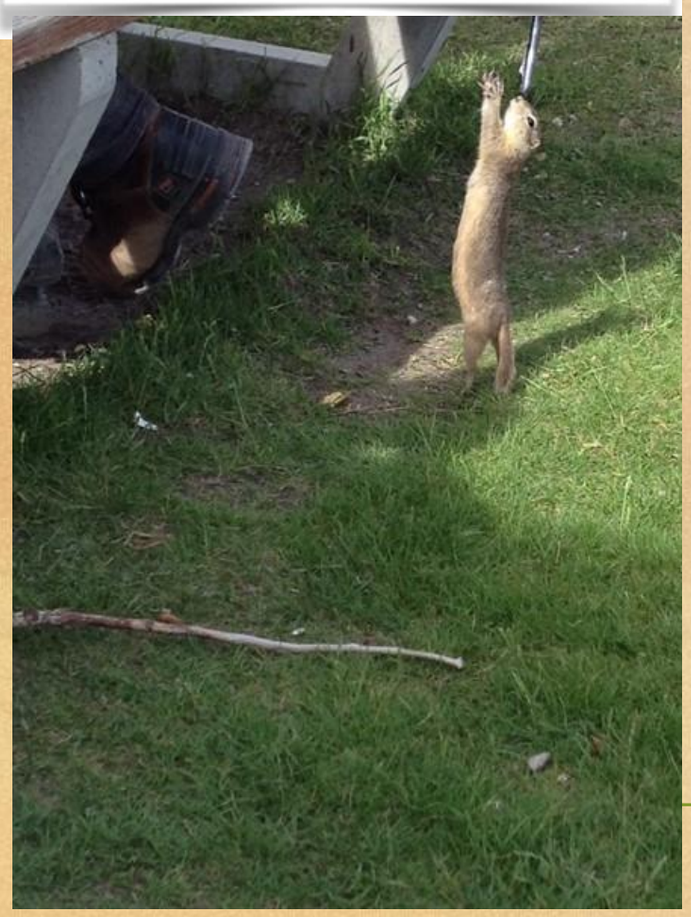
Content

- The material should be able to establish relation with their learning goal
- Bridging content – In today's world, availability of information is not an issue.



Original image from wikipedia (uploaded by PennySpender1983)



Increasing effectiveness – Online learning

- Defining objectives for online learning

Learning Objectives

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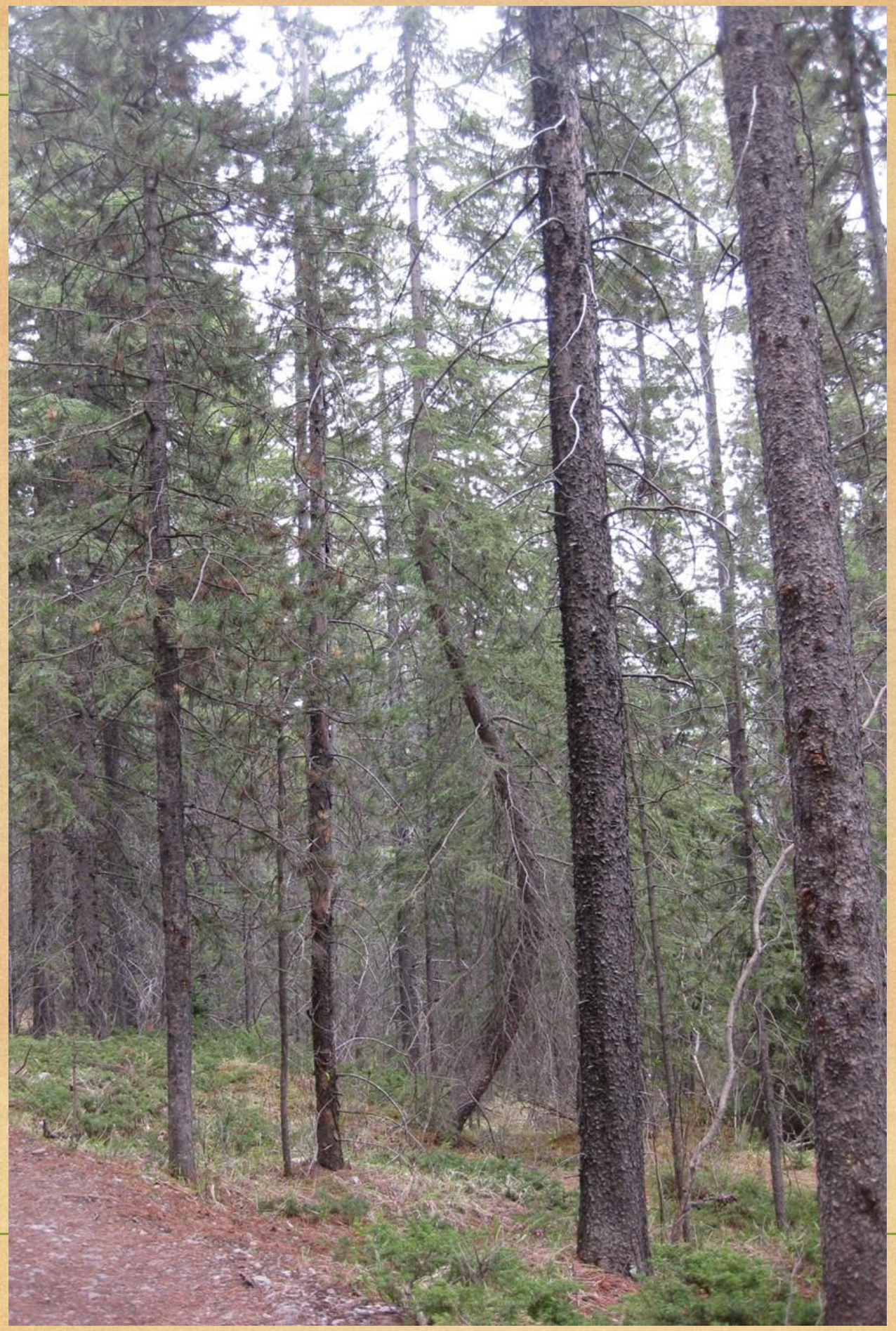
Delivery

