



# TLEF Project – Final Report

**Report Completion Date: (2018/03/31)**

## 1. PROJECT OVERVIEW

### 1.1. General Information

<b>Project Title:</b>	Enhancing personalized learning and engagement in a class with large enrollment		
<b>Principal Investigator:</b>	Tim Huh		
<b>Report Submitted By:</b>	Tim Huh		
<b>Project Initiation Date:</b>	March, 2018	<b>Project Completion Date:</b>	March 31, 2019
<b>Project Type:</b>	<input type="checkbox"/> Large Transformation <input checked="" type="checkbox"/> Small Innovation <input type="checkbox"/> Flexible Learning <input type="checkbox"/> Other: [please specify]		

### 1.2. Project Focus Areas – Please select all the areas that describe your project.

- Resource development (e.g. learning materials, media)
- Infrastructure development (e.g. management tools, repositories, learning spaces)
- Pedagogies for student learning and/or engagement (e.g. active learning)
- Innovative assessments (e.g. two-stage exams, student peer-assessment)
- Teaching roles and training (e.g. teaching practice development, TA roles)
- Curriculum (e.g. program development/implementation, learning communities)
- Student experience outside the classroom (e.g. wellbeing, social inclusion)
- Experiential and work-integrated learning (e.g. co-op, community service learning)
- Indigenous-focused curricula and ways of knowing
- Diversity and inclusion in teaching and learning contexts
- Open educational resources
- Other: [please specify]



### 1.3. Project Summary

Introduction to Quantitative Decision Making (COMM 290), a required course for every Sauder BCom student, is regarded as one of the most challenging commerce courses in the first year. While the sections of this course are large, approximately 230 students each, due to the interdisciplinary nature of commerce education and varying high school preparation, there is substantial variability among students in terms of their exposure and understanding of the curriculum content. In this project, we aim to enhance personalized learning and student engagement with course content, instructors, peers, TAs and Peer Assisted Study Sessions (PASS) leaders. Our objectives are to develop a series of tutorial videos, various interactive activities, and online quizzes with automated, immediate and tailored feedback so that students can adapt resources depending on their learning needs. We believe the development of these resources will contribute to the improvement of student learning.

### 1.4. Team Members – Please fill in the following table and include students, undergraduate and/or graduate, who participated in your project.

Name	Title/Affiliation	Responsibilities/Roles
Tim Huh	Professor	Principle applicant, course instructor
Greg Werker	Full time Lecturer	Co-applicant, course instructor
Sunah Cho	Faculty Liaison	Co-applicant, project manager
Rob Peregoodoff	Director, Learning Services	Co-applicant, support from Learning Services
Hossein Piri	PhD Student	Co-applicant, data analysis for proposal development
Vanja (VJ) Terzic	Graduate Student	Content development coordinator/contributor
Albina Gibadullina	Graduate Student	Content development coordinator/contributor
Bosung Kim	Postdoctoral Researcher	Content development contributor
Godot Bian	Undergraduate student	Content development contributor
Emily Hodgson	Undergraduate student	Content development contributor
Lincoln Lin	Undergraduate student	Content development contributor
Arkie Liu	Undergraduate student	Content development contributor, research coordinator



Alexa Rudakoff	Undergraduate student	Content development contributor
Maddie Zapach	Undergraduate student	Content development contributor
Sharon Shamuyarira	Undergraduate student	Content development contributor
Caryssa Kim	Undergraduate student	Website development (Wordpress)
UBC Studios (Andrew Wang)	UBC Staff	Video shooting, mentoring student workers for media development
Learning Services	UBC Staff & Co-op students	Video post-production, branding

**1.5. Courses Reached** – Please fill in the following table with **past**, **current**, and **future** courses and sections (e.g. HIST 101, 002, 2017/2018, Sep) that have been/will be reached by your project, including courses not included in your original proposal (you may adapt this section to the context of your project as necessary).

Course	Section	Academic Year	Term (Summer/Fall/Winter)
COMM290	101, 102, 103, 104	2018	Fall
COMM204	104, 105, 106	2018	Fall
BASC550	001, 002	2018	Fall
COMM290	921	2019	Summer
BASC550	300	2019	Summer



## 2. OUTPUTS AND/OR PRODUCTS

2.1. Please **list** project outputs and/or products (e.g. resources, infrastructure, new courses/programs). Indicate the current location of such products and provide a URL if applicable.

Product(s)/Achievement(s):	Location:
Project website	<a href="http://blogs.ubc.ca/quantitativdecisionmaking/">http://blogs.ubc.ca/quantitativdecisionmaking/</a>
Tutorial videos	<a href="http://blogs.ubc.ca/quantitativdecisionmaking/tutorial-videos/">http://blogs.ubc.ca/quantitativdecisionmaking/tutorial-videos/</a>
Problems (online quizzes with feedback)	Canvas course site

2.2. **Item(s) Not Met** – Please list intended project outputs and/or products that were not attained and the reason(s) for this.

Item(s) Not Met:	Reason:
Interactive learning activities for the Excel labs	We intentionally postponed this task as we first wanted to see how the supplementary resources were being used by the COMM 290 students and decide what learning activities we need to develop further to help and train the Excel TAs. The number of, and the scope and depth of the supplementary resources surpassed our original expectation through excellent contributions of the student workers. Due to the timeframe of this project (1 year), we ran the course with the supplementary resources just once so we will keep finding ways to enhance the ability to do more interactive activities for the Excel labs and to reference the supplementary resources inside and outside of classes. Once we have run the course once, we can get the feedback from involved participants (COMM290 students, student workers, instructors, and TAs) to know how we can improve for the future, or whether it is even necessary to add more resources for the time being.

## 3. PROJECT IMPACT

3.1. **Project Impact Areas** – Please select all the areas where your project made an impact.

