



Using Learning Analytics to Improve Student Learning

2018 CTLT Summer Institute



Facilitators

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Scenario:

You are reviewing your last (or current) course offering and considering updates or changes to your course.

Questions

- What information would be useful to know?
- What would you do once you have that information?

- Gain an understanding of learning analytics (and the UBC Learning Analytics Pilot)
- Explore how learning analytics can be used to provide feedback to learners
- Think about sources of data and identifying student support personas
- Identify important support actions in your course (when can students use extra support, and what support do they need)

Learning Analytics is the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of **understanding** and **optimizing learning** and the environments in which it occurs.

Why & Why Now?

- Universities generate and use enormous volumes of data each day
- Learning Analytics is an emerging scholarly field. Research in this area is showing that the data universities are already capturing can be used to as a tool to make informed teaching and learning practices in order to improve the student experience.
- Universities across the board are increasingly implementing pilots and projects to explore this area.

Using data, we can gain insight into learner performance and engagement:

- Performance Data:
 - Problem sets
 - Assignments
 - Self- and peer-assessment
- Engagement Data:
 - Time on task
 - Resource utilization
 - Video watching patterns
 - Navigation paths
- Interaction Data
 - Discussion forums
 - Social network
- SIS Data
 - Enrolment Records
 - Admissions Applications
 - Demographics

UBC's Learning Analytics Innovation Pilot

TYPES OF QUESTIONS WE CAN ANSWER WITH LEARNING ANALYTICS

STUDENTS



How long did students who got an A+ in this course last term spend on online readings?

INSTRUCTORS



What course resources are students using?

DEPARTMENTS



How can we better predict how many students will want to register for a particular course?

