



# Large TLEF/FLI Project Completion Report

Report Completion Date: (YYYY/MM/DD): 2016/06/30

## 1. PROJECT OVERVIEW

### 1.1. General Information

Project Title:	Development of instructional videos and online resources for Civil & IGEN Engineering laboratory courses		
Principal Investigator:	Noboru Yonemitsu		
Project Initiation:	2013/09/20	Project Completion:	2016/01/31

### 1.2. Project Summary

Courses with laboratory components are one of the major strengths of UBC's engineering programs, and Civil Engineering (CE) courses are taken by students in the Civil, Mining, Geological, Environmental, and Integrated Engineering Programs. For those CE courses that have a laboratory component, we developed short (~7 min) instructional videos in order to give students consistent instruction, including safety and proper use of instrumentation. These videos also allowed students to conveniently review instructions as often as they felt necessary prior to laboratory sessions. This development significantly improved the student learning experiences by dedicating lab time to actual hands-on elements and interaction with teaching assistants (TAs). Video instruction also enhanced the consistency and quality of the course material by successfully eliminating instructional ambiguity, which was one of the main factors contributing to poor quality of lab assignments and student understanding of course materials. Through the FLI project, we were able to invest in video production facilities as well as develop in-house video production expertise. This will allow us to not only continuously improve the learning experience of current students, but also has tremendous potential for attracting prospective students in the future.

### 1.3. Team Members - (Please fill in the following table and include students, undergraduate or graduate, who participated in your project).

Name	Title/Affiliation	Responsibilities/Roles
Noboru Yonemitsu	Senior Instructor/Civil Engineering	Design, manage,
Mark Rigolo (- Dec 2013)	Laboratory Manager/Civil Engineering	CIVL315/316 instructional manual editing coordinator, initial video production manager
Jim Sibley	Director/Centre for Instructional Support	Video production/web contents development coordinator
Yayah Nazhat	Instructor I/Civil Engineering	CIVL210, 311 instruction material development coordinator/designer
Jason Myers (- Dec 2013)	Faculty Liaison/Centre for Teaching, Learning and Technology	Faculty liaison and project coordinator



Barry Magrill (- July 2015)	Faculty Liaison/Centre for Teaching, Learning and Technology	Faculty liaison and project coordinator, video production coordinator
Novak Rogic	Manager/Web Strategy, Centre for Teaching, Learning and Technology	
Andriana Briseno-Garzon	Flexible Learning Evaluation Coordinator/Centre for Teaching, Learning and Technology	Production of the student survey questions for CIVL315/316
Tom Scott (- Sept 2013)	Senior Producer/Information Technology	Initial video production and editing coordinator, manager
Saeed Dyanatkar	Creative Media Services/Digital Media Technologies, Information Technology	Initial video production and editing, script modification, digital animation
Emily-Claire McLaughlin	Creative Media Services/Digital Media Technologies, Information Technology	Initial video production and editing, script modification, digital animation
Sze Ting Tam	MEng Student/Civil Engineering	Script development for CIVL315/316 course materials, video shooting, voice over, creating instructional video by using CIS equipment, web contents development, Development of Instructional manual for how to develop the website contents by using CIS equipment
Kwinten Van Gassen	Undergraduate RA/IBC Science	Script development for video production, Manual editing
Ruslan Amarasinghe	PhD Student/Civil Engineering	Geotechnical course video (CIVL210/311) production lead, video script development, manual editing, video editing
Adam Silvester	MASc student/Civil Engineering	Geotechnical course video production, video shooting and editing
Priyesh Verma	MASc student/Civil Engineering	Geotechnical course video production, video shooting and editing
Gaziz Seidalinov	MASc student/Civil Engineering	Geotechnical course video production, video shooting and editing
Achala Soysa	MASc student/Civil Engineering	Geotechnical course video production, video shooting and editing



Andres Barrero	MASc student/Civil Engineering	Geotechnical course video production, video shooting and editing
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**1.4. Student Impact** - Please fill in the following table with **past**, **current** and **future** courses that have been or will be impacted by your project, including any courses not included in your original proposal. [Note: Adapt this section to the context of your project as necessary].

Course	Section	Enrolment	Term
CIVL210: Soil Mechanics I	201/202 & L2A~L2I	~ 280 (Average)	Current
CIVL228: Introduction to Structural Engineering	201 & T2A	~ 130 (Average)	Future
CIVL231: Solid Mechanics II	201 & T2A	~ 180 (Average)	Future
CIVL311: Soil Mechanics II	101 & L1A~L1G	~ 200 (Average)	Current
CIVL315: Fluid Mechanics II	101 & L1A~L1N	~ 170 (Average)	Current
CIVL316: Open Channel Hydraulics	201 & L2A~L2P	~ 220 (Average)	Current
CIVL407: Environmental Laboratory Analysis	101 & L1A~L1C	~ 30 (Average)	Future
CIVL430: Design of Concrete Structures	101 & L1A~L1D	~ 160 (Average)	Future
CIVL439: Design of Timber Structures	101	~ 60 (Average)	Future
IGEN230: Introduction to Engineering Design	001 & LOA	~ 55 (Average)	Future

## 2. PRODUCTS AND ACHIEVEMENTS

**2.1. Products and Achievements** - Please **update** project products and achievements as necessary. Indicate the current location of such products and provide an URL if applicable.

Product(s)/Achievement(s):	Location:
CIVL210 (Soil Mechanics I)	Note*
CIVL311 (Soil Mechanics II)	<a href="https://www.youtube.com/watch?v=GKLfyvCT7Lk">https://www.youtube.com/watch?v=GKLfyvCT7Lk</a> <a href="https://www.youtube.com/watch?v=InDQdSgEjLs">https://www.youtube.com/watch?v=InDQdSgEjLs</a> <a href="https://www.youtube.com/watch?v=esp02qrK1Rg">https://www.youtube.com/watch?v=esp02qrK1Rg</a> <a href="https://www.youtube.com/watch?v=ragp9DgfZWk">https://www.youtube.com/watch?v=ragp9DgfZWk</a> <a href="https://www.youtube.com/watch?v=mql12wcl8xA">https://www.youtube.com/watch?v=mql12wcl8xA</a> <a href="https://www.youtube.com/watch?v=-gdbHseNj-U">https://www.youtube.com/watch?v=-gdbHseNj-U</a> <a href="https://www.youtube.com/watch?v=wlnRX_FVra4">https://www.youtube.com/watch?v=wlnRX_FVra4</a>
CIVL315 (Fluid Mechanics II) Instructional website with video clips and virtual walk-through	<a href="http://labs.civil.ubc.ca/">http://labs.civil.ubc.ca/</a>



CIVL316 (Hydrology and Open Channel Flow) Instructional website with video clips and virtual walk-through	<a href="http://labs.civil.ubc.ca/">http://labs.civil.ubc.ca/</a>
Instructional Video Production Facility (incl. HD camera, tripod, lighting, light box, software, sound recorder)	Centre for Instructional Support, Faculty of Applied Science, Room 1214, CEME Building, 6250 Applied Science Lane, Vancouver, BC

\* CIVL210 videos are with Dr. Jonathan Fannin as he prefers playing these videos during his lectures.