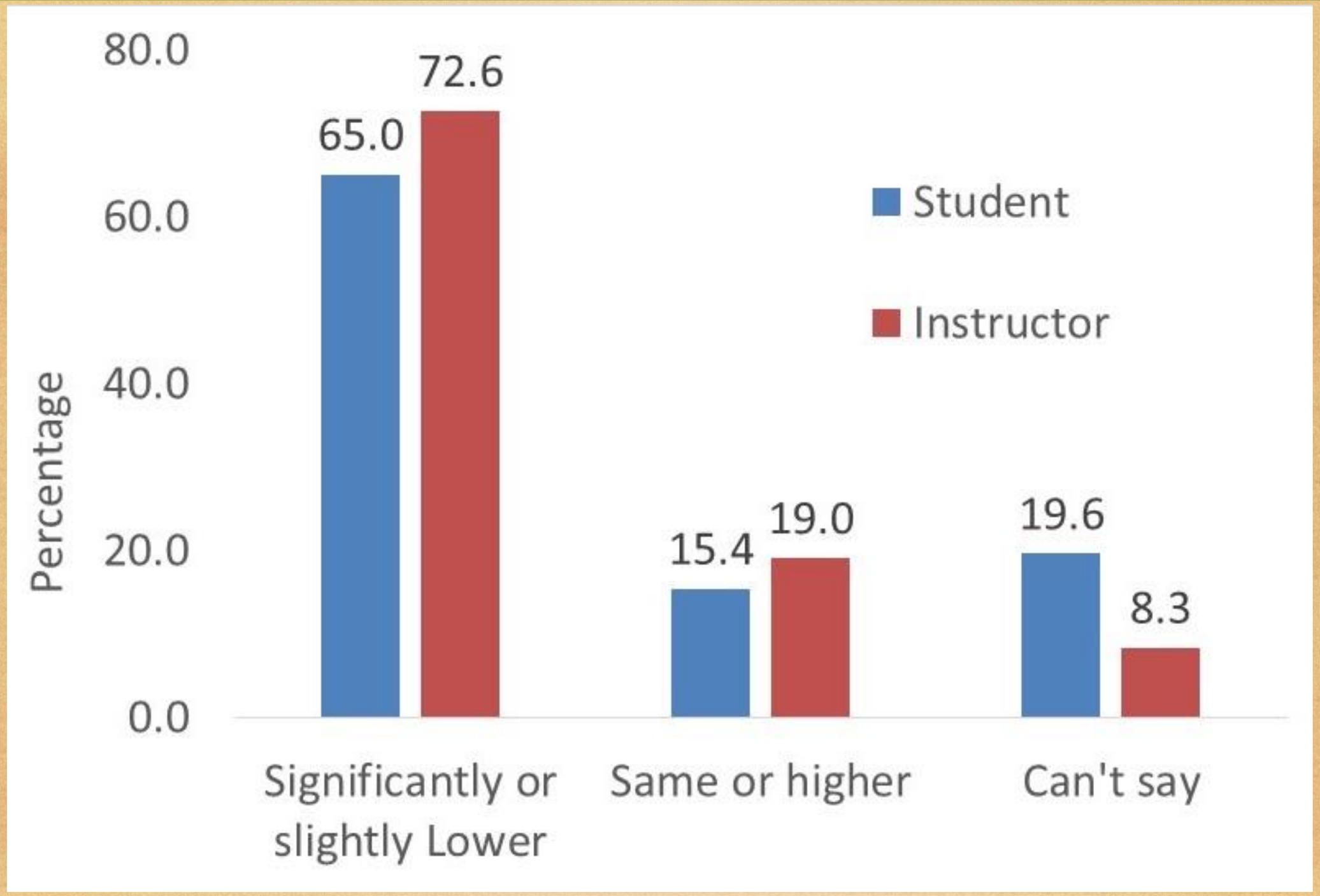


Face-to-face vs online

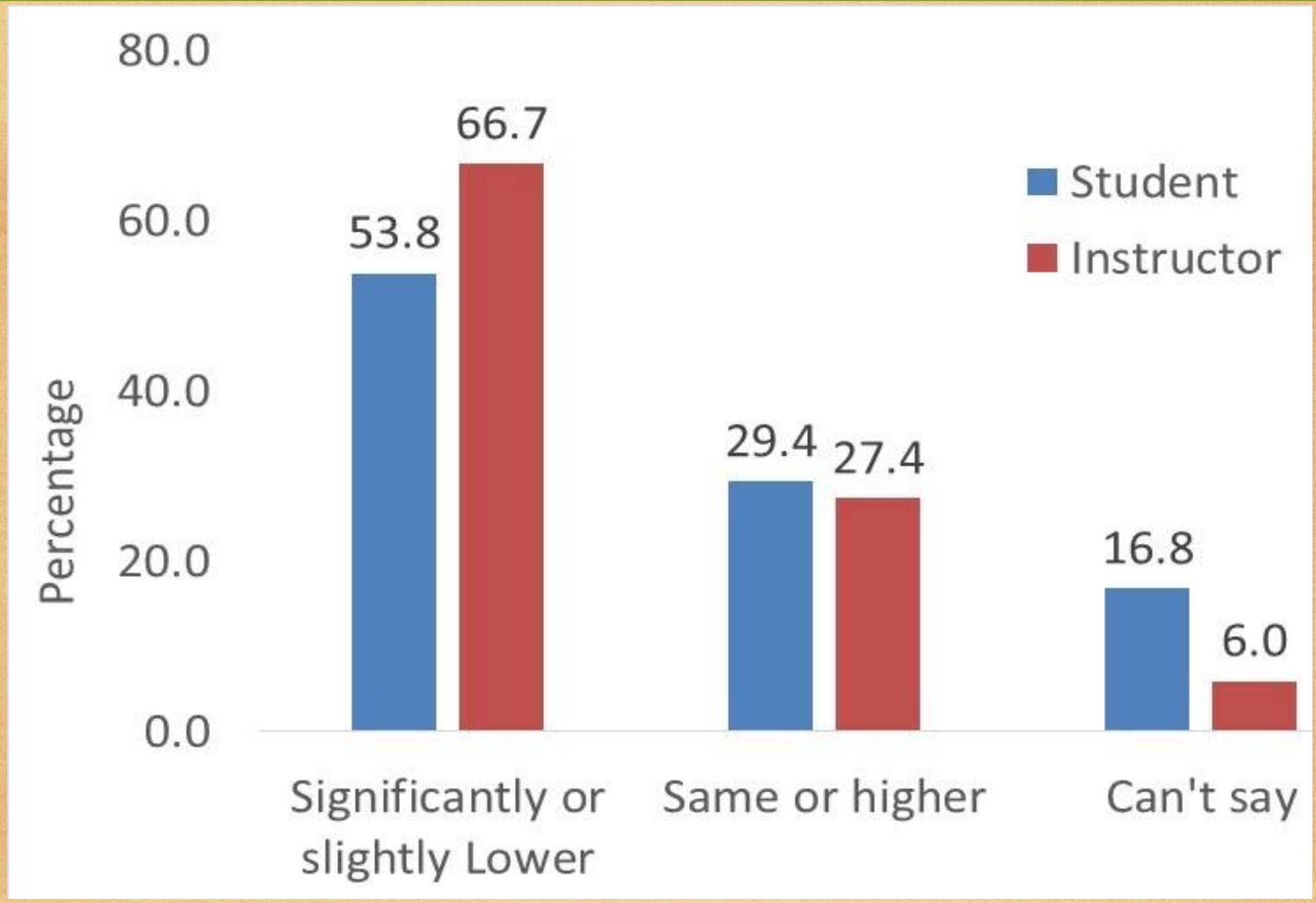
- Is similar level of interaction possible in Online learning compared to face to face learning ?
- Is it necessary?

