Report on the Feasibility of a Michael Smith Digital Media Outreach Program

For Dr. David Ng, Lead Coordinator of the Michael Smith Outreach Program

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Abstract

To be completed.

Introduction

Michael Smith Laboratory Outreach Program

The Michael Smith Laboratory located at 2185 East Mall, UBC, prides itself in its outreach program centered on providing secondary school students insight in the research and inner workings of science. Currently, the program consists of a 6.5 hour science symposium with keynote speakers, 5 hour lab tours for grade 9 students and 5.5 hour tours concluding with a DNA oriented experiments for grade 11/12 students.

Travel Time

Because of these 5+ hour programs, secondary schools may find scheduling an issue. Secondary schools located 45km away require at least 1 hour to reach UBC one way. Traffic and buffering times can cause these events to last a total of 8+ hours. Therefore, secondary schools such as ones in Maple Ridge cannot feasibly schedule the field trip within the 8 am to 3 pm school period.

Purpose of this Report

The outreach program aims to reach as many students as possible. Currently, the amount of programs that can be run is limited and the travel time from schools far from UBC can be a deterrent in attending. Converting the teaching programs to a digital format available online can alleviate these issues and can broaden the programs' audience. This report will outline the feasibility and effectiveness of establishing a Michael Smith online teaching program mirroring the in person outreach programs.

Data Sources

Primary data will be collected through surveys targeted to secondary school faculty members, obtained through various lower mainland school websites and the results from this will be organized by relative distance to UBC. An interview with Dr. David Ng, coordinator and organizer of the outreach program will be conducted to obtain further information on the teaching programs. Research on redundant existing sites/online programs will be done through search engines such as Google.

Scope of this Inquiry

The following questions will be addressed in this report:

1. Are there students or teachers that would like to attend the program but will not due to distance?
2. Can the science education programs be converted to an engaging media format?
3. Would high school students enrolled in science courses be interested in educational material in a digital format?
4. Would a Michael Smith oriented digital teaching program be similar to existing resources?

These inquiries are intended to address whether establishing a digital teaching format for the Michael Smith Laboratory is worthwhile to pursue.

Collected Data

The following data was collected from 42 schools and 132 faculty members.[1]
Further data collection will be done between now and when this report is finalized to obtain a larger sample size.

Interest in the Outreach Program versus Travel Time from Schools

The following data collected via online surveys through direct email to faculty members.[1] The question posed was "Would you be interested in attending a Michael Smith conference with your class?", with a yes, no, and maybe option. Yes was assigned a value of 1, no a value of 0, and maybe a value of 0.5, for a final average interest level.