The project was developed and modified throughout the entire project period of 31 months. In terms of project goals and deliverables, the project can be subdivided into four major phases:

First phase (July – November 2013: 5 months):

- Initial video production in UBC IT Studio
- Determined to be too expensive; budget would be insufficient to produce desired product quality
- First test video was produced and presented to CIVL315 course students, generally well-received

Second phase (Dec 2013 – Oct 2014: 11 months):

- In-house video production developed
- Newer, simpler, video production based on the student feedback
- CIS and student RA involvement in video development
- Complete set of CIVL315 instructional videos completed, website fully deployed to students

Third phase (Nov 2014 – April 2015: 6 months):

- Mr. Novak Rogic’s involvement started, lab walk-through component added
- Newer, more streamlined website developed
- Developed and completed CIVL316 instructional set, deployed to students
- Survey of all the lab courses in Hydraulics Lab conducted

Forth phase (May 2015 – Jan 2016: 9 months):

- Expanded and applied all the system (web, walk-through, video production) to Geotechnical courses (CIVL210 & 311)
- Dr. Yahya Neshat joined the project team and lead geotechnical course video material development (April 2015 – March 2016). This phase was partially funded through TLEF grant

At the end of the project period, we managed to produce instructional materials for four core courses in the Civil Engineering department. This resulted in a substantial increase in the quality of education for nearly 800 students. The students understood course materials better, and benefitted from a more efficient and effective learning experience in laboratory sessions. A detailed analysis of data related to the effectiveness of this program is provided below (see Project Evaluation (Section 3)).



**2.2. Item(s) not Met** - Please list intended project products and achievements that were not attained and the reason(s) for this.

Item(s) Not Met:	Reason:
CIVL228 (Introduction to Structural Engineering)	This course no longer has a laboratory component; instructional lab videos not required
CIVL231 (Solid Mechanics II)	Project time ran out for this course. The instructional materials will be developed with existing video production facilities in near future.
CIVL407 (Environmental Laboratory Analysis)	Civil engineering curriculum change (moved from fourth year technical elective to third year core course) resulted in major changes in the course content; these changes delayed the video instructional material development.
CIVL430 (Design of Concrete Structures)	Project time ran out for this course. The instructional materials will be developed with existing video production facilities in near future.
CIVL439 (Design of Timber Structures)	Project time ran out for this course. The instructional materials will be developed with existing video production facilities in near future.
IGEN230 (Introduction to Engineering Design)	Due to the instruction team member changes during the FLI project term, the same laboratory components are no longer required; as a result, no video instructions were produced for this course.

### 3. PROJECT EVALUATION

**3.1. Project Outcomes** - Please list the intended outcomes or benefits of the project for students, TAs and/or instructors.

Courses with laboratory components are the major strength of UBC engineering programs, and Civil Engineering (CE) courses listed in the original proposal are taken by students in the Civil, Mining, Geological, Environmental, and Integrated Engineering Programs. We proposed to improve the student learning experience through the development of short (~ 7 min) instructional videos in CE courses that have a laboratory component. The intent of these videos is to give students consistent instruction, including safety and proper use of instrumentation, as well as allowing the students to conveniently review such instructions as often as necessary prior to laboratory sessions. This enhances the student learning by dedicating lab time for actual hands-on elements and interaction with teaching assistants (TAs). Further to this consistency and flexibility, video instruction also eliminates instructional ambiguity by providing quality assurance. Instructional ambiguity is one of the main factors contributing to poor quality of lab reports and student understanding of course materials. To date, CE has attempted to address instructional ambiguity through the production of high-quality print documents. While this effort improved student learning outcomes, the continuity of instruction is still challenged as new TAs are being assigned each year. CE had previously explored the development of instructional videos, but was aware that the quality of instructional material is directly related to its effectiveness. In the production of instructional videos, it is apparent that video quality is directly linked to student learning experience, and experience suggested that a web-based instructional video approach to laboratory instruction would only succeed with a significant initial



investment. This investment in video instruction has notably improved the learning experience for current students in CE. Furthermore, as these videos have further enhanced the effectiveness of our laboratory-based curriculum, this program has the potential to attract prospective students to UBC in the future.

**3.2. Findings** – *Please describe the findings of your project evaluation effort: to what extent were intended project outcomes achieved or not achieved? You are encouraged to include both graphical representations of data as well as scenarios or quotes to represent key themes.*

We conducted two major student surveys in 2013 and 2015 academic years for students in CIVL315 and 316. Surveys in different years asked slightly different questions, as 2015 instructional website and videos were integrated with a so-called ‘walk-through’ component. Results are summarized as follows:

**Student survey results:**

2013W T1 & T2: Total number of students -> 389 students

Survey participation rate: 75.7% (294 students out of 389 participated)

Survey questions and survey resulting scores are:

Q1: Did you use the video instruction before your lab session? (Yes: 1, No: 2)

**Score -> 1.70**

Q2: By viewing the video, do you think it gave you or would give you a stronger understanding of the purpose of the lab? (Strongly agree:5, Agree:4, Neither agree nor disagree:3, Disagree:2, Strongly Disagree:1)

**Score -> 4.27**

Q3: By viewing the video, do you think it gave you or would give you a stronger understanding of the theoretical background of the lab? (Strongly agree:5, Agree:4, Neither agree nor disagree:3, Disagree:2, Strongly Disagree:1)

**Score -> 3.65**

Q4: By viewing the video, do you think it gave you or would give you a stronger understanding of how to perform the lab? (Strongly agree:5, Agree:4, Neither agree nor disagree:3, Disagree:2, Strongly Disagree:1)

**Score -> 4.55**

Q5: By viewing the video, do you think it gave you or would give you a stronger understanding of how to analyze the data? (Strongly agree:5, Agree:4, Neither agree nor disagree:3, Disagree:2, Strongly Disagree:1)

**Score -> 3.38**

Q6: How would you rate the video image quality? (Excellent:5, Good:4, Acceptable:3, Poor:2, Very poor:1)

**Score -> 4.54**

Q7: How would you rate the video sound quality? (Excellent:5, Good:4, Acceptable:3, Poor:2, Very poor:1)

**Score -> 4.33**

Q8: How would you rate the quality and effectiveness of the animations in the video? (Excellent:5, Quality is acceptable and helpful:4, Quality is acceptable but not helpful:3, Poor and not helpful:2, Very poor and disturbing:1)

**Score -> 4.08**

Q9: Was the length of the video appropriate for learning the lab? (Too short:1, Appropriate: 2, Too long: 3)

**Score -> 1.95**

Q10: Was the speed/pace of the video appropriate for learning the lab? (Too fast:1, Appropriate:2, Too slow:3)

**Score -> 1.97**



- Q11: Using the video alone would be sufficient to give me enough information to perform the lab. (Agree:1, Disagree:2) **Score -> 1.73**
- Q12: Using the written instructions alone would be sufficient to give me enough information to perform the lab. (Agree:1, Disagree:2) **Score -> 1.74**
- Q13: Using both (the video and written instructions) would be helpful to give me enough information to perform the lab. (Agree:1, Disagree:2) **Score -> 1.07**
- Q14: Using neither video nor written instructions, but just listening TAs' instruction/explanations would be sufficient to give me enough information to perform the lab. (Agree:1, Disagree:2) **Score -> 1.87**
- Q15: Having the additional videos for explaining the theoretical principles of the lab would be helpful. (Agree:1, Disagree:2) **Score -> 1.04**
- Q16: Any additional comments and/or suggestions?

Despite the fact that large percentage of students did not browse the instructional videos prior to their laboratory experiments (70.3% of students did not browse the videos prior to their lab), it is nonetheless interesting that the majority of students agreed that video instructions are helpful, increased their understanding in how to conduct the experiments, and boosted their confidence in operating the equipment. Several questions were dedicated to an assessment of the video formats, length, and sound quality; these results assured us that our production quality and methods were appropriate for the purpose of this project. Some of student comments are attached in appendices (attached), and majority of the students were satisfied with this newly developed tool for their laboratory experiments.