Interaction in online learning

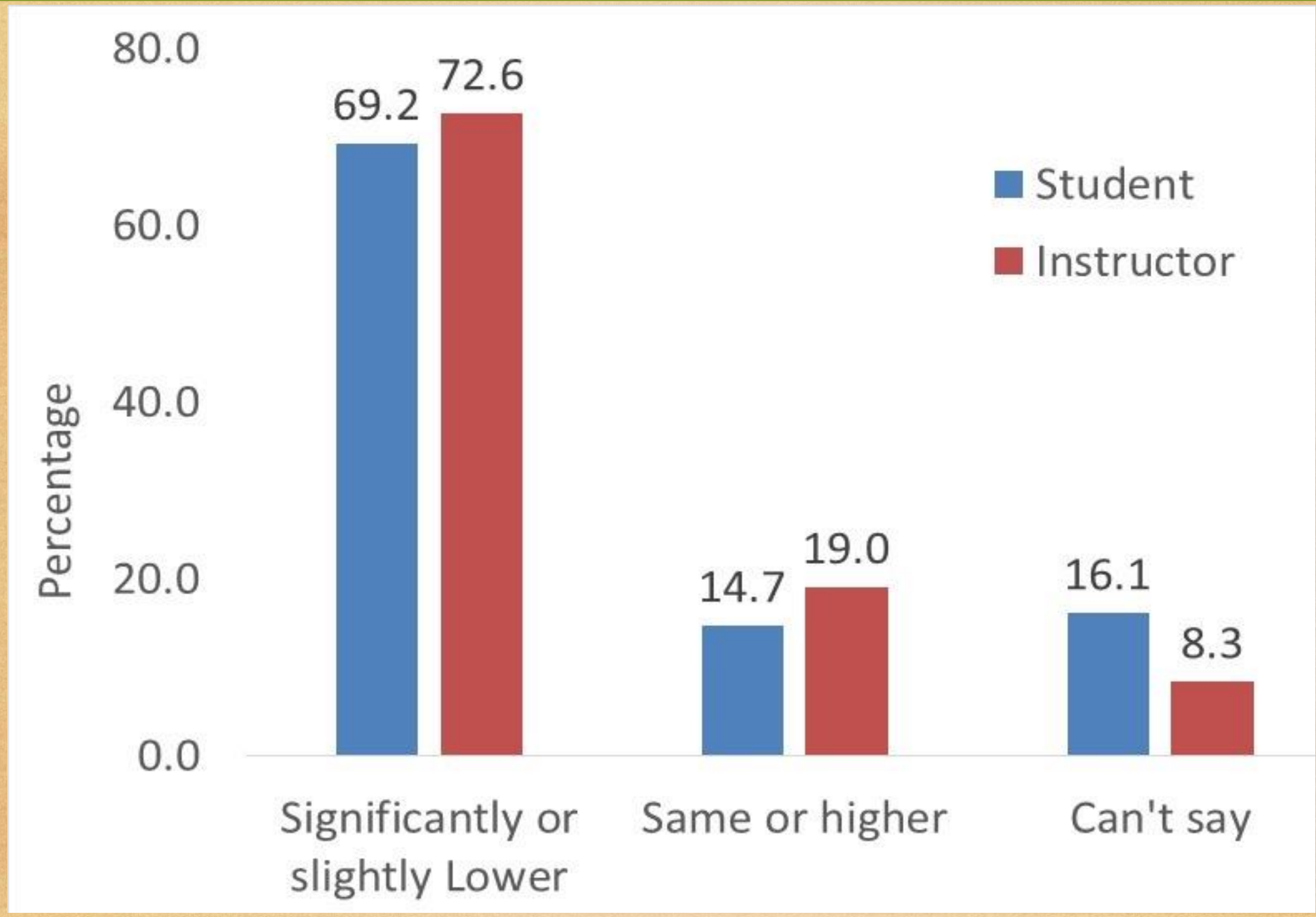
- Amount of interaction between instructor and student in Online learning compared to in-class learning
  - Significantly low
  - Slightly low
  - Similar
  - Higher