ADVISORS

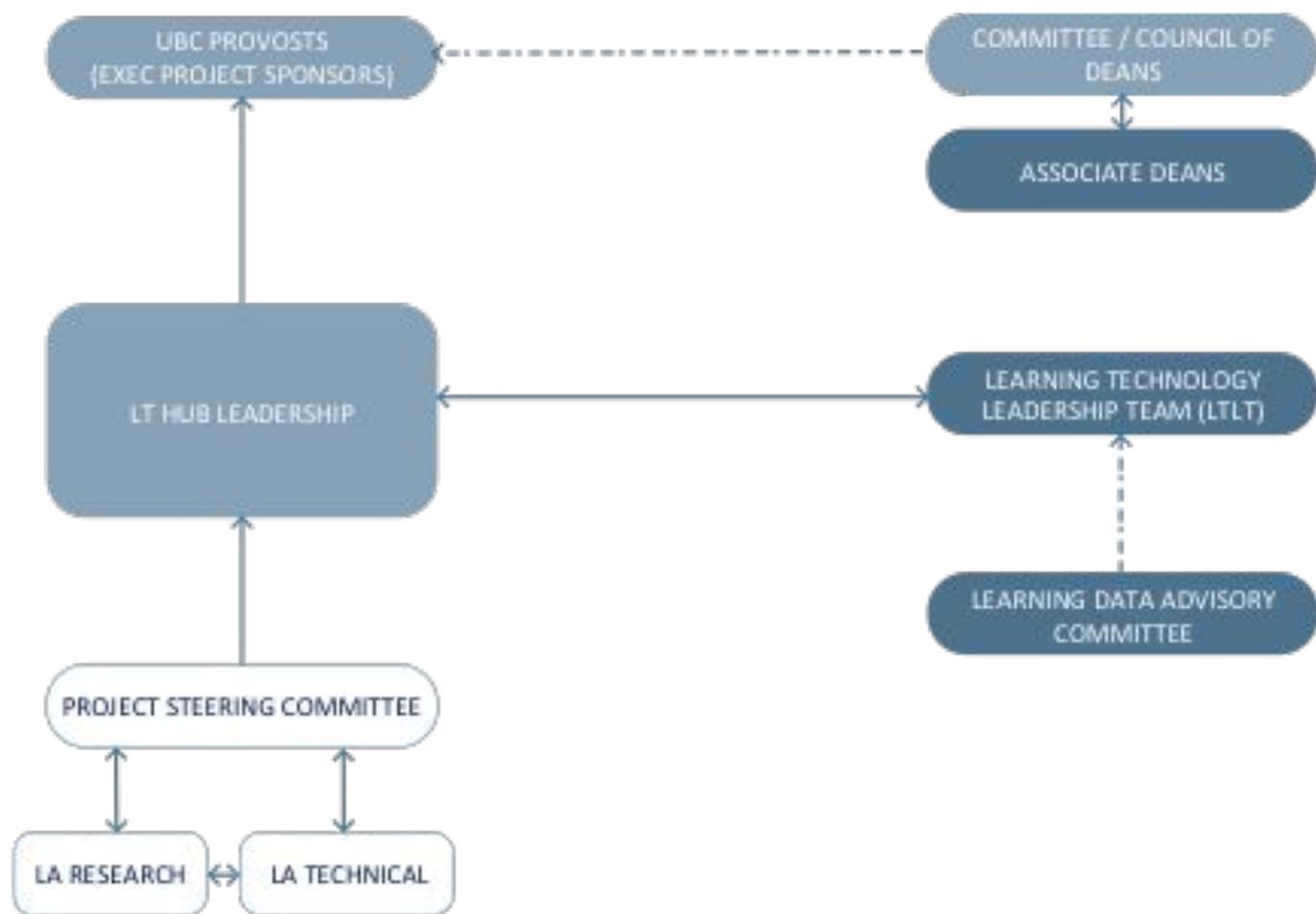


Which courses taken in first year are correlated with a higher GPA in second year?

The *Learning Analytics Project* at UBC aims to take a data-driven approach to improving student learning.

3 key strands:

1. **Community engagement via research pilots**
2. Development of an ethics and policy framework
3. Development of the technical infrastructure to deliver actionable insights from learning data to an enterprise level



Goals:

- Identify LA Priorities:
 - What pedagogical practices can be informed by data; what questions are answerable, actionable, and common?
- Understand service and support needs
 - Technology, pedagogy, etc