- Student learning and knowledge
- Student engagement and attitudes



Instructional team teaching practice and satisfaction

Student wellbeing, social inclusion

Awareness and capacity around strategic areas (indigenous, equity and diversity)

Unit operations and processes

Other: [please specify]

**3.2. What were you hoping to change or where were you hoping to see an impact with this project? – Please describe the intended benefits of the project for students, TAs, instructors and/or community members.**

- **For students:** We hoped to enhance students' understanding of course material covered in COMM290, which builds on the basic principles of quantitative methods and tools. Students would ascertain areas of weakness and target these areas for improvement through various resources. We expected that these resources would empower students with flexibility and autonomy to meet their learning needs and goals.
- **Instructors:** Instructors would incorporate elements of a flipped classroom framework that helps students be more prepared for class and encourage them to be more actively engaged in classroom activities. Also, instructors would find their office hour sessions more effective and efficient by focusing on more fundamental problem-solving skills and application of the problems rather than spending time explaining simple conceptual questions as they could refer the students to the supplementary resources that help explain key concepts.
- **TAs:** The supplementary resources would increase the effectiveness and efficiency of the face-to-face time with the Excel TAs and the PASS leaders. We expected that students would bring questions about the supplementary resources and more in-depth questions that consolidate key concepts into the TA sessions.
- **Student workers:** We expected the project participants (undergraduate and graduate students) would greatly benefit from this project. As both undergraduate and graduate students carry out the majority of activities in the project, they would deepen their subject knowledge by engaging with the varied subject matter, develop leadership and communication skills from cooperating with other team members, and experience making contributions to the scholarship of teaching and learning.

**3.3. Were these changes/impacts achieved? How do you know they occurred? – What evaluation strategies were used? How was data collected and analyzed? You are encouraged to include copies of data collection tools (e.g. surveys and interview protocols) as well as graphical representations of data and/or scenarios or quotes to represent and illustrate key themes.**

- **Student Engagement Survey** – We conducted a Student Engagement Survey during Winter 2017 and Winter 2018 to compare student learning experiences in COMM 290 before and



after the project implementation. Overall, there isn't any significant difference in the two feedback reports. Also the survey participation rate was low (44 in 2017 and 178 in 2018) but we received some meaningful open-ended comments (see Appendix A).

- **Student Experience with Supplementary Resources** – We conducted a brief open-ended survey on student experiences with the supplementary resources. Overall, the responses are very positive and encouraging. From this survey, we learned the supplementary resources provided student with opportunities and flexibility to prepare for exams, clarify concepts, practice difficult concepts and homework questions, and learn harder topics on their own time at their own pace (see Appendix B)
- **Student Usage of Supplementary Resources** – We captured all interactions between students and Canvas (Quizzes)/Video records in Panopto. The collected data describes the contribution of the resources to teaching and learning enhancement and suggest effective intervention methods to students' learning process (more results are available via <http://reports.sauder.ubc.ca>) (see Appendix C).
- **Failure Rates:** We compared the failure rates of COMM 290 in 2017W1 and 2018W2. There was no significant difference in these rates. Due to year-to-year variations in cohorts (e.g., more difficult final exam testing situation in Canvas this past year), it is hard to justify before and after affect.
- **Process Assessment** – Ongoing conversation among instructors and TAs ensured that the value of supplementary resources has been constantly increasing. From our focus group interview with student workers, we received positive feedback, confirming that they gained useful skills in not only becoming more familiar with the subject matter but improved skills in other areas like communication, video editing, teaching, etc. (Note: The results of the focus group interviews will be shared through SoTL events. This TLEF project planted a seed for our SoTL study on the value of the student workers in teaching and learning).

**3.4. Dissemination** – Please provide a list of **past** and **upcoming** scholarly activities (e.g. publications, presentations, invited talks, etc.) in which you or anyone from your team have shared information regarding this project.

- **TLEF Showcase (May 3, 2018) Poster**, “Student involvement in TLEF”, 10<sup>th</sup> Annual Celebrate Learning Week: Hossein Piri presented information on his work and contribution to the TLEF.
- **Sauder Workshop (Nov 29, 2018)**, Candid Canvas: Exploring Canvas Analytics Tools: Greg Werker demonstrated the results of the supplementary resources usage ([reports.sauder.ubc.ca](http://reports.sauder.ubc.ca)) to Sauder Faculty.
- **AACSB Re-accreditation (March 7, 2019)**: We shared the results of the survey on student experience with the supplementary resources with AACSB committee.
- **TLEF Showcase (May 2, 2019) Poster**, “Students as Partners”, 11<sup>th</sup> Annual Celebrate Learning Week: Arkie Liu plans to share her experiences with the TLEF project.



- **Spring Institute 2019 (May 23, 2019)**

**Presentation**, “Exploring the value of student workers’ contribution in teaching and learning’:  
We (Tim, Greg, Sunah, and Arkie) are scheduled to deliver a presentation.

**4. TEACHING PRACTICES** – Please indicate if **your** teaching practices or those of **others** have changed as a result of your project. If so, in what ways? Do you see these changes as sustainable over time? Why or why not?

Our project provides a series of video resources and online quizzes with detailed feedback for students to develop their understanding of quantitative decision making outside of the classroom. Different students find different concepts challenging, but the large lecture classroom limits opportunities for personalized learning experiences. With convenient access to walkthrough tutorials and unlimited access to the practice problem, they can easily revisit difficult topics whenever they please. We have a limited amount of time in the classroom to teach the course material, and students may feel that not enough time is spent covering the topics that they find most challenging. The videos and problems provided them with an alternative way to seek help for these difficulties they may face outside of office hours—which may be at inconvenient times for their schedules. Additionally, the array of detailed feedback and multimedia used in these videos, including whiteboard problems, Excel walkthroughs, and tutorial voiceovers, offers a dynamic learning experience that accommodates a diverse range of student learning styles. Students even have the option to watch tutorials and/or take the quizzes before arriving at class to prepare for what they can expect to learn or after attending class to review what they just learned. These videos and problem-sets provide an accessible and digestible way of learning the core concepts to students who are new to the world of operations and logistics. Thanks to these supplementary resources, we are able to use our office hours to answer deeper, more challenging questions or simply to spend extra time with students who are really struggling.