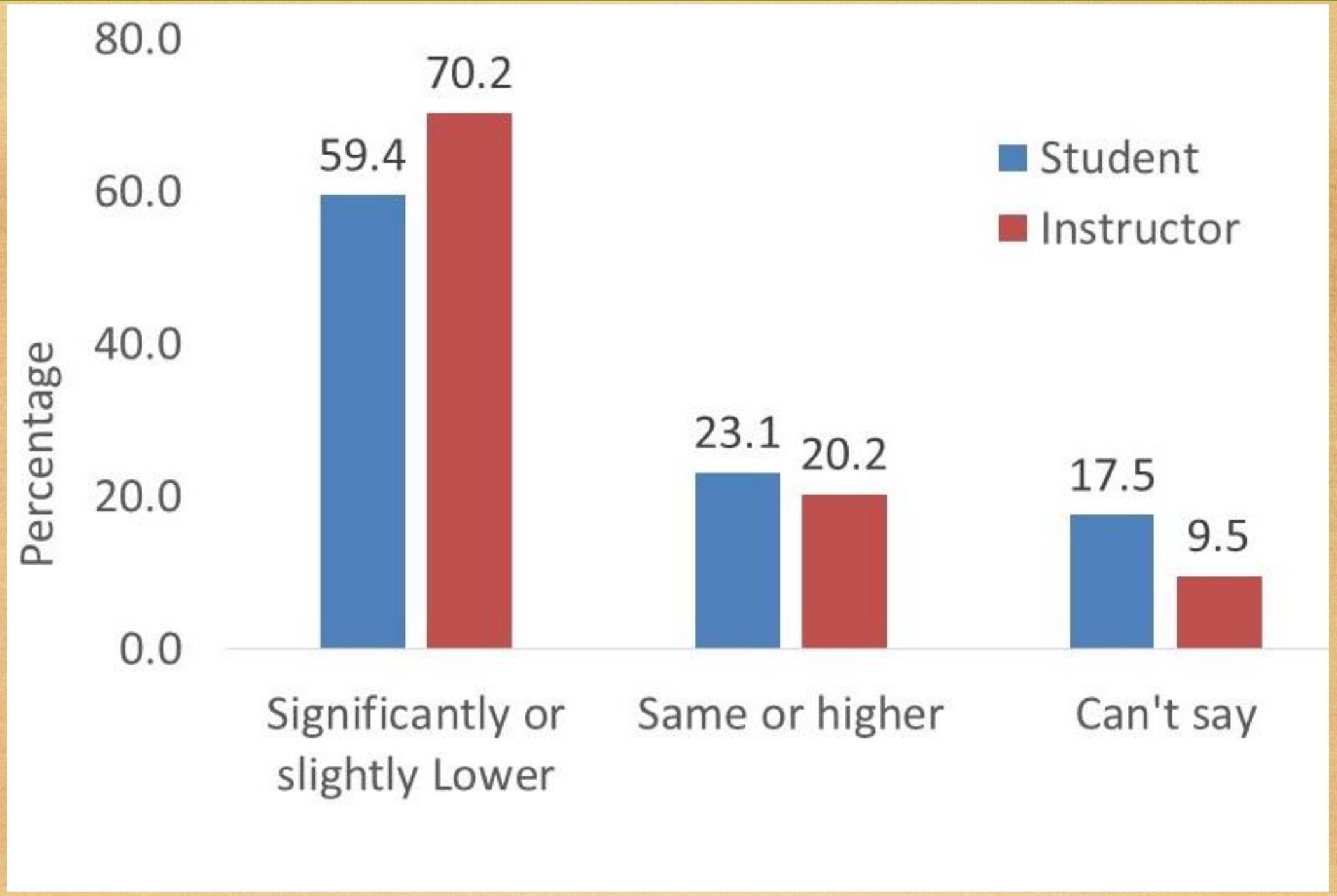
Amount of interaction between instructor and student in Online learning compared to in-class learning



Quality of interaction between instructor and student in Online learning compared to in-class learning



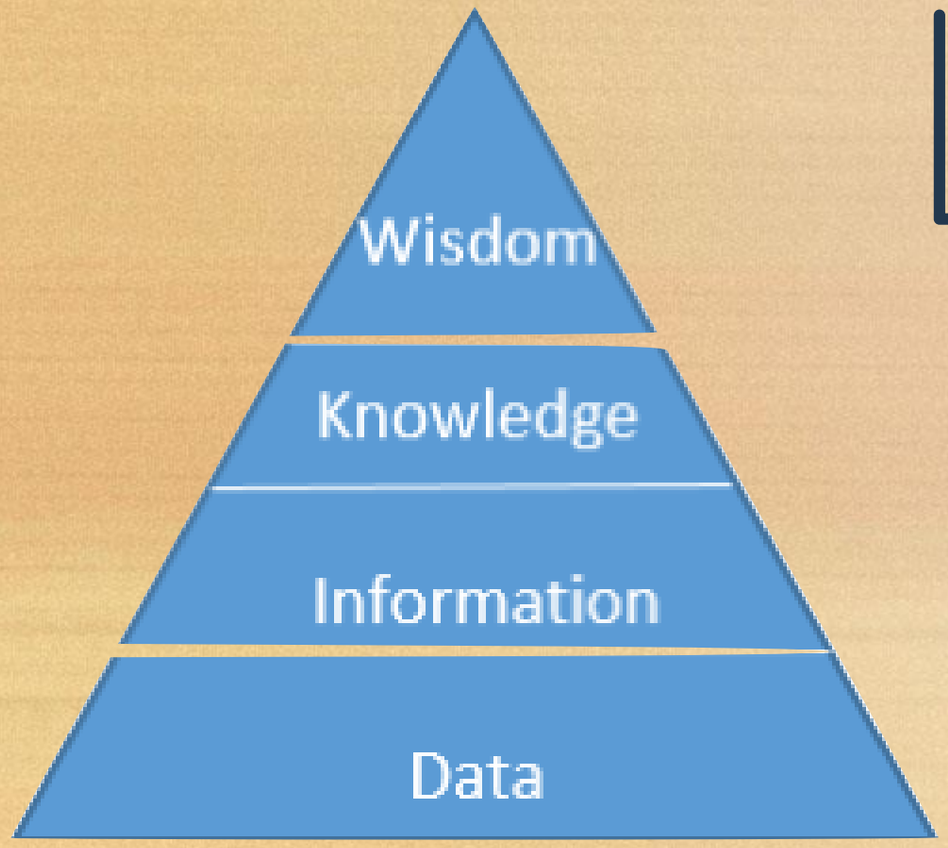
Amount of interaction among students in Online learning compared to in-class learning