In third phase (Nov 2014 ~) of the project, with help of Mr. Novak Rogic of CTLT, we introduced Google 'walk-through' technology, and all the instructional videos were integrated in the website with the virtual lab tour of the Rusty Hut Laboratory Building. This new development helped students not only understand the relative locations of the lab experiments, but also provided them with opportunities to experience virtual operations of the equipment. In the final phase of the project, we applied what we learned in the development of the CIVL315 and 316 instructional material development to the CIVL210 and 311 geotechnical engineering courses, and at the same time we could modify existing CIVL315/316 materials to enhance usability of already existing materials. We decided to conduct a second large-scale survey to investigate the effectiveness of this newly developed tool, producing a slightly different set of survey questions.

2015W T1 & T2: Total number of students -> 387 students

Survey participation rate: 63.8% (247 students out of 387 participated)

Survey questions as following:

Q1: Which instructional videos did you access? (Check all that apply)

**Results -> Lab1 = 28.4%, Lab2 = 15.8%, Lab3 = 6.8%, Lab4 = 12.6%**

Q2: The civil engineering labs website was easy to find. (Strongly agree = 5 ~ strongly disagree = 1)

**Score -> 3.57**

Q3: The civil engineering labs website was easy to navigate. (strongly agree = 5 ~ strongly disagree = 1)

**Score -> 4.03**

Q4: The 'walk-through' into the Rusty Hut had all the information I needed to complete the labs.

(strongly agree = 5 ~ strongly disagree = 1)

**Score -> 3.39**





Q5: The interactivity of the ‘walk-through’ of the labs was engaging. (strongly agree = 5 ~ strongly disagree = 1) **Score -> 3.56**

Q6: Seeing the inside of the Rusty Hut and the lab equipment in the ‘walk-through’ made the videos easier to understand. (strongly agree = 5 ~ strongly disagree = 1) **Score -> 3.66**

Q7: The videos were easy to understand. (strongly agree = 5 ~ strongly disagree = 1) **Score -> 3.87**

Q8: The videos helped me operate the lab equipment. (strongly agree = 5 ~ strongly disagree = 1) **Score -> 3.66**

Q9: The videos gave me confidence to operate the lab equipment. (strongly agree = 5 ~ strongly disagree = 1) **Score -> 3.53**

Q10: Which instructional method did you prefer in your lab? (1. Paper only, 2. Paper & Web, 3. Video & web only) **Results -> 1 =10.0%, 2 = 54.2%, 3 = 8.9%**

Q11: I accessed the videos as refresher before coming to the lab. **Results -> Always = 1.6%, Several times = 6.8%, a few times = 40.5%, Never = 25.3%**

Q12: I accessed the instructional videos during the lab to help me run the experiment. **Results -> True = 13.2%, False = 61.1%**

Q13: I felt added confidence because I used the lab videos. **Results -> True = 47.9%, False = 26.8%**

Q14: Please share your impressions and thoughts about using the instructional lab videos.

Once again, we found from this survey that our instructional materials proved to be effective for students, allowing them to perform lab experiments more effectively and to generally understand course material more fully. Those students that took advantage of the video resources found the material easy to use. However, it also became apparent that large numbers of students still did not access the materials prior to their lab sessions. In order to maximize effectiveness of this new learning tool, it is critically that we develop mechanisms to encourage and/or compel students to browse those instructional videos prior to their lab sessions. Again, a portion of the Q14 results are attached as appendices to this report.

**TA survey results:**

For CIVL315 and 316, each year we hired seven teaching assistants for the courses. Between 2013 – 2015 academic year (both in January and May), TAs were asked to provide feedback on the project in debriefing meeting. TAs were specifically asked to assess the effectiveness of the newly developed video instructional material. The questions that were repeatedly asked over three years are as follows:

Q1: How you noticed any changes before and after the implementation of video (and/or laboratory ‘walk-through’) instructional materials in students’ performance and understanding?

Q2: What was the noticeable improvement on the newly developed web-based instructional system?

Q3: What was not working, and how could we improve for next year?

Q4: How could we improve in effectiveness of lab teaching from TA point of view?

Q5: Any suggestions?





TAs' individual responses for those questions are attached in appendices, but generally all agreed that web-based video instructional materials are not only effective for student learning, but also reducing the TAs' teaching loads during the laboratory sessions.

**3.3. Data Collection and Evaluation Methods** - *Please describe the data collection strategies used, how the data was analyzed, and perceived limitations. Note: Please attach copies of data collection tools (e.g., surveys and interview protocols), any additional data or other relevant items.*

During the project period, a total of 4 student surveys were conducted. In addition to those student surveys, six Teaching Assistant survey were conducted during the teaching debriefing meetings in January and May (2013-2015 academic years). The survey in 2013 winter sessions were conducted to evaluate the effectiveness of video instructions mainly in areas of material formats, style of videos, and ease of use of the materials, while the survey in 2015 was intended to find the overall effectiveness of the whole structures of additional instructional resources available for the same courses. This difference between surveys required some modifications in survey questions. Results were used to improve in quality and format of instructional materials. TA survey was conducted to gage the effectiveness of additional instructional materials from teaching team perspective. The survey questions were therefore focused on feedbacks and suggestions rather than scoring format. Please refer section 3.2 and appendices B~D for more details.

**3.4. Dissemination** – *Please provide a list of **past** and **future** scholarly activities (e.g., publications, presentations, invited talks, etc.) in which you or anyone from your team have or intend to disseminate the outcomes of this project.*

Eventually the results of this work will be disseminated in various forms and places, however the project is not completed at the moment and consequently the outcome is still needing more thorough analysis.

**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?*

In general, this project provided students with an invaluable source of information about laboratory exercises that they could access prior to the lab period. Given the highly technical and often equipment-dependent nature of CE laboratory work, these videos allow students to arrive in the laboratory more fully prepared for the work they need to conduct in a relatively short period of time. As a result, these resources reduce the amount of time that TAs and instructors need to dedicate to describing the operation of equipment during laboratory sessions, freeing up time to assist students directly in the use of equipment and to provide more personalized assistance to individual students. Also, this new video instruction program will drastically increase the consistency of instruction among instructors and among years, resulting in an equitable delivery of course material. This improvement was reflected in positive teaching evaluations, both at student and TA levels. These program improvement should be permanent, as long as more effective mechanisms students to properly guide students to the web-based resources are developed. To achieve this goal, we will continue to develop the structure of this program to ensure that web-based instructional video tools are fully utilized by students to enhance their practical laboratory experiences.



**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?*

After three years of project development, students and TA feedback survey, video production facility investment and RA training, we are confident that any instructional video clips for CE and possibly IGEN programs can be produced without much of external help (except for funding support for RAs). The challenges are not in production of the video resources, but more in the areas of how to guide students to use existing and future resources, thus we need to continuously investigate and develop some mechanisms such as pop quizzes students must take prior to their laboratory sessions. Nonetheless the effectiveness of the laboratory-based CE courses tremendously benefitted from developing video and web based instructional materials. We will continue producing videos for many other courses and continuously improve both quality of video instructional materials and mechanisms to lead students for proper usage of such materials.