The project products are sustainable as we considered a potential curriculum change when we developed the materials. A BCom program review will be started this year. We developed a couple of extra tutorial videos which were beyond our original scope of the project, considering the point where new content potentially needs to be developed within a new curriculum.

**5. PROJECT SUSTAINMENT** – Please describe the sustainment strategy for the project components. How will this be sustained and potentially expanded (e.g. over the next five years). What challenges do you foresee for achieving the expected long-term impacts listed above?

Even though the materials developed through the TLEF project were used as supplementary resources and not as mandatory course activities, the usage of the materials has been growing. We do not see any significant changes or development needed to the existing materials. But we may need to continue our conversation with the Excel and PASS TAs so that they can use the materials in enhancing their TA



sessions. We received the SoTL Seed Research Fund. The intent of the research is to explore the value of the student workers in teaching and learning. The potential impact of this SoTL study is to inspire higher education institutions to encourage more involvement from students.



## Appendix A: Student Engagement Survey

### What was the most enjoyable factor in this course?

- Our instructors were the most enjoyable factor.
- Greg's humour and Tim's stories, both relating to the course content really well.
- Professor
- excel labs
- Professors made lectures interesting and i enjoyed coming to this class every time.
- None
- The professors
- I liked the real life applications.
- Profs
- Both the professors were very engaging
- Professors lighten the mood with their humor!
- Getting to know the professors
- I really enjoy stats!
- The addition of Tim and Greg's sense of humor.
- Tim's jokes.
- Interactive classes
- FUN PROF Both prof
- GREG AND TIM - great guys overall
- Excel
- Excel
- The professors were really engaging which helped me focus better and learn better.
- The clicker questions and experimenting with Excel
- Lecture
- The professors were very engaging and enjoyable to learn from
- The applications to real business problems
- Learning features of excel.
- fun lecture
- Teacher's teaching style.
- Tim's lecture!
- Learning new interesting things
- Applying knowledge to real life situations
- Learning more excel skills
- learning excel functions
- The examples given in class
- Greg
- In-class questions
- iClicker questions
- The instructors
- lclicker
- excel labs
- music



- helpful
- 2min rest
- profs were engaging, clear, and funny
- Linear programming
- the teachers are good
- The stretching
- In-class comedy and how it was used to teach material.
- Clicker
- The instructors and course materials
- case study
- Fun slides
- N/A
- the professor
- Professors
- Greg is cool
- Gregs fun attitude
- Only one homework a week, very enjoyable workload
- Variable
- Probability
- Funny teacher
- Labs
- Taking a course where you can actively see how the concepts learned in class will be applicable in a business setting.
- Slow paced and deep learning
- Jokes
- Instructor
- Excel
- Greg and Tim's jokes
- The class
- The profs
- Probably attending the lectures; the teaching was done quite well.
- The teachers who were very engaging
- the professors are humorous and make many specific examples about the concepts
- The clear answers.
- Most enjoyable factor was the way the profs taught the concepts.
- I liked the course content and professors
- The most enjoyable factor in this course is probably the instructors. They were both engaging which made the course really fun to learn.

### What was the most stressful factor in this course?

- The concepts were the most stressful factor.
- Learning about the sensitivity analysis and the huge sample information trees.
- Tests
- Sometimes the weekly homework is difficult, and i have a hard time doing them on my own.
- Exams
- Exams
- The exam.
- Nothing



- The exams
- Heavily weighed on exams.
- The fact that each exam is worth 30%
- Nothing
- Midterm
- Midterm
- Some TA are not good
- Probability
- Practice a lot but I get bad score
- Nothing was too stressful
- Quizzes
- Exams
- Understanding probability
- The midterm
- not coming to class
- Exam
- Clicker
- Midterm exam
- The midterm
- Concepts are confusing
- midterm / final
- concepts are hard to understand
- Final and Midterms
- Probability
- Exams
- Second half of the course
- None
- every week HW
- final exam
- midterm and final
- homework
- Probability
- final exam
- Exams
- Stretching
- The midterm and final exam because the final is worth so much.
- Homework
- Everything.
- Variance
- N/A
- Excel
- Homework
- Midterm
- Nothing, perfect course for first years
- Not getting the help, and taking too long.
- Notes don't match up with my package i bought. Especially for second portion of course. Makes it hard to study.
- Midterm
- Exams.



- I sometimes feel sleepy during afternoon
- complex numbers
- Computation
- Probability
- The midterm
- No stressful factor
- It's hard to isolate a specific factor, since I didn't have any serious issues with the course.
- Midterm
- i need more time to understand some new concepts
- Midterms.
- The midterm stressed me out as I prepared with the practice midterms but did poorly on the actual midterm.
- Sometimes, the calculation will be complicated.
- None
- The most stressful factor in this course is probably the homework and the midterm.

### How have the supplementary resources (videos and problems) contributed to enhancing my learning?

- They gave a better understanding by making the concept clearer.
- They allowed me to better understand the concepts taught in class.
- I have been able to learn more
- Helpful
- Yes
- It really helps me get a review course materials that I forget to help me with my homework and to gain a deeper understanding of the subject.
- VERY HELPFUL
- They helped me doing homework and reviewing outside of class time. The videos demonstrates class concepts very clearly.
- more practice on the concepts
- Yes
- They are good if I need to study outside of class.
- they help me understand the material
- I was learning at my own pace and was more comfortable.
- Sometimes, it still doesn't help me better understand the material.
- The videos are a great way to revise what has been done in class and is extremely helpful for exam practice.
- It gave me visual representation.
- Taught me what I didn't know in class.
- Practice problems allowed extra practice using new types of problems which helped prepare me for the exam greatly.
- really helpful!!!!
- Neutral
- I practice but I hope there is more
- Helped me practice and remember/review the concepts we learned a long time ago
- For practice and going over concepts if I didn't understand them in class.
- They helps me prepare for my midterm.