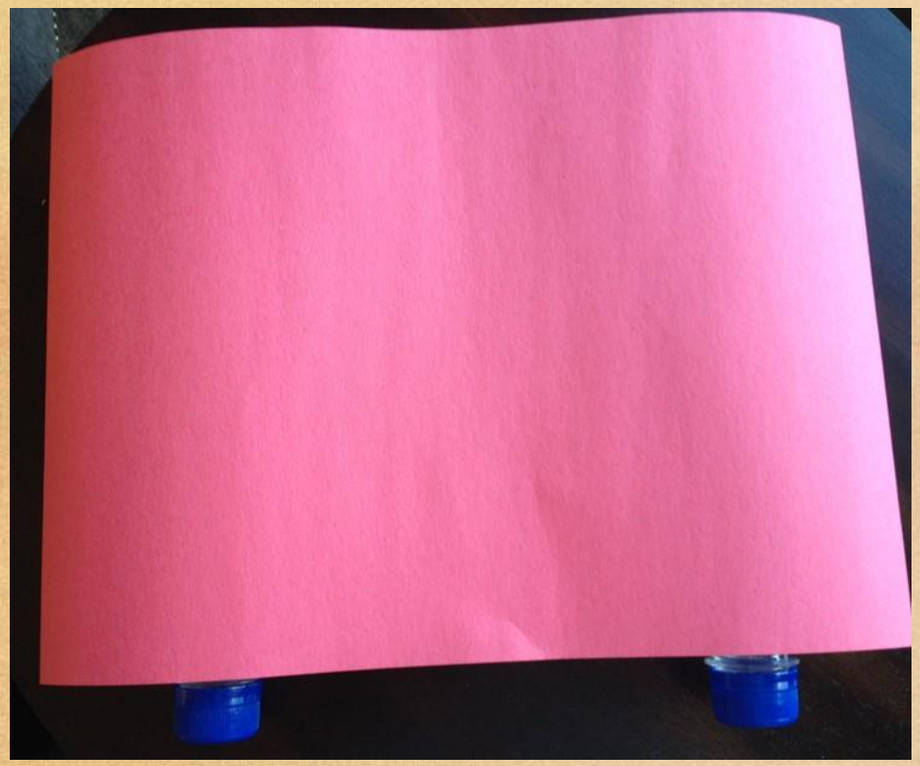


The quality of interaction among students in online learning in Online learning compared to in-class learning

Instructor's role

- Instructor's role
  - Facilitation in connecting the dots to realize the bigger picture
  - A quantum jump from information to knowledge
  - Instructor's role is important