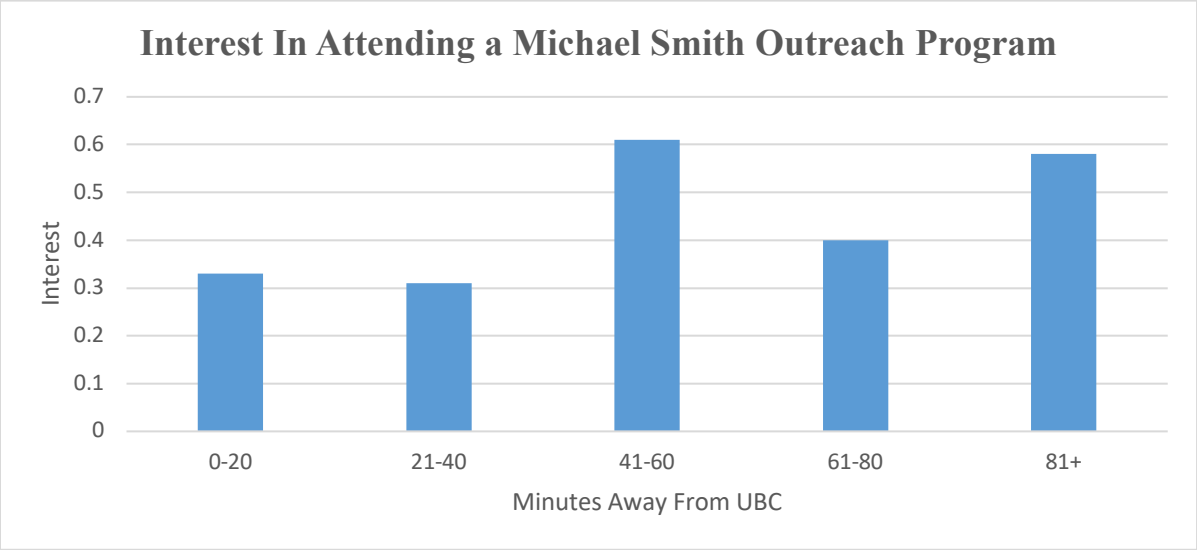


Figure 1: Interest versus time taken to drive from the school to UBC. Collected from 42 schools spanning across the lower mainland from 132 teaching staff.

Analysis

Analysis of this data shows that schools further from UBC are more interested in attending a seminar than closer schools. This may be due to the lower likelihood of having attended a Michael Smith program in the past, or from being further from the downtown area and therefore, similar lab experiences from other universities. Furthermore, most schools express some interest in attending a tour or teaching session.

Study of Media Conversion of Teaching Material

The existing outreach programs' key components include tours of a technical research lab lead by a researcher from the Michael Smith laboratory, full PCR labs involving participant DNA replication and keynote speaker sessions conducted by esteemed UBC faculty members.

Tours can effectively be converted to an online format. The tour could be done in video form, led by the same instructor, and could include existing key points effectively. An interactive online tour akin to Google map's street view is another possible alternative. The lab machines could be clickable, linking to a small blurb or a video instructing how they work and what they do.

The PCR labs would be difficult to emulate. Currently, the PCR lab consists of an instructional lecture involving slides on how PCR was discovered, how it is run and the applications of the technique, performing PCR on student DNA (most often on saliva) and analyzing whether each student has a gene. While the lecture portion could be effectively digitalized, the loss of the interactive portion would greatly lower the engagement of students and could make this portion too technical.

Keynote speaker videos already exist on the UBC website. However, consolidating the science oriented videos to a central outreach website could prove useful in accessing them. Furthermore, lectures could be given more frequently due to the convenience of recording on the speaker's own time.

Interest in a Michael Smith Digital Teaching Format

Surveys were sent to staff of all public schools in the lower mainland. All 42 of the schools that responded to the survey have student computer labs.
The digital format is therefore able to be accessed among these schools.