- I didn't understand a concept so I watched the videos and did the practise problems, and it significantly improved my understanding
- Before a midterm or an exam, the problems helped me review.
- If I miss any of the topics covered in class, the videos help me refer to them again and understand the content better.
- A very approachable way to find solution to any class material problem
- Great
- Help understanding concepts easily.
- N/A
- improved understanding
- They, solve clarified class material
- Review
- When I don't understand the class concepts I can watch the videos to help me. I can pause or rewatch the videos too
- Pretty well
- Positively
- They have explained the concepts in detail to help me with applying them to questions
- Help me understand the concept better
- you get to test your understanding of the 290 concepts.
- None
- very helpful
- further understand
- Provided opportunity to practice skills at my own pace.
- Make class concepts more easy to absorb.
- they are positive to my ability
- To study
- They allow me to review concepts and practice them.
- it makes more easily to understand the concepts
- It's helped me grasp the material more intimately and have a new perspective in understanding the class.
- The videos make the concepts very clear.
- N/A
- very well
- Good
- good review
- When I need them, they're there, though I haven't had to rely in them much.
- Never tried them
- a lot
- Clarify doubts
- They haven't review
- Reviewing
- very positive
- Well
- Neutral
- Helped clarify concepts
- I learn things that I didn't understand in class
- I haven't used the videos, but I've done the practice problems to prepare for tests, which made the tests easier.
- Made it easier to understand course concepts
- help me review and learn some skills that can be used in daily life.



- By quickly summing up information in a clear manner.
- They have allowed me to review course concepts that I have a difficulty understanding.
- I can repeat watching them over and over again until I totally understand them, which really help me a lot!
- Very positively
- They enabled me to look back on things discussed during the lecture that I may have missed or I may want to build upon further.



## Appendix B: Student Experience with Supplementary Resources Survey

### Q1 - What motivated you to use the supplementary resources (videos and/or problems)?

What motivated you to use the supplementary resources (videos and/or problems)?

Practice for final exam

To review in preparation for the exams (mostly the final).

If there was materials that I did not understand, those supplementary resources helped me a lot.

If I didn't understand something and if I wanted to review a topic.

Not fully understanding concepts, midterm/final practice

It allowed me to review concepts of the course that I wasn't quite understanding. Plus the problems help as a studying tool

Supplement lectures.

To study for the final exam

I had some issues solving questions from the assignments so I went to the supplementary resources.

To enhance my understanding and get some exercises.

When the concept wasn't clear in class

It was really helpful to revise all the concepts during the final season.

Help study for midterm and final exams.

They were the only study tool as the class notes weren't useful at all.

I wanted extra clarificatoin

- midterm exam - figuring out homework questions

There was a lack of clarity sometimes in class, and the videos provided a resource I could use at home to resolve this conflict. Its easy to get behind in a large class, the videos you could always pause fast forward or rewind unlike a class of 300.

i wanted to understand what i was learning to my fullest capabilities.

- I first started watching the videos as a review resource when I couldn't retain all the information covered in the lecture because I was too sleepy, but I soon realized that the videos are often so helpful that they can basically replace the lectures. I don't know how they did it but the videos are able to



condense a whole lecture's material within 20 minutes. In fact, I was able to do very well in the first midterm by reviewing only using the videos and the associated problem sets. To be honest I never looked at the course handouts (the printed-out lecture slides) except when I need to take notes in class because the videos can totally replace them.

I can't understand/miss some lectures and want to enhance my understanding,

I was confused about a topic and I needed extra practice.

-Understand concepts that I didn't understand on class. -Review -Practice

To study and to relearn any concepts that I can't understand in the lecture

my friends strongly recommended and said it was useful.

It is a good and efficient way to review concepts while looking at my notes.

For review purposes before exams.

Needed help

when I was sick and couldn't make it to class, I watched the supplementary videos to make sure I didn't lag behind and could follow in the next class.

clarify my questions

Extra practice

- Confused with concepts - Wanted extra practice - Review

Practicing for the midterm and final, also on some of the tougher assignments to get a better grasp on the concepts.

Study resources and tools I used these resources when I needed further clarification to subjects encountered in the homework problems and when studying for the midterm/final

I used the supplementary resources to clarify class concepts on my own time, and to learn harder topics at my own pace. I found the videos and following problem sets helpful in ensuring I understood the concepts as well as I believed I did in class.

extra practice confusion on certain topics

Midterm.

I did not understand a concept taught in class and wanted to learn more about it and practice it.

To clear out doubts and make sure that my concepts are clear, and I to make sure that I didn't make any error while listening to the prof in class.

I skipped some classes in the end of the term, due to personal health. So, while preparing for the final, these resources helped me a lot!

When reviewing material or doing an assignment and needed a reminder on how to do a problem

Wanted to review concepts and didnt have all the notes

Lack of notes, learned well with videos in math and computer science

I prefer to listen in class rather than be distracted with notes. Also, I am a visual learner



Self-learning and enhance knowledge learned in class

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to gain a deeper understanding of the topic

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When I do not fully understand the course

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Studying for the final exam/Refresh course content from the beginning of the semester

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To help with studying and review difficult topics.

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Extra understanding and practice before the exam

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Mastery of each topic

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Useful while studying for exams.

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Sometimes I need extra instruction on the topics I learnt in the last class.

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Tim recommended us to review the previous concepts before the next class so I did

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There were parts I didn't understand thoroughly in the hw so I decided to check the videos.

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I needed extra help with some of the concepts.

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I didn't understand the concepts so I decided to watch the videos and work on the problems to gain a better understanding.

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Great opportunity to understand better and get help outside of class.

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To understand concepts that I was lacking. It also helped refresh memory from the class lectures.

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I would consider myself a fairly strong academic student but have trouble following concepts in class on the first attempt. Most of my learning is done through videos - going at a pace that I can follow and for me to repeat if needed.

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I forgot course content and wanted to have a refresh on it.

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There were times when I was lost during our lecture,so watching these videos really helped!