## Appendix B: Student Feedback for CIVL315/316 in 2013 Academic Year

- The combination of videos and written instructions would be very helpful. When we had just the written instructions we wasted a lot of time trying to figure out where certain valves were or exactly what the piece of equipment the instructions were referring to. The video helps us avoid that situation.
- In the first overview shot showing all the parts (0:08-0:26) It's hard to get an idea where these parts are in relation the hole system. The zoomed in box doesn't really show you where it's located, maybe if you had an arrow point to its location on the overview shot it would help. It also wouldn't hurt to slow this section down a little as this is critical information which helps you comprehend the rest of the video. Some of the shots are a little to close up, and I think it would help to zoom out a little. The shots were they are closing the valves it hard to see which one is which, but if you could see say the pump right below it or the horizontal pipe, it would help solidify the location of that valve in the mind of the viewer for when they go to do the experiment. There are other shots that are also a little to close up for my liking. I might have missed it but I don't think this video went over the fact that we have to measure all the sections of pipe or what that is for, though it sounds like you want to do another video more on the theoretical ideas, which I think would be useful as well. Overall I think the video is a great learning tool, just needs a little improvement.
- Overall the video was great. More correlation between the video and notes would allow for clearer instruction.
- Do this for all of our courses.
- Video was very helpful.
- We assumed that moving forward in the experiment while watching the video would help, but it turned out that it would not we missed part of the lab because it was not mentioned in the video.
- Preparing videos for labs are very helpful since it is hard to understand the instruction sheet without knowing what the equipment look like and how you need to work with them.
- The narrator talks too slow in the video!
- Change the background music
- Good video overall, perhaps pane out then zoom in before speaking about specific parts sine sometimes it was difficult to tell what we were looking at.
- I wish it could give more background and quickly talk about data analysis. Maybe show more details.
- I found the video very helpful in visualizing where everything was and where to obtain our data. - Overall, it greatly helped in the performance of the lab. I didn't find it helpful in the sense that we were not told to collect all the data needed in the video. This is why I think the written part manual or more help from the TA's is still necessary.
- Watching the video before doing this lab, really helped myself to visualize the lab procedure. It aided in my understanding of the theory behind it by creating a mental model that I could not visualize alone without the lab manual. While the manual is a valuable resource and should still be used, the video should supplement this reading material. This video was hugely beneficial to my understanding of the lab before attending the lab and was time saving in the sense that the group already understood the procedure.
- These videos are really helpful and would be great to have them implemented.
- Generally are good, but still need some improvements.



- The video was useful for understanding how to perform the lab, and gave more detail than the written instructions (which are very general). I think having both would allow students to be best prepared for the labs, and perform them accurately and efficiently. I would suggest, however, making the videos available only as in-lab sessions approached (ie. release on connect one week before). We viewed this video a couple weeks before performing the lab, and I had already forgotten about it a short time after. Having video instructions for the labs would have been really helpful, especially for those labs performed before the material was taught in lecture.

- Use of "pauses" during the videos with added graphics annotations, combined with further oral explanations of important points and details, could be much more helpful. Videos can go beyond the procedure to cover theories, applications, etc. because always two or more labs are performed while students have not been taught the relevant materials.

i think its a good idea but it needs to be less cut-and-paste instruction wise. maybe have some scenes with brief written explanation notes throughout instead of just pictures and footage of the apparatus

- Would be nice to have both. Visual learners will like the video idea more, but the written instructions are a must so you can reference them in the lab..

The videos are such a good idea! I wish we had those before heading to each lab session. Keep going at it!

- I found the videos more useful than the written procedures as I was able to visually see how the lab is performed. Relying only on written word is a little bit ambiguous and can cause confusion at times. Also, there were several mistakes in the written procedures that needed to be clarified by the TA's.

- During my groups first lab this year we had a number of problems because of typos in the written lab material as well as the TA's being inexperienced in the lab material and unable to adequately answer our questions. I made a comment to my group about how lab videos would go a long way to clearing up these types of issues. My thought was that a simple video explaining the lab would be enough to answer most questions. Additionally if the TA's were to be the one's performing the labs in the videos they would be much more familiar with the content of the labs. The videos that have been made now are still quite good and I was quite excited when the change was announced. My group did have the chance to use the video before the lab and therefore got to experience the full benefit but since we had also talked about the advantages of something similar because of my early comment we discussed many ways in which a video would have improved clarity on the other labs as well. Thanks!!

- For lab 2 the video tells the students to take the readings at "monometers 1 AND E", so our group only took those readings, only to realize later that readings at other monometers were necessarily to analyze the data and answer the follow up lab questions. In addition, the TA provided a procedure that he printed off and it also said to only take reading at "monometers 1 AND E";. The video, and written procedure, should state to take all readings from monometer 1 to E, or take "monometer readings BETWEEN 1 and E";. Other than that the video was excellent and was very useful for performing the lab. The video just needs to provide the correct information for collecting data.

- Ensure that the information in the video is correct! In one occasion it mentions to take manometer readings at 1 and E, while it should be 1 through E - Please overhaul the lab manual documents (for all labs, not just lab 2). There is so much missing and incorrect information. i.e for lab one, the similarity equation given for flow is incorrect (doesn't account for rpm) and there are multiple instances where it tells you to "measure voltage and current" when you need to really measure those things PLUS the flow rate and pressure. It should just say take all readings or something. Especially watch the wording, it is generally misleading.



- The idea of having videos explaining the theory of the principles would be great! I think it could put more perspective into the labs being conducted. It would be good to not use the generic music that comes with most video editing programs, for some reason the music to me sounded like multiple other youtube videos I've seen online and it just was offputting to me.
- The video is a great addition to the written instructions that go into more detail, although these instructions have proved to be sometimes misleading and not containing all necessary steps to collect the sufficient data. So it could be an idea to revise these instructions, especially for lab 1 I think it was a bit unclear whether or not the procedure were to be repeated for different speeds, plus the numbering was wrong.
- This video would have been very handy when going into the lab. The TA's in the lab gave us conflicting instructions for the lab therefore having the video explain the apparatus would be very helpful.
- Including a section on common mistakes would be very helpful. For example, in lab 2, not correcting for the common datum of the top pipe and manometer board can really mess up the numbers and it may not be immediately apparent why.
- The main confusion in understanding how to perform the lab before hand is the apparatus set up. The schematics in the written lab instructions is only a model and does not show how it is set up in person. The video helps a lot, but a short section to give an overview of where each important part of the apparatus would be very helpful.
- It should be done for all labs in civil engineering. It is a great idea.
- Would have been nice to have videos for Lab 2-4 before conducting the lab. Video for lab 2 was excellent and made it easier to understand the lab before attending the session.
- I found the video to be very helpful and effective. It is very hard to make certain connections when reading the written instructions without seeing the actual apparatus in front of you. It also helped to clear up some confusion and it should be noted the written lab instructions have a few typo's!
- These videos have so much potential! Watching the video and visually seeing the content of the lab makes it much to understand what each lab entails. while the editing and narration could be improved, the content was impressive and I would very much like to see more of these videos in the future.
- We had just submitted our lab when the video came out, but even then it gave me a better understanding of what had actually been going on in the lab (and even demonstrated some places where we may have erred in our conducting the lab and/or calculations where it seemed as though there was not enough detail in the lab manual, unfortunately. Cliche as it is, a picture is really worth a thousand words.
- It was very helpful to know which measurements are needed for calculations
- The videos were good in the sense that they showed the apparatus. For a student entering a fluid mechanics lab for the first time, I can't have a piece of paper saying "surge tank" or "pump" and know what it looks like in real life. By watching the videos which showed what each piece of the apparatus was, it would have been much easier to recognize the components of the apparatus.
- Video gives a good overview of lab. Tough to know exactly what to do once in the lab thou unless pressing pause or play constantly on a laptop with this video or without written instructions. No real background information given. Nice Visuals.
- Creating the videos is a great a idea. It will be very helpful for future students (and TA's). I feel that a lot of the confusion my group experienced would have been addressed with these videos.
- Excellent production quality, and helpful. Only complaint is that this wasn't shown in time to help me prepare for my lab.