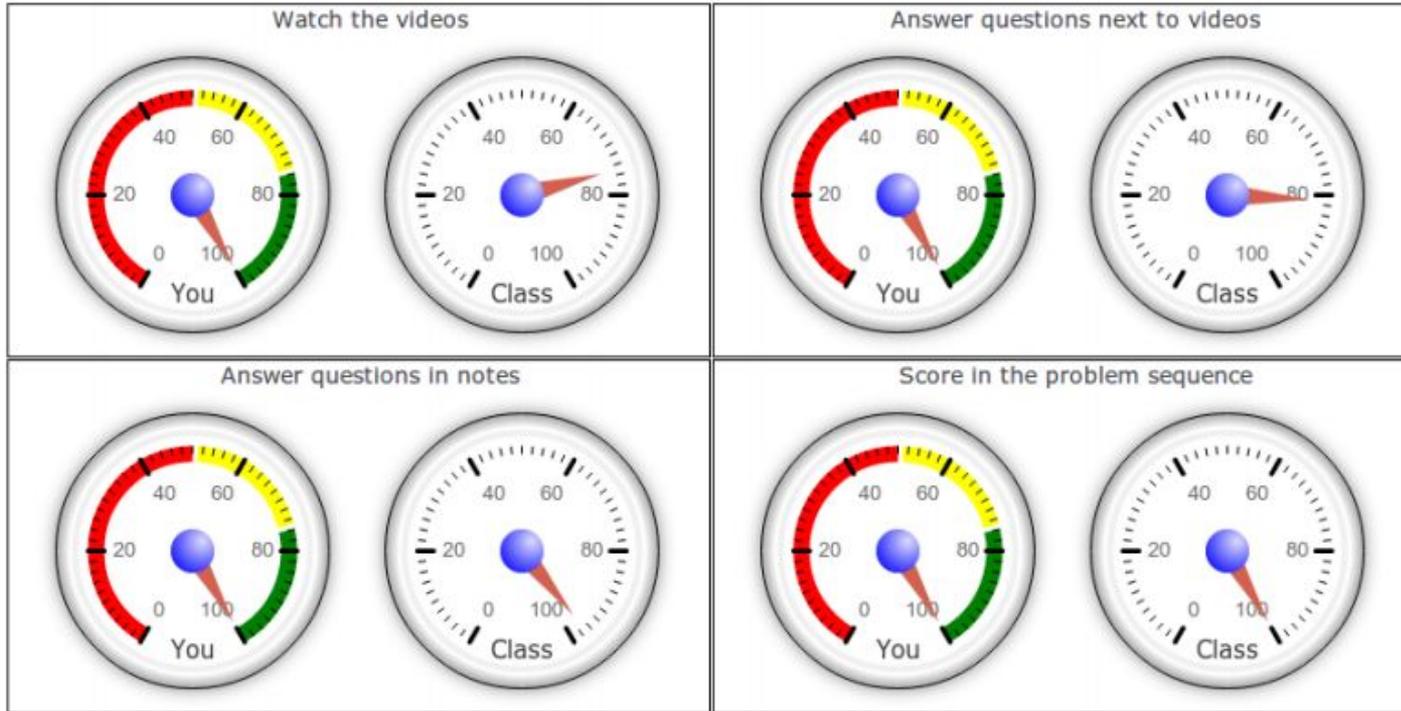
Example of an area of interest in Learning Analytics:

- Can we help students stay motivated?
- Can we help students establish better learning strategies?

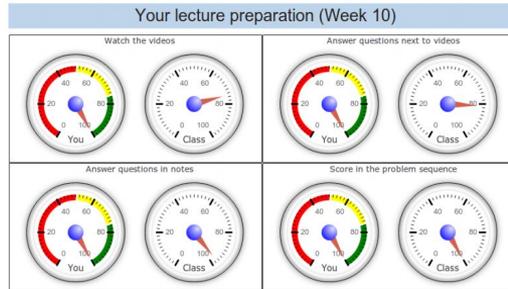


Example: Learner Preparedness Dashboard

Your lecture preparation (Week 10)



Questions:



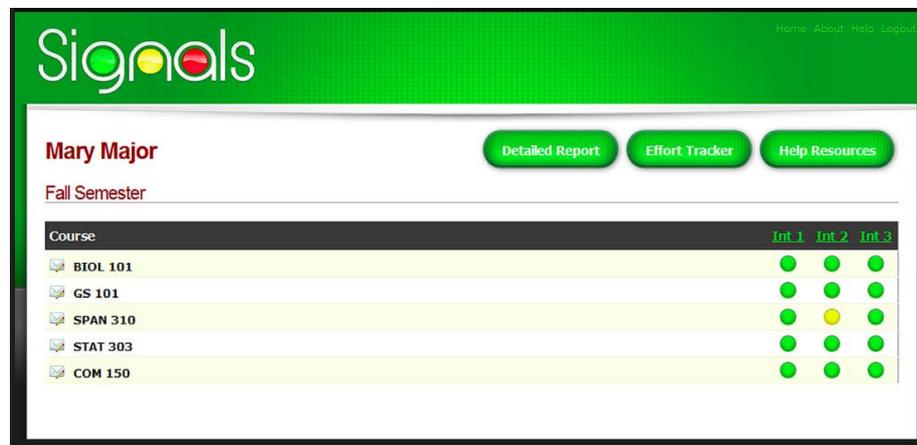
- Do you think this tool would be useful?
- What other types of information could be displayed to help inform students?
- If this tool was available, how would you introduce it to your students?