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Sometimes I would be confused or lost in class, so watching the videos helped me understand concepts at my own pace.

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What motivated me to use the supplementary resources was to gain further understanding on the COMM290 material beyond what was tested on the homework and the examples in class.

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When I was having trouble solving a problem for the homework. I also liked using them as review for the final exam.

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Needed help during HW questions Studying for midterm/final Did not understand course material from just attending class

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I found the videos and problems very useful in cementing my knowledge and for review. I watched the videos and attempted the practice problems in preparation for midterms and finals and used them to clear up concepts if I left a lecture feeling confused.

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to get a better understand of the concepts learned in class and to revisit concepts during studying

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some unclear knowledge

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The difficulty of the midterm and finals

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## Study for exams

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To refresh my knowledge of topics learned previously in the course, as I may have forgotten them. Additionally, the practice problems were a good way to enhance my understanding of probability related topics.

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When I review or encounter some problems, I will use these resources to help me absorb the knowledge better.

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Missed a lecture.

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Helps me recall material discussed in class and lets me understand better and practice on my own

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I was motivated to use the supplementary resources as they helped clarify a lot of the content that I learned in class.

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Needing to practice without any consequences from making a mistake.

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x



**Q2 - What was/were the factor(s) of the supplementary resources that impacted your learning the most? Please explain why.**

What was/were the factor(s) of the supplementary resources that impacted your learning the most? Please explain why.

I could get a feel for the questions and then see what type of mistakes I was making so I could stop making them

The problems were good practice leading up to assessments.

The videos and practice problems help me to understand the materials really well.

Walking through things slower and having the ability to replay if needed.

videos were very concise. problems provided more practice

Having the videos work through problems because I felt like some important topics weren't covered in lecture enough

The in depth nature of them.

The ability to moderate the pace, the clearness of question examples, and the incorporation of TAs in the videos.

Some of the videos went over questions very similar to those on the assignment which was very very helpful.

Practice problems. I can practice some questions and get to know how to do the questions.

The videos were great

The videos were short and to the point. That helped me to understand all the concepts during a short span of time.

Probably the videos, skimming through them is a good refresher.

The students making the videos explained the concepts very well through examples.

The easy and concise explaining with examples

- videos that helped walk you through how to solve something step by step

Best videos. I would not have passed or got nearly the grades without them. Not a huge fan of lectures because I am a quick learner and just need the facts. the video gave me the info visually and through audio quickly. I loved stopped sometimes just to digest the content than moving forward or fast forwarding when it's easy.

The extra problems helped, and the videos. It helped because I was motivated to learn.

- Videos contain the same amount of information as lectures but take up much less time. - The problem set attached to each video is really helpful.

Very concise and easy to understand

Having additional questions available to me for practice.

The opportunity to review everything at my own pace and to have the opportunity to pause the video and take notes.



The practice questions and the videos so that I am more confident with taking the midterm and final exam.

The practice problem. It is always a good idea to have more practice exercises.

The extra problems as they test your understanding right away.

There were practice problems with solution and explanation, which were useful. Practice problems are only useful if we know whether we are doing them right or wrong, and why.

Video portions

The fact that I can pause the videos, and re watch them made it so much easier for me to understand concepts at my own pace. Sometimes during lectures, I feel bored when I've already understood a concept well but the prof kept on explaining it because others may have not. Some other times I struggle to understand a concept or miss a key word during lectures, and don't even know what to ask. Videos really help at those times.

step by step teaching

Videos

- The videos provided easy explanations of the concepts we learned in class

The practice right after that relates to the concepts taught help reinforce concepts. I also prefer not to read textbooks, and learn better through visual and audio so this was of tremendous help.

The videos were very straight to the point and clear while still covering all necessary steps to explain a concept. The videos provided me with an easy example which I could practice in other problems.

Videos, Practice questions in each topic

visuals were really good and easy to follow

Problems are useful. Trying the problems is a good way for me to check my understanding of the course.

Helped my understanding of a topic more, with easy explanations. I also liked the examples that were done step-by-step during the videos.

The fact that I could replay the videos until I fully get it, and that I can watch it whenever my mind is free of chaos helped me a lot

Factors like the human touch in the video, extra examples were explained which were different from that in the course package, and taking a quiz after each video, boosted my understanding in the concepts individually. And the additional problems given in the end of the pages gave me a push to self-confidence in the topics I learnt

The videos really helped especially because its hard to write convey the way to approach and set up a problem via notes.

Both the videos and the extra problems, they provided could explanation of the concepts while going through an example. Easy to follow and great to both learn and review concepts

sample questions, good to have a taste of what reasonable questions regarding subject material are like

As mentioned above, I am a visual learner and especially liked seeing how each value fit into the decision trees (ex through animations and red boxes). I also liked that I could learn at my own pace

Videos and corresponding quiz. Once there was a time I ask for a sick leave and I can learn the course content on my own to make up for the class



- the format: similar to lectures in class

Could explain the questions better.

The problem sets that allowed me to practice and apply what I just learned with immediate feedback about any wrongdoings

The videos walking through examples help me to work through similar problems when I get stuck.

The brief explanation of the entire concept learnt in class plus practice for the same!

I learn the best by working through problems. With the large amount of practice problems available, it was a great help to me.

Allowed for you to better learn the material since the course package was often very vague and unhelpful to look back on.

I can watch the videos over and over.

The practice questions were the most helpful because it gives us an idea of what we could be asked on an exam and gives us practice to do the problems

The concepts and steps are explained patiently in details, which makes them easy to understand.

The videos are easy to understand and zone in on one specific concept.

Going through additional problems for greater understanding.

The videos and practice problems. Gave me more chances to practice which helps a lot.

Explanation of the problem and extra set of problems to clarify the concept.

The videos are clear and concise and aid in grasping the concepts.

They cover course content and are concise and you can always pause.

I think the fact that everything in the videos were explained in a clear and slow manner helped a lot. I also liked how I could test my understanding by doing the questions afterwards.