- I think having both the written procedure as well as the video is optimal. I would prefer to use the video for the procedure and to orient myself to the lab, but use the written instructions for dealing with the data afterwards. Definitely like the idea of the videos.
- Better music, or no music at all. Cheesy elevator music does nothing to aid in understanding. - The musical taste of students varies widely; leave music out unless you have very compelling evidence to suggest that cheesy elevator music aids in understanding and memory retention.
- The theory of the lab may be better explained if there are schematic diagrams provided in the video since much of what is learned in class is presented in idealized schematics.
- I thought the video is better than the readings because it gave more incentive to actually learn about the lab before you completed it instead of just learning it as you do the lab.
- There should be a short introduction to the labs done by the TA before every session. In CIVL 311: Soil Mechanics II, the TA gives a short 10 min power-point presentation on performing the lab and discusses relevant equations / theory that will be needed for the report. In addition, there is almost always a short demo that is performed. The CIVL 315 TAs have not been too helpful during lab time, especially at the start of the term as it almost seemed they were unfamiliar with them. A lot of groups, including mine, had to keep coming back to collect missing data later on. These videos will be helpful and should be used in conjunction with a short demo.
- The videos are definitely a good idea. I often find it difficult to picture what to do in the lab just from reading the written instructions. The videos give me a sense of what equipment I will be working on and how to operate it. My group was lucky, and the TA (Amir) explained each step of this lab clearly to us. However, I have heard and noticed, that some other TA's do not explain the concepts well and do not clearly teach how to operate the machinery, and just say, "Oh, feel free to ask me if you have any questions." The videos clarify a lot of vague areas in the written instructions.
- Thought it was really well done. These videos should be made for all the labs. It would be a great resource.
- I think a combination of both video and written instructions is the the best. Video instruction provides a quick overlook so that it's easier for students to be familiar with the new lab. And written one shows more details and explanations.
- Seeing the steps before hand would be really great. TAs especially at the beginning of the year weren't very helpful. They did get a lot better as the weeks progressed.
- 1. Lab Manual should be rewritten. Steps are either wrong or missing. 2. Concept of having Lab 1 Project is great. However, the scope of it should be clearer. Otherwise, it consume too much time just doing unnecessary research.
- It helps to have the visual aspect, it is hard to read the instructions that say open one valve then another valve and remember what to do, it is easier to see it.
- I really thought that the video was helpful, but I do think that the speed of video is a bit slow TA's explanation during the lab is very important. However, not all the TAs can explain well. The selection of TA should be stricter.
- It can be played a little faster, since the video can be replayed whenever there is lack of understanding.
- Great video, very informative.
- I thought the video quality and audio was excellent. Further details regarding theory and how to analyze results would be really helpful.
- The Video was released following my Lab 2 date, therefore, only watched it afterwards.





- I wish these videos would have been available before I performed my labs! they will be super helpful for future students. I believe that the quality of lab reports will increase as a result of these videos being used.
- Very helpful videos would be glad if we had it before the actual lab
- First of all, where was this video when my group was doing the lab? I understood how the lab should be carried out better after watching the video. My suggestions for the video would be: 1. Scrap the music. It was distracting and I am used to watching instructional videos on Youtube without background music and I paid more attention that way. 2. A video for the theoretical principles of the lab would be helpful but can be considered optional as having one that shows how the lab is performed properly is the priority. I have noticed that we had to seek out help from the TA on how to perform certain tasks required by the lab and this dependency on the TAs is detracting from the learning experience. 3. Have wide shots for certain tasks since in the video, we are shown different valves being turned but not where the valves are in relation to the entire set-up. Having both the written lab manual and the instructional video at hand would be a great help for both the students and the TAs for the labs to run more smoothly.
- The videos in combination with the written instructions would be extremely helpful in completing the labs as you would be a lot more familiar with the equipment and how to use it. Premade empty data sheets could also help as everyone would be aware of what values are being obtained.
- This would be very helpful for all labs in Civil Engineering, not just in CIVL 315. Sometimes having a visual image of the apparatus and procedure prior to entering the lab can save time and help with understanding greatly.
- The video instructs you to take readings only from manometers 1 and E: this would not give you enough data to complete the lab. Otherwise, the video is far superior to the written instructions for performing the lab. However, the written instructions are much better for helping complete the lab write up then the video. The written instructions include lab deliverables and essential equations that are not in the video.
- This is a great idea. Thank you.
- they video should be made before the labs are done and that would definitely save a lot of time and clear confusion for us thanks!!
- This is a great idea! I found it hard to visualize the lab procedure by simply reading the lab manual.
- Everything that I wanted to say was covered in the above questions.
- In my opinion, it is difficult to describe physical processes like those that are required during these labs in text and often during the labs the TAs are unable to explain what's going on without either further complicating the lab or providing outright the answer. This video is a good response to solving that issue.
- Students only need the lab manual to complete labs. Videos are a waste of time an money.
- The vedio instruction idea should be used for all labs.
- The lab section of CIVIL 315 was not as clear as it should be. The written instructions were ambiguous and inconclusive, and the TAs' knowledge of the lab and the equipment were not sufficient. This video could be extremely helpful to explain to students what needs to be done and how, and it would save students the time trying to figure the lab out or interpret the written instructions. I would strongly recommand that these types of videos be used as well as or instead of written lab instructions to help students' better understanding of the labs. However, should the lab equipment or lab procedure change over the years, these videos need to be updated yearly and up to date.
- I really wish this video was available before I performed the lab.





- It might be helpful to have key images from the videos included in the written instructions so students can easily what they are reading before and during the lab with what they saw in the instructional video.
- I did the lab before the video was out, but viewing the video after I think that it would help tremendously when doing the lab.
- By the time the video was made, we have already done lab2.
- I think the video is a good way of explaining the set-up of the lab equipment for the experiment. It's really hard to convey the lab set-up with written materials only. The video should be used for theory, lab equipment, and procedure and a supplemental written document should be provided for the procedure.
- The video was clear and professionally done. I think that it would absolutely make performing the experiment during the lab period easier. In my opinion, there is still a use for written instructions and TA explanations, particularly for labs that have moving parts and/or may be dangerous. If possible, additional videos for theoretical principles and possibly the more difficult parts of the data analysis would be useful as well.
- We do not have the video before the labs
- The video does help with understanding what we need to do during the lab, but the primary difficulty is not performing the experiments, it's recording the correct data and understanding how it applies to the objectives. I understand that one of the purposes of the lab is to simulate some of the vagueties of engineering requests, but given that these are the first fluids labs students will do, more direction on how to meet the objectives would be reasonable. In addition to the videos a rewriting of the written instructions would be beneficial; there were several typos and errors throughout the lab manuals that lead to minor confusions during the labs.
- I wasn't able to look at the video before my lab as I had already completed the lab by the time the video was released. However, I think that the video was very good and I would have liked to have used it before my lab. I found that the written procedures for these labs had many mistakes, so it would have been nice to have these to give us a better idea of what the purpose was (instead of always asking the TAs).
- There were times when the TA themselves were not knowledgeable about lab during the lab sessions. This was very unfortunate. Also, I really hoped that the videos were created prior to this year's course because I find that the video is extremely helpful, especially when the course material taught in class is not taught at the same pace as the sequence of the labs.
- Some portions of the video zoom in on the task too close. There were times when the TA themselves were not knowledgeable about lab during the lab sessions. This was very unfortunate. Also, I really hoped that the videos were created prior to this year's course because I find that the video is extremely helpful, especially when the course material taught in class is not taught at the same pace as the sequence of the labs. closely&quot;. It would be easier to observe the action from a wider view. An example of this would be in the Lab 2 video, at around 2:50, there is no indicate of which pressure gauge this is or where it is located.
- The Videos are very helpful and would help to speed up the time spent in lab. I think they are a great idea.
- I think the videos are an excellent idea and really wish they had been available for us. I found the lab manual vague in providing an overview of the labs purpose and location of different parts of the apparatus. The videos will definitely provide a clear overview for students and help to understand the intended purpose of the data being collected and analyzed.
- I think the videos are very helpful. I think that these videos will allow us to get started on the labs immediately without relying on the T.As. With the videos and the paper handouts, I think that we should