Kensington

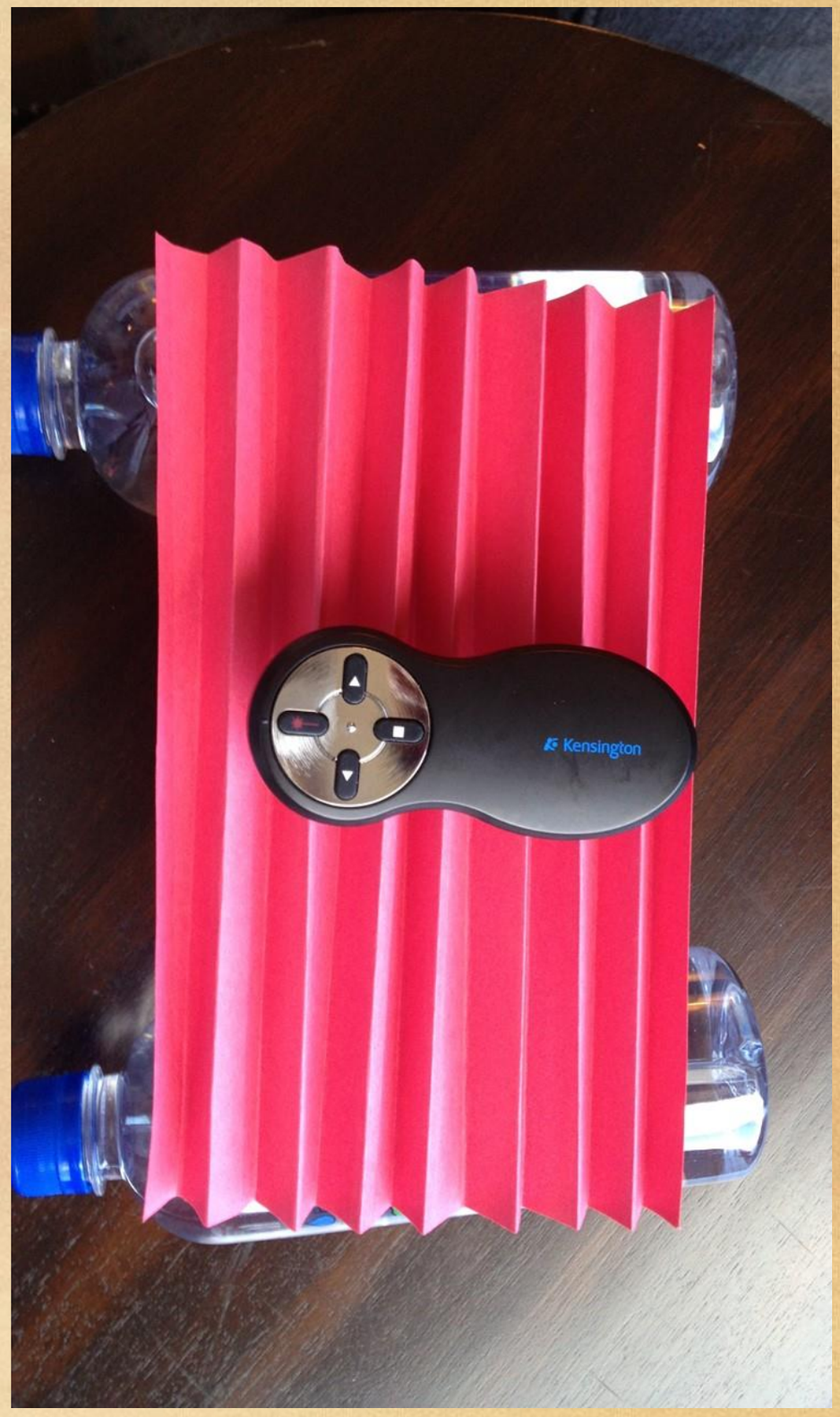

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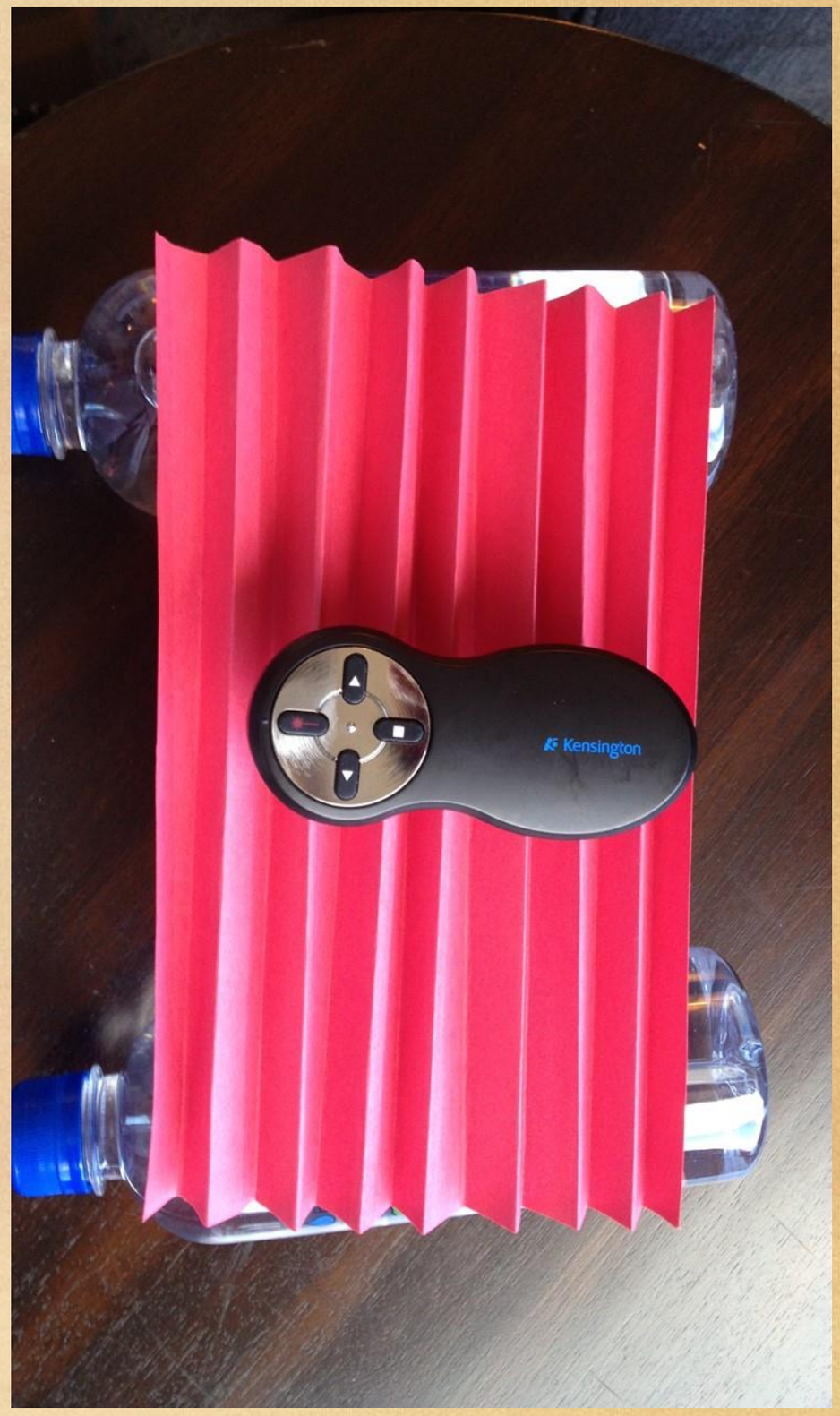
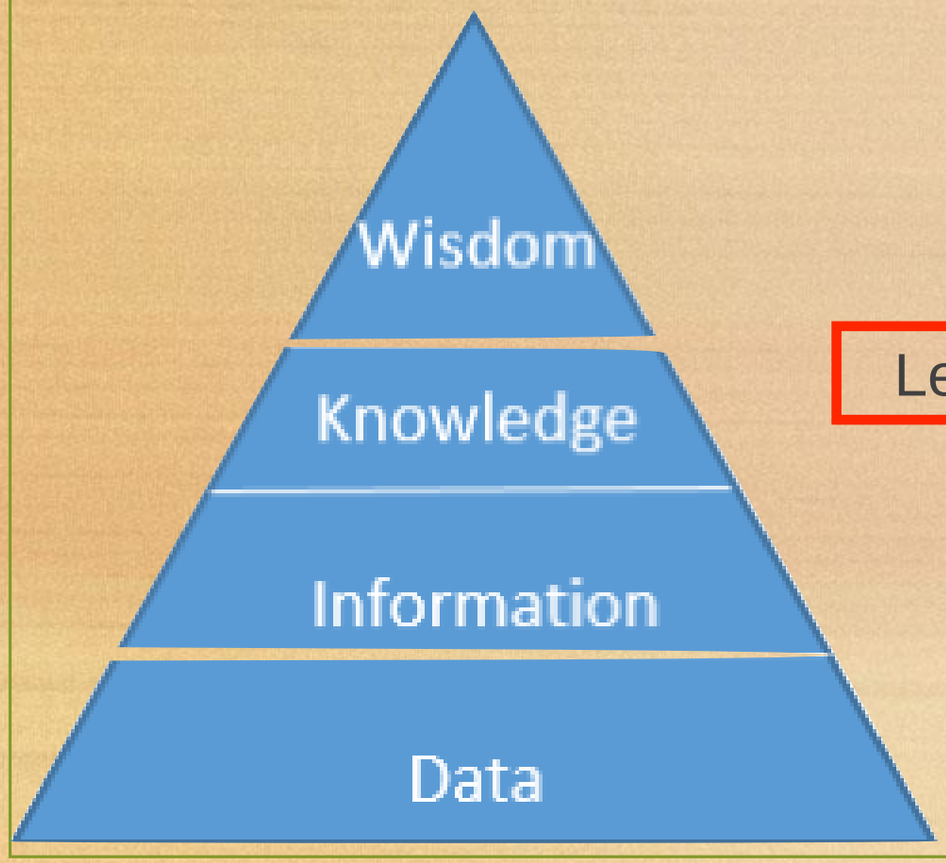
Image source: Richard Wheeler, wikipedia.com



Information to Knowledge

- Knowledge – learners have absorbed information such that they can apply the information in different context
- Quantum jump from information to knowledge