Case Studies:

Purdue Signals study showed **10% more As and Bs** were awarded for courses using Signals than for previous courses which did not use Signals. According to one survey, 89% of students considered Signals a positive experience; 74% said their motivation was increased by using it.

Source:

Arnold, K. and Pistilli, M. (2012) Course Signals at Purdue: Using Learning Analytics to Increase Student Success. In Proceedings of the 2nd International Conference on Learning Analytics and Knowledge (LAK '12). Accessed from: <https://dl.acm.org/citation.cfm?id=2330666>



Signals

Home About Help Logout

Mary Major

Detailed Report Effort Tracker Help Resources

Fall Semester

Course	Int 1	Int 2	Int 3
BIOL 101	●	●	●
GS 101	●	●	●
SPAN 310	●	●	●
STAT 303	●	●	●
COM 150	●	●	●

A Challenge:

Student directed feedback has been identified as one of the most important factors influencing a student's academic achievement ...as course enrolments increase there is a diminishing level of time per student that an instructor can devote in order to develop timely, personalised feedback.

–Pardo, A. , Jovanovic, J. , Dawson, S. , Gašević, D. and Mirriahi, N. (2017), Using learning analytics to scale the provision of personalised feedback.

Br J Educ Technol. . doi:[10.1111/bjet.12592](https://doi.org/10.1111/bjet.12592)

Scenario:

You are planning on sending individual feedback to each of your students

Questions

- What kinds of information would be useful for them to know?
- What info do you need to know about them in order to help them?
- When would it be most useful for students to receive that information?
- What types of patterns do you think you'd see after talking to all of them?

Effective Feedback



- Goal-Oriented
- Tangible and Transparent
- Actionable
- User-Friendly
- Timely
- Ongoing
- Consistent

What if we could suggest personalized strategies based on the behaviour of previous learners?

- “You logged in once this week for a three-hour session. Successful students tend to study more frequently, and in smaller chunks.”
- “Based on your answers in quiz 2, you may find it useful to review minutes 3–4 in the video, ‘Part 3, Lecture 2: Statistical Reasoning – Describing Data I’.”
- “You were one of the most engaged students in the discussion forums this week. Keep it up! This bodes well for your completion of the course.”

A case study in mass personalization

- First Year CE course, blended learning @ large, research intensive Australian university
- Offered in 2013, 2014, 2015
 - 291, 315, 414 students, respectively
- Feedback based on video watching behaviour, multiple choice questions, summative exercises each week
 - In 2015 only, 2013–2014 offerings are used as baseline reference

Feedback parameters

- Advice given for 4 weeks leading up to midterm (weeks 2-5)
- 4-7 activities per week
 - students received one piece of advising per activity
 - 4 “levels” of feedback, one per quartile
- Advice is short, 1-2 sentences:
 - E.g. “Make sure you practice again the exercises. Make sure you understand two concepts: memory operations, and memory size. See if you can go through the entire sequence without errors”
- Advice is highly individualized, -45%-60% distinct

Sample Feedback

Hi [REDACTED]