be able to complete the lab independently. The video seemed fast, but that is fine because we can stop and replay any sections that we didn't understand. One part of the lab 2 that I found confusing was having to adjust the head readings for elevation differences. If that could be explained more in this lab I think that would be very helpful. I think these videos will be great for future classes

- It might be clearer by pointing out all the lab apparatus in a picture of the whole experiment assembly instead of showing individual pictures. Another thing is that the talking is a little bit too slow. Otherwise, the video is very good and helpful.
- good one
- I saw the video after I had done that lab, and had really wished that I had seen it before. It made what had to be done during the lab much clearer and easier to understand. The written instructions alone are really horrible and I hated using them. Suggestions would be to make the video a bit more detailed.
- It would be helpful to include something about obtaining measurements for the lengths and heights of the pipes in the system. That was a major issue for my group when we completed the lab. Including a schematic with blanks would also be helpful so you know what data is important to gather. The emphasis on the different pressure units for positive and negative readings was helpful since that was initially confusing for my group. More instructions on how to actually analyze the data would be helpful as well. With this lab you get a lot of data and it's intimidating to try and figure out what to do with it. A data sheet similar to what is available for lab 1 would also be helpful so you don't miss important values. Many groups had to go back to the lab later on to get measurements they forgot to take. These videos will definitely be an asset for the labs and would be helpful for reviewing the apparatus setup when completing the calculations and write up.



## Appendix C: Student Feedback for CIVL315/316 in 2015 Academic Year

- The lab videos are useful aids in preparing for the lab experiments
- I only accessed the lab videos once, and found that it was helpful for putting the lab setup on paper to the lab setup in the lab, however the guidance throughout the video lacked.
- didn't get to use the videos for most of the labs because it wasn't out yet
- Never used it.
- -very helpful -good clear explanation of what needs to be done
- I think these are a really good resource and very helpful.
- I honestly wasn't even aware we have videos to help us understand the labs until Dr. Nobu sent us the email requesting to fill this form, and all the labs were done. Or maybe a link was sent in the beginning of the semester and it was my negligence and carelessness. Otherwise, if seen beforehand, I feel like the videos would have really helped me better understand the labs. They are very clear and easy to understand. The music in the background also helps keep it not-so-plain. The written procedure should still be provided as sometimes it is easier to refer to.
- Never used instructional lab videos.
- I believe Lab 1 and 3's sections were not uploaded by the time I had to do those labs, so I did not access much of the lab content. I personally suggest that if the online website was to replace pre-readings, I would like to see the experiment/report objectives on the website as well to get an overall understanding of what I need to be looking for, and would greatly improve and also motivate me to look on the website. The TA's also guide us through the lab so there wasn't much incentive to watch the videos if there is a live demonstration from the TA. For some experiments, some of the TAs did not allow us to carry out the experiment on our own, so we did not have to come to the lab with knowledge of how to operate the experiment. However all the TA's were exceptionally clear on how to conduct the experiments. I personally did not watch most of the instructional videos simply because the labs I began with did not have any content uploaded at that time, thus I did not get into the habit of watching them before the lab. The one I did watch however (Lab 2), was very informative of how to operate the lab equipment, but I feel I wasn't sure what the aim of the experiment was, so I had to look back on the experiment memo.
- The first 2 labs we completed did not have instructional videos at the time. While helpful in providing background information, lab instructional videos are not a substitute for having knowledgeable, fluent and helpful TA's.
- Didn't use the videos. But that being said I would have if I had thought of it before hand. Thus Q1 and Q13 are wrong as I had to choose an answer.
- They were helpful but they could be more descriptive in the experimental method as that was always vague even with the videos.
- The videos and lab procedure pages were very helpful. Especially because it had information that was needed in order to do the experiments that weren't on the paper documents.
- Really happy the option was there to see the equipment in use. I used the vids to help prep for the lab the day of. I would say there are certain things missing from each lab vid but overall the experience is good. For example, it would be great to have a video on how to measure the drift radius of the particles. Awesome job - lots of hard work went into the vids and I think it was worth it. Keep it up. Cheers, JW
- good



- I felt that the instructional lab videos were very helpful to explain the procedure on the pre lab sheets
- I generally didn't have time to access the video, though I'm sure it would've been very helpful.
- nicely done
- Verbal communication of lab procedures was better than just watching the lab videos. The videos gave me a guidance of what to expect but a clear procedure of the lab in the pre-lab materials would have been better.
- Videos were really helpful to understand the lab manuals.
- Very good. I like it when the video explains why you are taking a measurement as opposed to simply asking you to measure something without knowing why. I feel more prepared coming to the lab with the walk through in addition to the memo.
- I think this is a wonderful option, because with the limited number of TA's it is an added reference source that helps makes sense of the labs, which can be quite confusing if you've never performed a similar test before.
- Lab videos are really helpful for me to understand the lab before coming to it, and make me confident during the lab.
- They were pretty good. It was nice to have a visual introduction before doing the lab.
- It's a helpful visual that can aid in the interpretation of how the labs should be performed. The combination of the lab videos and the paper lab memos are helpful when performing each experiment.
- Never really used them apart from a look over for the first lab I did (experiment 2). Seem like a good idea overall though.
- I never used the instructional lab videos.
- i had no clue there were instructional lab videos, my mind is blown
- Think about posting the videos on blackboard so that we have a complete source and do not have to jump between websites. Check where each video is posted, as some videos were posted to the incorrect labs. Other than that, the lab videos were an effective supplement.
- They really helped to get a good grasp on what we were supposed to do. In previous year the paper hand outs were always outdated and essentially useless so having an up to date instruction video really helped.
- They were quite helpful for the reasons discussed above. However, most of them weren't ready until after we had completed the lab! Definitely will be good resource for future years, looks like the CIVL department is heading in the right direction. Way to go Nobo!
- As far as the walk through in the Rusty hut, I think that the default locations should be fixed when you click on Lab 2 and 4 as you get taken to the back side of the experiment (this isn't dire as you at least see the location of the experiment, but if it is easy to change, I think at least Lab 2's default location should be changed. I found the videos very detailed and helpful.
- The videos are excellent but there are a few discrepancies between the labs and the videos (just some gaps where a few more videos would be good. Check the lab manuals vs the videos). This is muuuuuuuuuuuuuuuuuuuuuuch better than the more traditional methods. Also, getting more feedback earlier on the lab reports would save us a lot of grief. Getting back poor marks months after we've submitted the lab does not allow us to correct our mistakes on the next ones
- The TAs (the male TA in particular - don't know his name) made it clear that we were not to proceed until receiving dir A little late to use. ect instructions from them. Once we tried to begin a lab on our own and were chastized by the male TA. Because of this, videos, or any instructions for that matter, are irrelevant



since the TAs walked us through the lab procedure. As a general comment, the slow grading times for our labs was unacceptable. We submitted 3 of 4 labs before receiving a single report grade. And we still have not received any reports back with feedback. We must have this feedback as quickly as possible so that we can correct major errors in our next lab submission. I fear that we made the same mistake multiple times. Where is the learning in that?