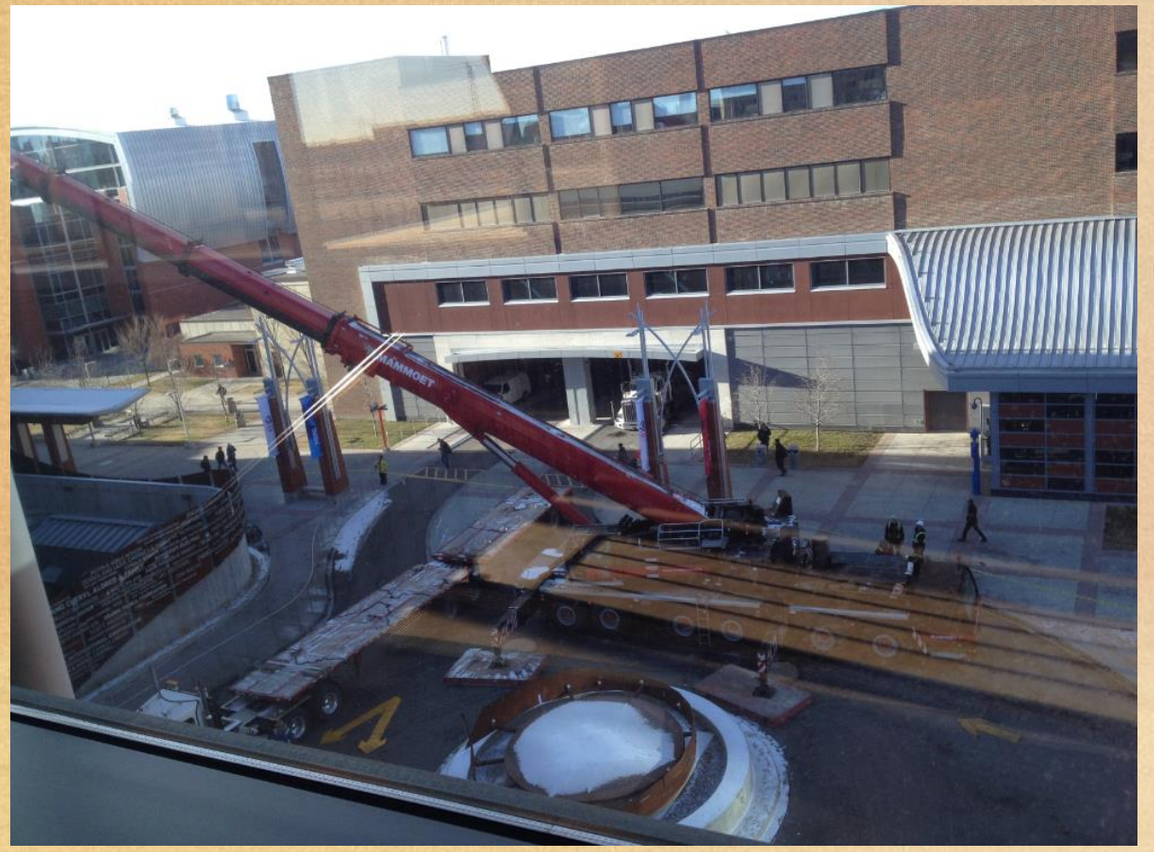


Learners will be able to apply the information

Instructor's input

Learners process data to information

Source: Ackoff, 1999; Bernsetin, 2009



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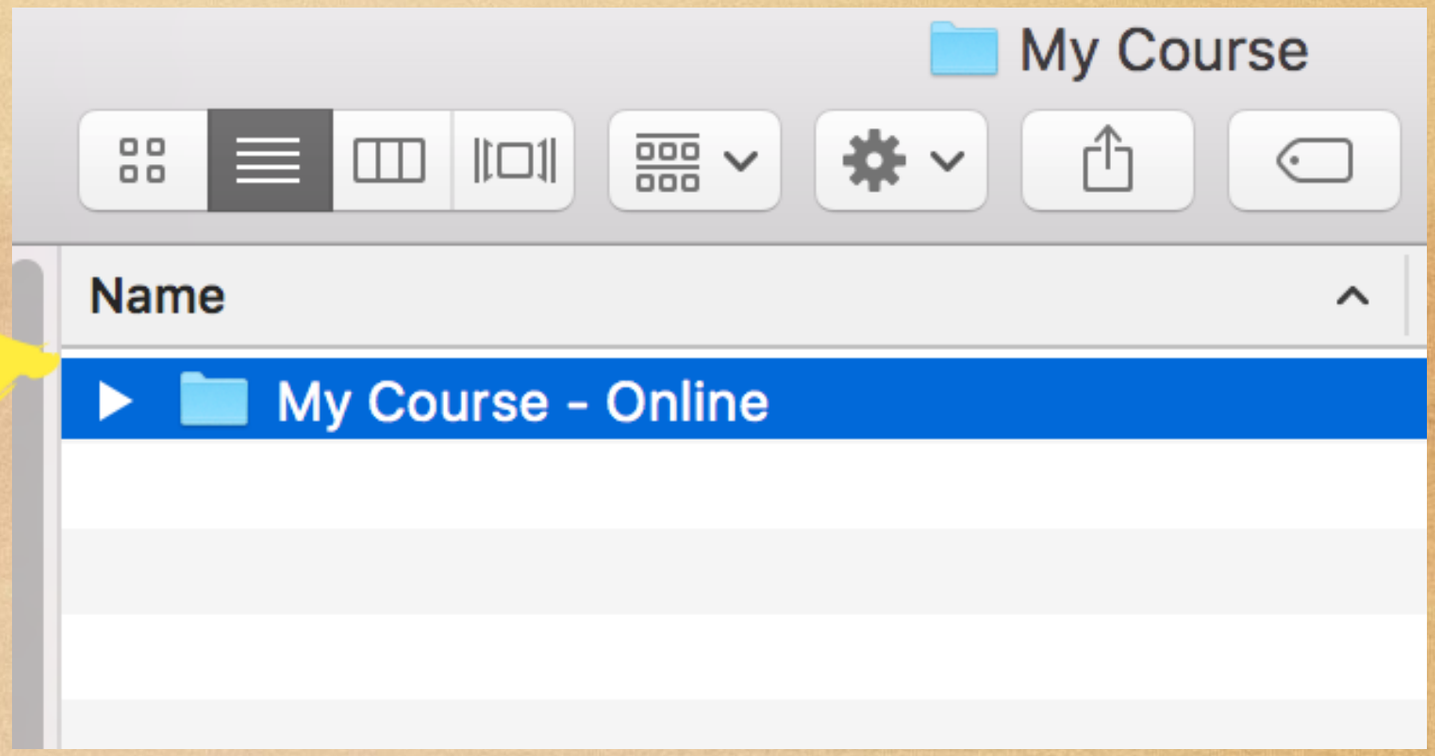