The videos and practice problems really helped me understand the concepts better. Moreover, I could practice in my own time.

I was positively impacted by the video explanations and the 'end of module' quizzes as it helps reinforce and test my knowledge in a way that breaks down the class content.

Having both videos explaining the concepts as well as practice allowed me to access more practice or clarification when needed.

Clear explanations Easy to access Ability to pause, rewind, fast forward, etc

I found the videos to have the most impact on my learning because I appreciated being able to hear a concept more than once. I really enjoyed having the practice problems as well as they made me realize if I truly understood a topic.

videos were basically what was taught in lectures and you could rewind and rewatch sections whenever needed

close connections to contents in class

They helped me understand some of the most difficult concepts.

Videos were really good recaps, and I did all of the practice questions.



The practice problems, mainly because there are not that many resources available to us for extra practice.

---

I can pause the video and listen to some important points more than once.

---

The quizzes and problems were very helpful as I can see how the concepts were actually applied.

---

The videos helped me remember the past material discussed and the problems/quizzes let me practice

---

The in-depth explanations and broad range of topics covered in the resources helped the most with my learning.

---

Provide practice without consequence of making a mistake, solution is thoroughly explained

---

x

**Q3**  
**be improved?****- How could the supplementary resources**

How could the supplementary resources be improved?

All compiled together so I didn't have to click through modules to get them And maybe practice finals

After doing all of the problems, it was not uncommon for me to notice errors or typos in them, so if those could be fixed that would probably be good?

I hope there were more practice problems for students.

No recommendations.

More optional problems

I think being more precise about how to answer the practice questions, since I would technically be right but because it was not the same format as the answer I got it wrong.

More practice examples per lesson.

More practice quizzes

A few more examples for the probability portion of the course.

I think they are good enough.

N/A

I found that some of the answers for the problems were wrong. It would be great if you can have a look on that. Also, in one of the questions, I wrote the answer in whole numbers but the answers given in the form of  $AX+BY$ . I feel that multiple answers should be accepted in these videos.

Make it so I don't really need to watch the videos to do the practice questions.

Make the accompanying problems harder as they are quite easy and the difficulty needs to be raised to better prepare students for their midterms and finals.

It is good as it is

- more in depth videos - question sets should all be separate (e.g. for LP, there were several sequential sets that used the same LP, but we weren't provided the LP in the following set, you would have to flip back and forth between tabs)

The speakers sometimes lacked confidence, and inexperience showed. Other were phenomenal though.

With more practice quizzes, and mock exams or practice problems similar to what would be on the exam.

- Definitely add subtitles. - The video player isn't very smooth compared to other established video sites such as YouTube. - Add more problem sets. To prepare for the final exam, I have done all the provided problem sets and I am already re-doing past assignments. I don't think re-doing past assignments is very helpful so I hope you guys provide more problem sets. - \*\*\*Very minor problem\*\*\* For some reason, some problem sets give out the wrong information that doesn't correspond with the answer key. For example, in module Random Variables, under Videos & Problems, within additional problems (where it says "Finished all of these topics? Try these additional problems"), Question 4 gives out the wrong information that doesn't match the answer key: the problem says "\$0 (no bonus), \$1000 (small



bonus), \$2000 (medium bonus), and \$5000 (large bonus).", but it should've been "\$0 (no bonus), \$1600 (small bonus), \$3600 (medium bonus), and \$4900 (large bonus)." - I'm not sure if the person reading this has the authority to do this, but I think other Commerce courses need to also have these videos and problem sets.

If more courses can have these resources. :)

Some of the questions required you to watch a video in order to get the information to do the question. Those types of questions were useful when I was confused about a subject, but when I was just looking for additional practice it would have been helpful for there to be more questions that you didn't need to watch the videos to complete.

There could be more quantity (videos and problems) and a little more detailed on the explanations (videos).

I think that there could be harder questions for the supplementary resources

Be more related to what we've learned in class.

I think they should include harder and trickier questions to solve.

Provide transcripts or slide summary or text-based article options as a complement/alternative to the videos. It is better to have a source for referencing specific concepts which is quickly and easily searchable instead of having to manually skip through videos.

N/A

Providing more example problem videos on similar topics can be super helpful to future students. Sometimes the supplementary practice has technical mistakes like not counting decimals properly, or not showing a graph when it's supposed to, and it would be great if those exercises are corrected and have the same format as test questions.

more examples

Advertised better during class (maybe incentives)

The supplementary resources were well done. The only thing is that the formatting of some of the questions and inputs makes it hard to read. The questions on putting inputs in for the formulas tend to be weird and could be improved.

System maintenance should not occur during exam periods as this is when student need it the most.

encourage to use more throughout the year because I did not realize their potential until the midterm

Not sure

NA

It would be better to provide detailed answers for the supplementary problems. It could also be better to provide the word version of the content in the video.

More problems. Maybe problems that are like the ones that will be on the midterm/final/

They're already great!!

i dont think there is any scope for improvement, yet.

No improvement needed- found them very clear and helpful



Maybe provide additional videos that solve difficult problems, maybe relating to past homework problems that were particularly difficult.

more problems

There were some moments when it was a bit slow for no specific reason ex. when filling in long lists of probabilities one at a time instead of many at a time (a.k.a the animations took some time in some instances, which may be off putting when cramming last second :) )

It would be better if you can put the class slides on canvas

no comment

Provide both simple sample questions and harder questions, which may come up in the future exams.

More question sets added for even more practice with tougher topics. Maybe even add harder level problems that expand on what we learn.

Practice final

More practice timed exams before the paper for the second half

Some answers are marked incorrect when they are indeed correct, just some polish.

Make the course package much more specific and explanatory.

I think it would be better to provide more examples and provide more details of the class concept.

More practice questions

Sometimes the practice problems make us use information from the video, so we have to go back and check. This inconvenience can be eliminated by uploading the pictures or pdf documents of the problem given in the videos.

Overall, nothing needs to be improved. Maybe there could be more videos!!

N/A

Maybe having different answer keys if you want to redo something.