- The videos were actually quite helpful in running the experiment, but one of the labs (I think lab 3) did not have a video at the time. I think a little more details in the videos may help.
- They are especially useful if I don't have time to read the written lab beforehand, so they are a nice way to understand what's going on and to go into the lab knowing what to expect. They helped with my confidence in the lab, as labs always seem a bit easier once you go through it once and know what to do, so the videos provided that experience.
- The lab videos provided an adequate description of what to do in the lab, but i believe the videos would only really help someone if they learn a lot better from a visual aid. Otherwise, it would be better if the lab was more straight forward in saying what measurements were required and what numbers were needed.
- A little late to use.
- I feel given not all the lab videos were not completed by the start of the course I didn't tend to use them. However if they were completed by the beginning of the course I think they would be useful.
- They gave a visual idea of what to expect while operating the lab equipment
- The videos are a useful technique to become familiarized with the experiment as well as the equipment before entering the lab, reducing the number of questions asked during the lab time and ultimately smoothing out the process.
- They gave a visual idea of what to expect while operating the lab equipment.
- The videos are a useful technique to become familiarized with the experiment as well as the equipment before entering the lab, reducing the number of questions asked during the lab time and ultimately smoothing out the process.
- Some of them need work, more thorough explanations
- The videos were very helpful to be able to understand how to use lab equipment, so that when the TA explained what to do, it was easier to follow the instructions. As the videos were not done for all the labs before I performed them, I did not use the videos for every experiment but I think that having watched them before would be helpful. If the website could be easier to find from a simple google search, that would be helpful (I always have to use the link from connect or from an email).
- The instructional lab videos are extremely useful. Given that most students carry a heavy course load, reading the lab manuals is not always possible, as it takes a lot of time. I believe that watching the videos is more useful, as it gives us a sense of how to actually operate the apparatus models, how to measure the required variables, and the explanation of related concepts.
- Helpful :)
- good videos
- I am not aware there are instructional lab videos available for us to use.
- I feel that some of the videos did not include all the steps of the experiments. It would be helpful if there was a voiceover guiding you through each of the procedures, as the lab TA was often not very thorough with explanations.
- Good idea
- Was not sure what to record and what I was supposed to learn from it at times.



- Videos were released in the later half of the course therefore I wasn't aware they existed until my last lab. By that time I already had the confidence to do the experiments without video guides. For the next classes consider releasing the videos at the start of the course.
- The lab videos are very helpful in understanding the general steps in the experiment, especially when you did not have the time to read the experiment memo in detail. However, the four lab videos could have been posted earlier. Overall, it is very helpful. The walk-through was not available when the term first started, perhaps it was made available later on in the term, but I completely forgot about it. But I can imagine it being helpful to future students in this class. Overall, very helpful and impressed by the well use of technology in this traditional mechanics class.
- Completing the labs isn't that hard. For me, the website would have taken more time than it was worth.
- Even though the Lab videos were mentioned in class and were suggested for us to view in preparation to the class, the paper instructions for the lab seemed sufficient to prepare myself for the lab. I didn't know where and was not very motivated to find the videos to help me out. The lab manuals seemed more accessible. I would guess the videos would be very helpful, but perhaps a direct link to them would make them more inviting to look at.
- I found that the lab manuals given on connect gave enough information to perform the labs along with the guidance of the TA's.
- Took a long time to have all labs uploaded to the site, so I feel this may be a better learning tool for next year.
- Easier access to the videos would be very helpful in order to complete the labs. the best way to make this easier would be to have a direct link to each individual lab from connect meaning that each lab has its own folder containing both the lab manual and the direct link as to facilitate access to both materials. the videos were not accessed during the lab due to time constraints and the fear of accidents happening resulting in a ruined laptop. I believe a mixture of both paper and video methods works the best because people learn in different ways and this would make it easier for more people to understand the labs before arriving. I hope I was of some assistance.
- The voice in the video was a bit boring sounding.
- Have never used them, but from what I hear they are very helpful in understanding how the lab will work and what is the purpose of it.
- I liked the videos. They showed us exactly what we needed to do.
- Didn't watch them. Please mark the lab reports quicker.
- It is helpful seeing the lab be completed once before in order to clear up some confusion, as I felt that during certain labs what the TA was trying to explain differed from what was written in the lab manual.
- They were somewhat informative and helped me on what to do during the labs
- The instructional lab videos are very helpful if you need to refresh your memory after you have already completed the lab and are at the stage of writing the lab report. They're also helpful to watch before doing the lab.
- The videos were important to reference before coming to the lab and in order to access the equipment efficiently I would suggest communicating that the videos are not sufficient enough on their own to ensure understanding about the expectations and deliverables. If the videos are meant to be the single resource I think adding some final notes at the end about how to use the experiment model to make conclusions about the behavior of waves, hydraulic jumps etc.





- Mainly there was too much going on for us third years to even have time to properly read the instructions on paper. The instructional videos should be a link directly on the connect course home page to allow easy access. I, personally, forgot about the videos existence until now.
- Videos helped because the written labs are confusing at times with procedures.
- Instructional lab videos and procedures were clear and relatively easy to understand.
- They are helpful, yet should not be used for official learning material. It is still lacking.
- I found the videos to be useful but still TA's help is necessary during lab session.
- Make them easier to find and make them for all aspects of the experiment. In sort make more. They are an excellent resources
- I found them to be helpful.
- the videos were very helpful and I understand the procedures better.
- The labs videos would be more helpful in CIVL 315 since the labs in 315 are more difficult than the ones in 316. However, it is always good to have something to look at when we got a question about the lab.
- Very good. Short, clear and informative. A useful tool especially if you dont want to read the long lab instructions.
- The TAs told us everything we needed to do to operate the equipment regardless if videos were watched or not. So why spend time watching them if I'm already able to finish labs on time and the TA instructions are easy enough to follow?
- They were helpful, however they were not a replacement for the information that the TA gave us (however only one of the TAs actually gave us helpful information).
- Video idea should be implemented in other courses that contain a lab component.
- They helped to understand how to operate some of the equipment, but they didn't really show how to conduct an entire experiment.
- The lab gives you an idea of what the lab will encompass of, but does not give you confidence or experience in performing the lab. We still need help from TAs to conduct the experiments in safe and timely manner. Also there could be a video on lab safety.
- I did not use the lab videos.
- The lab videos were great to help with the lab equipment. Of topic: It would be helpful for the marking to be faster, I handed in my final lab before I had seen any marks previously. Without seeing any feedback it is frustrating to fix mistakes and improve on lab reports.
- They were really useful. More clear and understandable than reading a procedure.
- Some TAs asked us to do things slightly differently which then made it difficult to use the videos.
- they are wonderful
- the videos are very useful. It helps as prelabs before going to the lab. Also, when i forget something when writing the lab report, i can always watch the lab videos.
- They are helpful for the experiment but not whats required on the reports
- Videos were helpful for learning how to use the equipment, however a brief overview of what measurement we will need to record would be beneficial
- never used them because i was not aware they existed
- Great videos, they helped to complete the lab as well as understand the process in which to carry it out.
- It was helpful to see what I would be doing before actually doing the lab myself