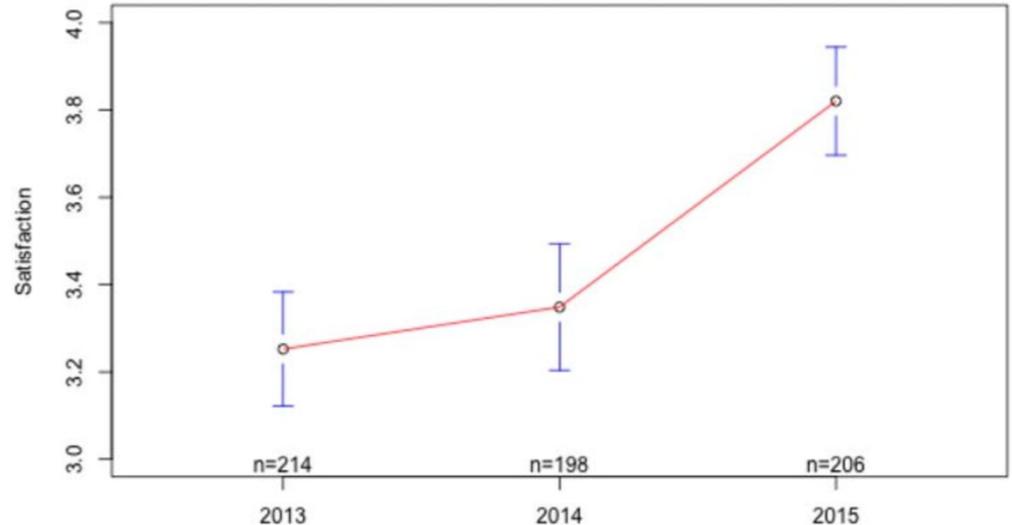
Here are some comments and feedback about your lecture preparation in [REDACTED] during Week 2.

Activity VIDEO: Encoding in base 2, 8 and 16

- Make sure you review again the whole content explained [in the video of the activity](#). You could use a piece of paper and try to replicate the developments that are explained in the video.
- Give another round to the questions next to the video in this activity until you answer all of them correctly at the first attempt and without looking at the solutions.

Does it work? (Satisfaction)

- Student satisfaction with feedback:
 - 2013, 2014: “Feedback from my assessment and otherwise was useful in helping me learn.”
 - 2015: (Treatment) “I have been guided by helpful feedback on my learning.”
- Statistically significant difference between 2015 and 2014 ($d=.49$), and between 2015 and 2013 ($d=.61$), but not between 2014 and 2013.



Does it work? (Academic Performance)

- An identical midterm exam was used for 2014 and 2015 (2013 had a different format)
- Small, significant effect on midterm exam scores:
- 2014 midterm scores (M = 12.801, SD = 4.794)
- 2015 midterm scores (M = 13.835, SD = 4.893)
- $t(684.499) = -2.859, p=.002, d=0.213$

Results indicate a small to moderate positive effect on both student perceptions of feedback and academic performance.

Why use OnTask?

Class announcements: Public, generic, easy

Individual email message: Private, high(er) time-cost: Proportional to #students contacted. Highly personalizable

Office hours: May not reach all students, especially those in need of assistance

OnTask: Personalized, private, time-cost is proportional to #advising-scenarios, reaches all students. Requires learning to use a new tool.

OnTask Pilot @ UBC with Dr. Silvia Bartolic

SOCI 200 (88 students)

- 2 messages
- Received messages based on **course participation**
- **Not aware** of OnTask tool

SOCI 415 (32 students)

- 5 messages
- Received messages based on **course performance**
- **Aware** of OnTask tool

Examples: Soci 200 – highly engaged students

Hi!

I'm really pleased to see that you have been actively participating in class activities as well as doing the homework assigned. These tasks should help you understand the material and also better succeed on the midterms. **For more information** on kinship and decent see: https://www2.palomar.edu/anthro/kinship/kinship_2.htm . **If you are interested in** group marriage (or complex marriage) please see:

<https://www.britannica.com/topic/Oneida-Community> for a description of the Oneida community. The following **Ted talk** rebuts Exchange Theory and questions our ability to be rational:

https://www.ted.com/talks/dan_ariely_asks_are_we_in_control_of_our_own_decisions?language=en#t-83887.

Finally, if you are interesting in trying to deepen relationship closeness, have a look at the article that can be found here:

<http://www.stafforini.com/docs/Aron%20et%20al%20-%20The%20experimental%20generation%20of%20interpersonal%20closeness.pdf> . Note the questions you are supposed to ask your partner for closeness to increase are listed in the appendix. **Keep up the good work!** See you in class.