Have detailed explanation for some of the practice problems with the supplements.

...more examples maybe? Not sure.

It's good enough for me.

Maybe just having access to harder questions.

There could be written tips and key takeaways that we need to memorise for each concept.

Perhaps providing a transcript for the videos.

It would be nice if there was a summary of the problem in the practice problems since sometimes I just want to practice the concepts and don't necessarily want to watch the video explanation.

N/A

N/A



sometimes the videos didn't go as in depth or the example problems used in videos were much easier than the ones used in class or in homework sets

---

show more connections to the exams

---

Nothing, it is just incredibly amazing!

---

Some of the practice questions had small errors, equivalent answers were not taken in as correct. If those were fixed, then it would be great!

---

Having more supplementary resources would be great. For instance, posting practice final exams would be very helpful.

---

I think it good so far.

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I think it is fine as it is.

---

Quizzes/problems could be improved by double-checking errors. There are times where some answers that are correct but Canvas marks wrong. Also, there are portions where answers are shown unintentionally

---

I think the current supplementary resources are very effective and can not think of many improvements at this particular moment.

---

Give more practice problems outside of the homework

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x



**Q4 - Is there anything else that you wanted to share about your experiences with the supplementary resources?**

Is there anything else that you wanted to share about your experiences with the supplementary resources?

Super helpful for preparing for exam

They were overall helpful.

No.

They were helpful and I think they should be promoted more in class.

very very helpful

Maybe remind students more often about the videos and problems because I kind of forgot about them. Also maybe adding subtitles because sometimes it's not so easy to understand what the people are saying Also maybe more than two questions in a practice set would be a little useful

Overall very helpful.

All the TAs were excellent in the videos

I really enjoyed all the videos available. In a class with no textbook, these videos are invaluable.

It is useful and I hope more students can utilize this resource to help them learn more about this course.

N/A

No.

Nope.

No, they were very helpful and I hope you can make the notes from the class so they can accompany the supplementary resources to help studying for midterms and exams.

IT was amazing

- Albina was a great explainer of concepts

Keep them and always enhance them. The class was complete with these videos and actually made me envious while I was in other classes without them.

More practice problems that are more difficult (with answers to check).

- Let VJ Terzic and Arkie Liu do more videos. They are both great speakers and I can totally see them becoming future teachers/instructors.

Reallt helps me a lot!!

No.

I believe that the supplementary resources were really helpful. I value the time the professors invested in developing this resources for us and believe that a similar approach could help us to improve our learning and take more advantage of the opportunities.

N/A



There could be a summary of knowledge points at the end of every chapter.

I think having an extra section at the end of each big modules with a long question including every topic to solve would be useful.

Overall, a very good start. Well done.

They were amazing, please include it next year

I support these resources 100% and I'm really grateful to have them. I think it's time that we start diverting from an "industrialized" model of education where everyone is expected to learn at the same pace at the same place. Learning could've been much more efficient if each is to learn at her own pace. I think professors can film their lectures ahead of time, and use class time to solve extra example problems and answer questions (like CPSC110) . It would make greater use for both the time and effort of professors and students.

it's very helpful and timesaving

Helpful

The videos were extremely useful! Loved how I could speed through them with the faster speeds too.

Some of the videos could be slightly shorter

Very helpful

They were great and were essential to my learning in this course. They assisted in homework, exam prep and to further understanding.

really helpful

Not really. The supplementary resources are great. Thank you!

N/A

They're very helpful, I wish all courses had such a thing!

i would recommend these resources to each and every person who is in trouble with the tasks and lectures of comm290.

no they were great!

Was very useful would've had a difficult time studying without them since the notes are not completed and sometimes i dont copy down all the notes

Theyre great, maybe add more questions in additional questions or per each topic

I really appreciated the problems. It would be amazing if you could compile a list of "tricks" or common mistakes for example confusing given probabilities with their reciprocal (i.e  $P(A|B)$  is not =  $P(B|A)$ ). This would greatly benefit all students using the resources, and will result in a more even grade distribution as these tricks are where the smarter students differentiate themselves, making scaling harder.

nothing more

no

No..

The videos are a great refresher and really spark my memory about class learnings.



---

They were amazing and so so helpful!

---

They were challenging and very helpful

---

None

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I really like supplementary resources, it really helps me a lot.

---

They are good exam prep

---

When you put the supplementary resources along with all materials we need in class, it's a little hard to identify.

---

Really helpful and ensured that I could review course concepts.

---

No

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Helped a lot! Thank you!

---

N/A

---

All classes should have video components. I'm a strong proponent for supplementary learning through resources like Khan Academy and other online video resources.

---

It is helpful for exam preparation.

---

No.

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Comm 290 was the course that had the most resources which definitely helped improve my learning.

---

I also really value the explanation of the answers for the end of module quizzes.

---

There are a few formatting issues sometimes which makes the quiz mark me wrong even though I have a correct answer. For example  $A+L+P=14$  is equivalent to  $P+L+A=14$  but the quizzes are only keyed for one answer.

---

Most of my learning throughout the course was solidified through the videos !

---

Thank you for providing them as I truly feel it has helped me to understand the course material on a deeper level.

---

enhanced my learning thanks !!

---

na

---

No, not really

---

I could not have done well on my midterm without them. Thanks for taking the time to set them up!

---

No.

---

No.

---

It was very helpful.

---

Nothing, other than it is really helpful and I'm grateful for it!



I overall enjoy the resources offered to help with the success of the students in this course. I think that they cover course topics in a reasonable depth, and that the students who put them together (particularly the videos) are very enthusiastic and knowledgeable.

---

The videos were very helpful for me, thank you all!