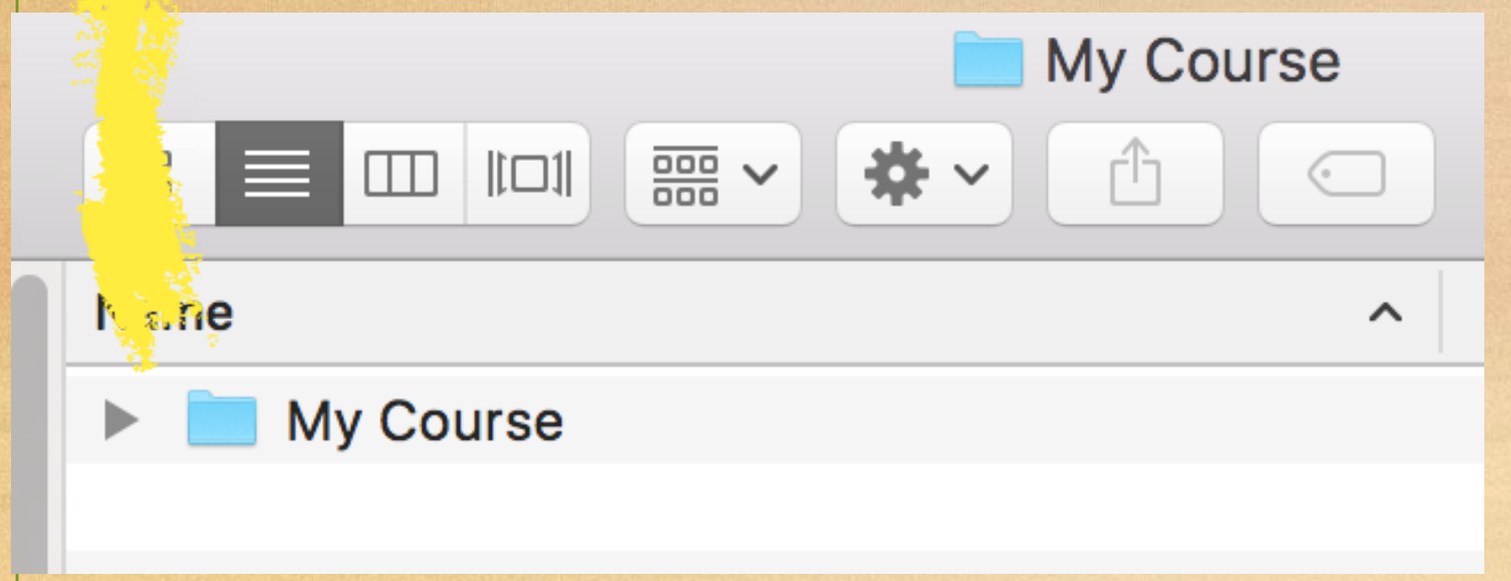
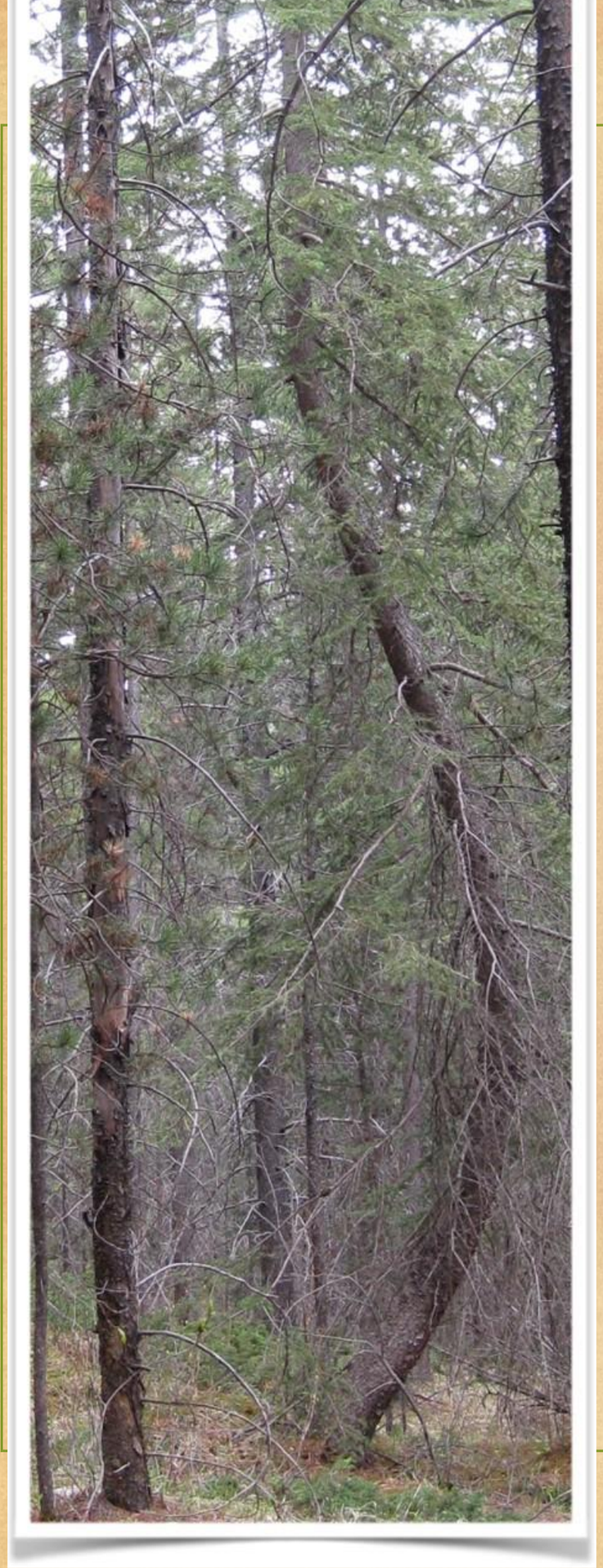
In Summary







Cease conceiving of education as mere preparation for later life, and make it the full meaning of the present life.

John Dewey

Thank You

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