Best,

Silvia

Examples: Soci 200 – low participation score

Hi

I've noticed that you did not submit all in class group activities and/or the assigned homework. These tasks are geared toward helping you understand the material and **should also help you succeed on the midterms**. These activities also contribute to **your participation grade**. It's not too late to get active in the class! Remember, **I will be looking at both in class and online** discussion, participation in in-class activities and homework when assigning a participation grade. But more importantly, I'm hoping your participation will help you connect the course content to your own life and prior knowledge. **Please don't hesitate to ask questions**. See you in class!

Best,

Silvia

Examples: Soci 415 – high quiz score

Your multiple choice answers on Test 5 show **excellent understanding** of the Life Course Developmental Framework. As always, continue to focus on the learning objectives presented for each unit. You should be able to describe and APPLY framework assumptions, concepts and propositions. Knowledge of the variations are important in this unit so if you wanted to **take your learning further**, I would recommend reading/thinking more about these. Here is an example of Family Developmental theory used in nursing: http://www2.nau.edu/~nur350-c/class/2_family/theory/lesson2-1-3.html. Here is an application of life span theory to education: <http://infed.org/mobi/life-span-development-and-lifelong-learning/>. Consider how you can apply these two variations to a family issue or challenge. **How would the application of life course developmental framework or one of the variations differ than the application of social exchange theory or symbolic interactionism?**

Examples: Soci 415 – low quiz score

Your answers to the multiple choice questions on Test 5 – Life Course Developmental Framework show that **you need to review the basic** assumptions, concepts, propositions and variations in this framework. **Be sure that you focus on the learning objectives for each unit.** It will help to either examine the application **examples provided in the text and readings** or to **try to apply the theory to your own family issue.** By applying you should be able to check your understanding. Please be sure to **ask questions** if you are unclear. I also want to remind you to continue to think about how this framework is similar and different from the previous theories we have discussed.

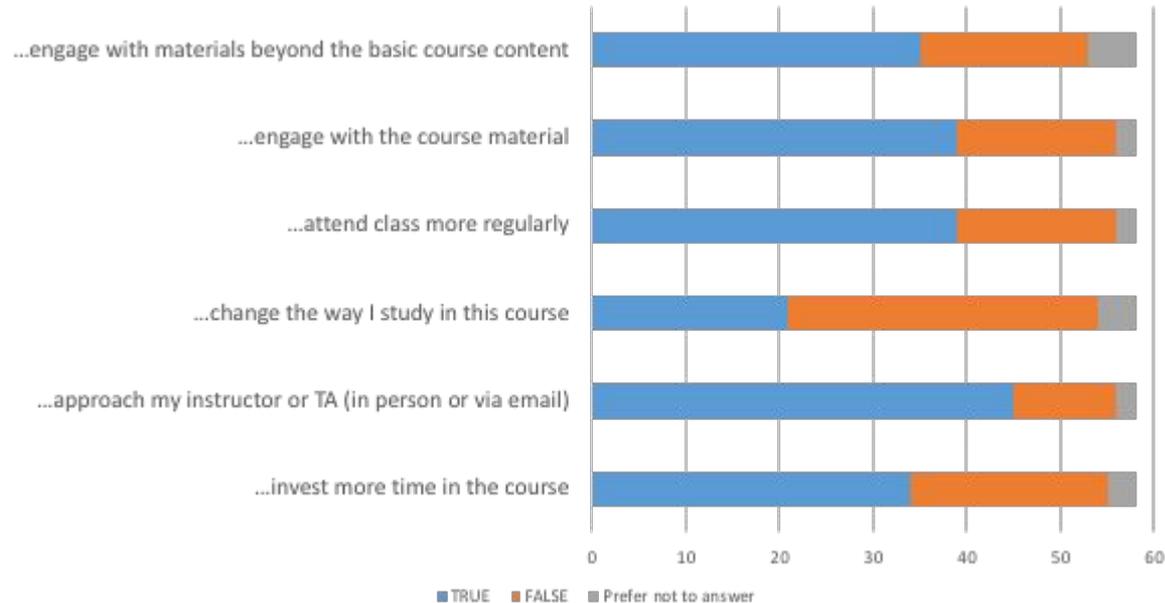
Pilot: follow up & evaluation

Both courses were surveyed to collect student opinions regarding:

- Usefulness/helpfulness of feedback
- Volume of feedback and degree of personalization relative to other courses
- Attitudes towards feedback personalization
- Attitudes towards instructor (approachability/caring)
- Changes in attitudes/behavior
 - Invest more time in course, approach instructor or TA, change study behaviour, attend class more frequently, reach beyond required basic content

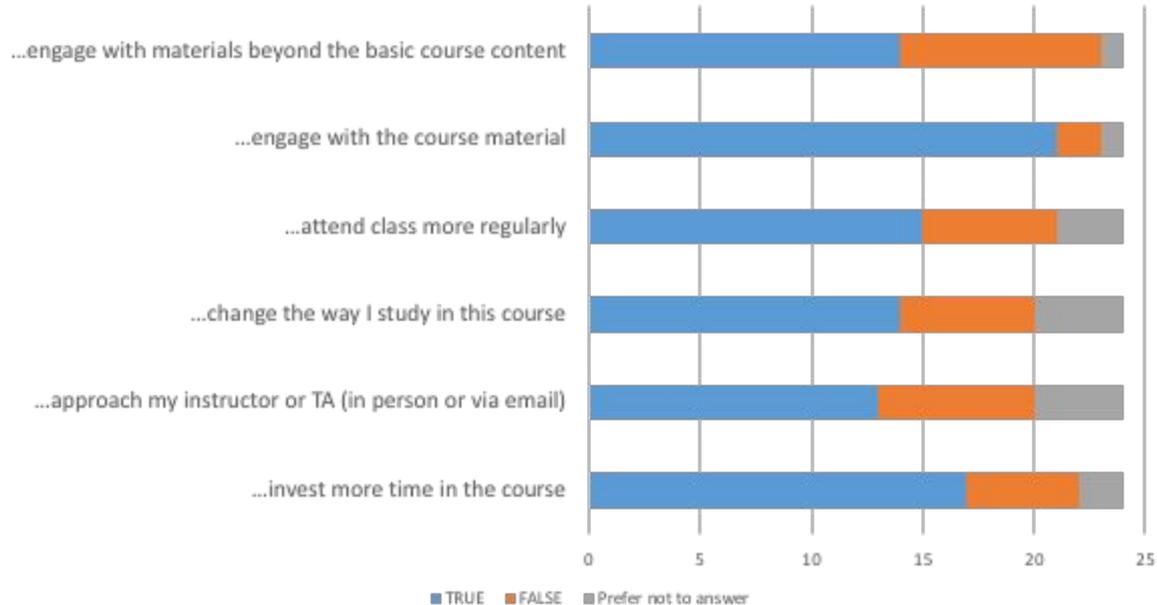
Pilot Evaluation: SOCI 200

Please indicate whether each of the items below are true or false for you. The personal messages I received helped me...



Pilot Evaluation: SOCI 415

Please indicate whether each of the items below are true or false for you. The personal messages I received helped me...



OnTask Walkthrough

Scenario:

You are planning on using OnTask in a Fall Course

Questions

- What data should (or should not) be used?
- Are there concerns regarding fairness?
- What is the right delivery platform?
- How much feedback is too much?

Survey:

<https://is.gd/OnTaskUBC>

Direct Link:

https://ubc.ca1.qualtrics.com/jfe/form/SV_5mt1SOjZc5nCLQN



Thank You!

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Join the pilot!

Currently supported:
BYOD (Bring Your Own Data): Canvas Gradebook,
Quiz scores, Clickers, Excel

More complex data? Please talk to us!