- they r helpful but i think i can do pretty well wven without them because these lab are not actrually so hard to do. And we also have our TAs help.
- I wish that the video was avaiable at the beginning of the term, because by the time we notice that there are video that we can watch from to learn and prepare for the lab, we had already finish total of 3 out of 4 labs. therefore it was not as useful for most of the student at the begining of the semester.
- I am a more hands on learner, so while it did help, nothing compares to actually doing it in the lab.
- They're great. well designed
- Very informative overall. Beneficial to be able to visualize the lab instead of just reading it from the memo.
- The lab videos are helpful. However, it will be much more helpful if there were videos on introduction and basic logics of the lab procedures.
- Having watched videoos before doing the lab experiment is very helpful in understanding how to use lab equipment. It it always easier to absorb information visually rather than by reading the description of the apparatus, for example.
- To be honest I never watched the videos, they probably would have helped but the TA's guided the experiments well enough regardless
- Q4 - nothing we were given had all the information I needed to complete the labs. Q6 - the walk-through was cool to see but not necessarily super helpful to understanding what to do in the lab experiments themselves Q7 - the videos were vague at times and simply just showed the process but not the explanation of why we were to do what we were shown. - the videos didn't come out until three of our four labs were completed. Useful for future years, but useless for us. To be honest, the experiments themselves were fun and neat to see, but the overall process of these labs sucked. The TAs that I got to work with weren't particularly helpful when it came to figuring out what to do, because they didn't seem to understand what to do either. A lot of the questions that were asked during the labs went unanswered which was really unsatisfying and unnerving when trying to understand the processes that were happening. Everyone/everything just felt really unprepared and disorganized. The lab reports are also incredibly tedious and much more time consuming than one would expect in comparison to the short, physical experimentation time.
- Lab videos are helpful.
- It was nice to be able to see the lab equipment and how the experiment is run; much more descriptive than reading the lab handouts. Also gave me an idea of what to expect during the lab.
- I used the lab videos during the write up to help me remember what happened during the lab.
- These video are reallly useful, but I am the only one in my group that watched video before the experiment. So if there are minor differences between video and paper, we just go along with what lab TA said. But I do really like the video and I wish we had these in 315.
- I think they are helpful
- it was helpful
- They cleared up any questions I had after reading the lab procedure. It's a much more useful way of teaching the lab rather than displaying the process on paper.
- The lab procedures were fairly straight forward in the lab manual. Any questions were answered to an adequate extent by the lab TAs. I personally did not gain from the videos, but the labs themselves were pretty fun and so the videos were interesting to watch.



## Appendix D: TA Feedback for CIVL315/316 in 2015 Academic Year

### Q1: Have you noticed any changes before and after the implementation of this video instruction for the lab experiment procedures?

- About 20% improvement in knowledge
- I would say yes. Previously, Students used to read the procedure only and it was hard for them to visualize what to do during the lab. But after the introduction of the videos, I have seen them already prepared what to do. They said it was less time consuming for them to get ready for the lab.
- It is difficult to discuss the changes given that cohorts differ from year to year. However, I think that it has helped students to gain an overall understanding and overview of the experiments before conducting the experiments step by step following the lab instruction they are provided with in form of a pdf document. This can help the students to conduct their experiments quicker and enhance their learning experience along the way. It can also be helpful as a way to revisit the experiment when working on their reports following the lab session.
- While many of the lab manuals do include detailed instructions, without the context of the apparatus in front of you it is often difficult to follow the meaning of those instructions. The video instructions show these procedures in the context of the actual experiments so it is easier to follow. As a result, more students understood what they were meant to do once they arrived at the lab after the implementation of the videos compared to before.
- N/A did not host lab sections - did mark the same lab but did not notice dramatic difference in quality of lab reports from one year to another.

### Q2: What were the noticeable improvements on the newly developed web-based instruction system?

- About 15% know what to do with the experimental setup
- It looks like it's working well so far. Sometimes there are too many tabs to access. Maybe we could reduce the number of tabs?
- It is easily accessible and well organized. Students can navigate through the site easily and find answers to specific questions about the experiments.
- More students watched the videos and read the instructions after the implementation of the videos compared to before. Some students that did not read the instructions still watched the videos, so less instruction from TA's was necessary.
- facilitating the mental bridge of connecting 2D diagrams and illustrations with 3D objects within the lab (315 experiments)

### Q3: If that was not working well, what do you think the causes of problems?

- The videos tell them what to do to get the setup running but not said how to take the data more accurately



- Too many folders to get lost. Sometimes, students found it hard to find the proper instruction manual for the lab.
- Students might not take advantage of the opportunity but rather come to the lab unprepared.
- I feel that regardless of how good the lab videos are, or if all students are adequately preparing there will still be a reasonable amount of instruction from TA's necessary. Given the current set-up (2 TA's assigned per lab period each 1 to help 2 groups), there is no reason why the TA's shouldn't be able to provide this instruction. Unfortunately when I helped students during lab periods they often commented on how thankful they were because they weren't used to TA's being willing to help. It seems many students are under the impression (whether correct or not) that the lab TA's are generally unwilling and unable to provide any direction.

**Q4: How could we improve this new system for more effective lab teaching?**

- Provide data sheet, to give the students idea about what type of data they are collecting and how he/she can improve data collection
- Should add the videos under the same tab of the lab manual.
- Add a multiple choice assessment students have to do prior to their lab to encourage the use of the videos.
- Perhaps have some type of accountability for watching the videos or preparing for the lab? I think the idea of quizzing the students on the content of the lab procedures is a bad idea... but maybe have the videos hooked up through Connect in some way that the system will know once a student has watched it and then assign a "completion" type mark for watching the video before the performance of the lab. I'm not sure of the best way to implement an accountability system.

**Q5: Any items you want to comment/suggest/observed? Any comments would be truly appreciated.**

- 10 min. lab quiz on previous/current experiment prior to start the current experiment
- So far the labs are working well. I believe separate tour session to the lab before the semester could be helpful to the students but its not an absolute.
- I think a adding a video that provides a quick overview at the beginning might be very helpful for students and help them to better understand the purpose of the experiment and why the single steps within the experiment are conducted.
- In many cases, only one student in the group does the bulk of the preparation work and the other students relied on them. Sometimes this was by design (they would take turns and the person who did more prep work would have a smaller requirement in writing the report), but other times this was because of unmotivated students being paired with student who are motivated and interested in learning. In the latter scenario there is an unnecessary burden placed on the motivated student. The implementation of the video instruction did partly deal with the issue above by making the instructions easier to see and understand, and by reducing some prep time. However, the issue still strongly persists. When groups were well prepared (multiple members had read the lab manual AND watched the video), they were largely self-sufficient and required little instruction. The videos provided a lot of context for the apparatus that was missing from the lab manuals. TA support will continue to be necessary. Students complained to me that in response to questions, other TA's simply replied "You should have watched the video" and



then refused to provide clarification. In some cases these were motivated students that simply didn't understand some part of the instruction. However, I never observed such an interaction; the TA's I worked with were always willing to help. Whether the students' claim is true or not, the videos should never be used as an excuse to not provide necessary instruction.

- I'd like to push the students to think about other phenomenon - the website is great as it is but could there also be related links showcasing extraordinary phenomenon that can be explained via first principles learned within the experiment? It would be a interesting challenge for the students.