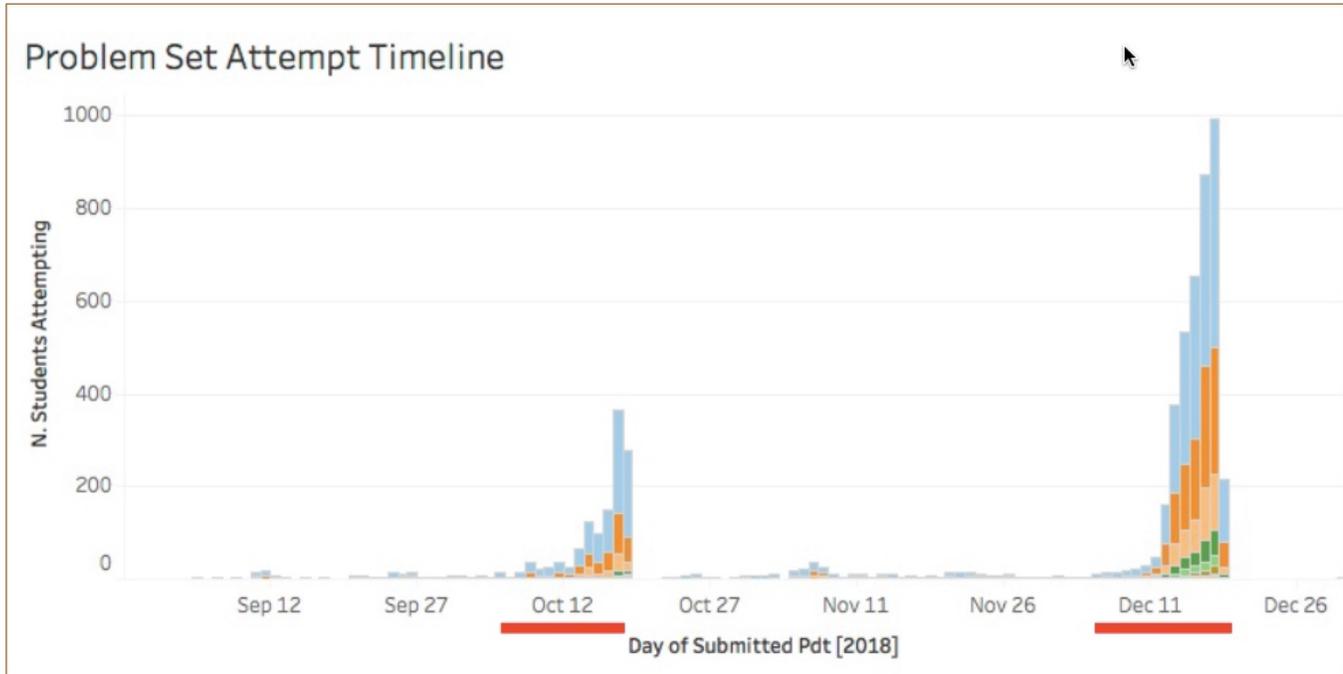
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x



# Appendix C: Student Usage of Supplementary Resources

## 1. Problem attempts (timeline)

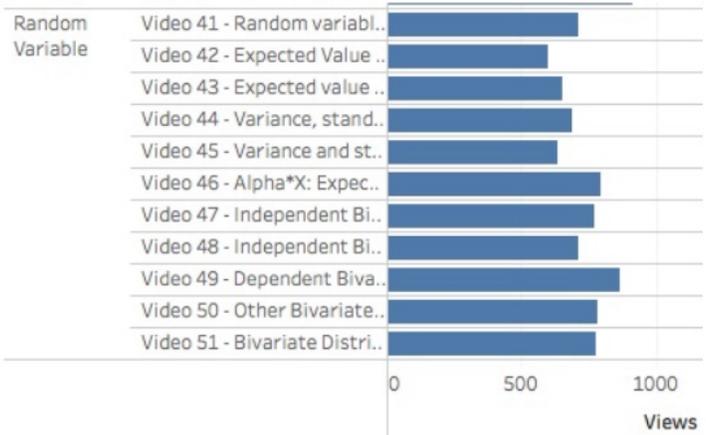
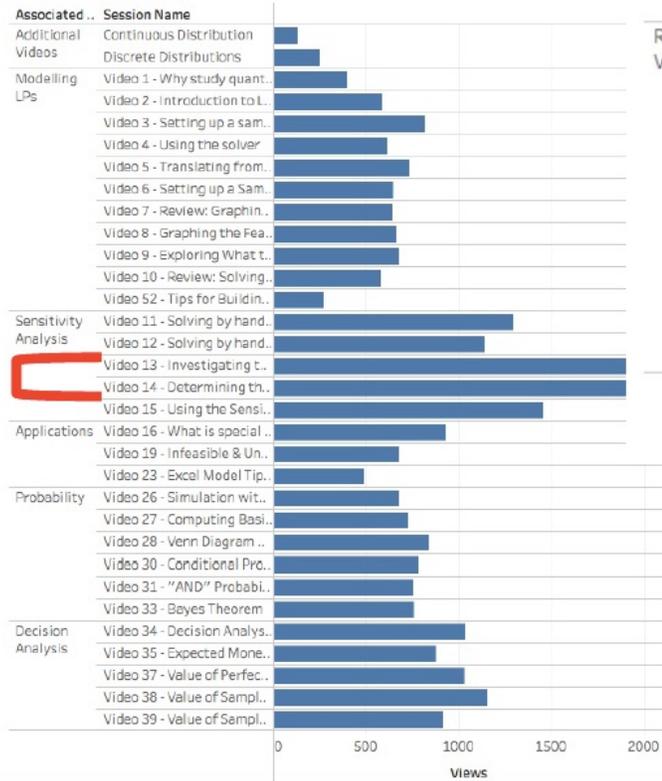




## 2. Video Views Summary

### Video Views and Viewers

Using summary data aggregated by Panopto. Date range: September 1 - December 31, 2018





### 3. Video (Minutes Watched/Session Length)

#### Video Details (Minutes Watched/Session Length)

Showing the average minutes viewed compared to session length per video. Percentage shows average % of video watched based on average minutes viewed. Using summary data from Panopto. Date range: September 1 - December 31, 2018

Measure Names

- Average Minutes Del...
- Session Length