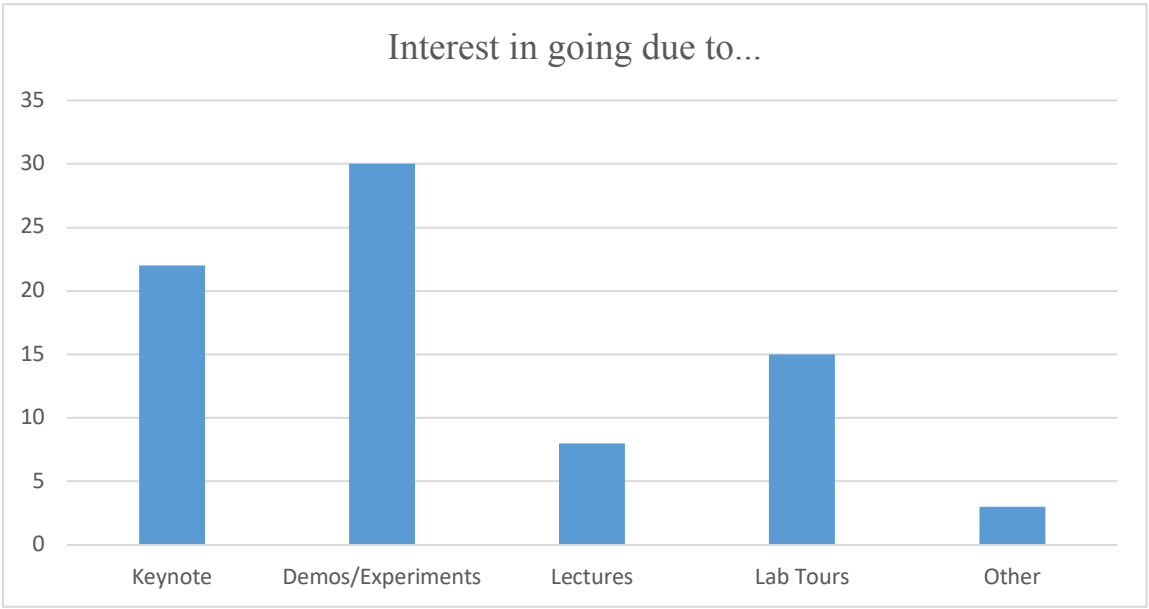


Figure 2: Reasons schools interested in attending a Michael Smith outreach program are enticed to go. According to this data, the demos are the most persuading aspect of the program.

The schools surveyed have shown interest in the experiment portion, the keynote speaker sessions and the lab tours. Of these, the lab tour and the keynote can be recorded and shown as videos online. Past meta-analysis of using digital media in learning have shown that there is an overall positive benefit when used as a support method (**2**)(Higgins et. al., 2012). When used as the sole source of learning, there was a slight decrease is performance compared to direct engagement methods such as a tutor (**2**).

Research on Similar Websites

Sites with programs similar to proposed media formats:

Science World Outreach

Ask an Educator[3]

- Science World's education team answer science oriented questions directly by email

DIY Lab Instructions[4]

- Instructions for labs and where to buy material

Games[5]

- Simple flash games designed to teach

All targeted to elementary students, but Ask an Educator could be adapted to any audience

Various Video Sites (Youtube, Ted, etc.)

360º Lab Tours[6]

- Requires a 360 degree camera, but engaging
- Requires a phone capable of viewing 360 video

Keynote Seminar Recordings

- TedX, TedTalks, existing educational YouTube channels
- Proves engaging lectures via video are feasible

Other University Outreach Programs

SFU and Waterloo video site tours

- Not extensive and university/building specific

Overall, digital media forms of teaching is extensive and many existing resources can be found. Therefore, creating Michael Smith specific media is paramount in establishing a novel and local resource.

Conclusion

Summary

- This inquiry has found that there is a moderate interest in attending an outreach program among lower mainland high schools
    - this interest increases as distance to UBC increases
- Converting teaching seminars and lab tours to a digital format is feasible; the main elements can be presented effectively and the interactivity can be maintained.
- The interest in a Michael Smith specific site is low to middling. This could be due to the abundance of similar sites or programs and the limited computer lab times given in secondary schools
- Similar sites include the Science World online outreach site, which include instructions for labs (no materials provided), games and "Ask an Educator", a science question response program.

Recommendations

- Lab tours can be recorded using a 360 degree camera to create an interactive experience akin to Google maps.
- Videos of keynote speaker sessions is an effective analogue, and is similar to Ted talks. As higher level video lectures exist, incorporating a secondary school version would expand the audience.
- The PCR lab cannot be converted effectively without losing the interactive portion, and should remain a physical lab.
- However, providing pre-lectures on PCR online will greatly reduce the lab times. This allows for more time for the interactive portion that cannot be done online.

Appendix

References

1. Primary Research, see below

2. Higgins, S., Xiao, Z., Katsipataki, M. (2012). The Impact of Digital Technology on Learning: A Summary for the Education Endowment Foundation. Retrieved July 30, 2017 from https://educationendowmentfoundation.org.uk/public/files/Publications/The_Impact_of_Digital_Technologies_on_Learning_(2012).pdf

3. https://www.scienceworld.ca/ask-an-educator#

4. https://www.scienceworld.ca/resources

5. https://www.scienceworld.ca/online-games

6. https://www.youtube.com/watch?v=v7tCftsyJqc

Survey Questions

Have you heard of the Michael Smith outreach program prior to this survey?

- Yes
- No

Would you be interested in attending a Michael Smith conference with your class?

- Yes
- No
- Maybe

If no, why?

- ☐ Distance from the school to UBC
- ☐ Not interested in the content
- ☐ Can't fit it in schedule
- ☐ Other

If yes, which aspect are you the most interested in?

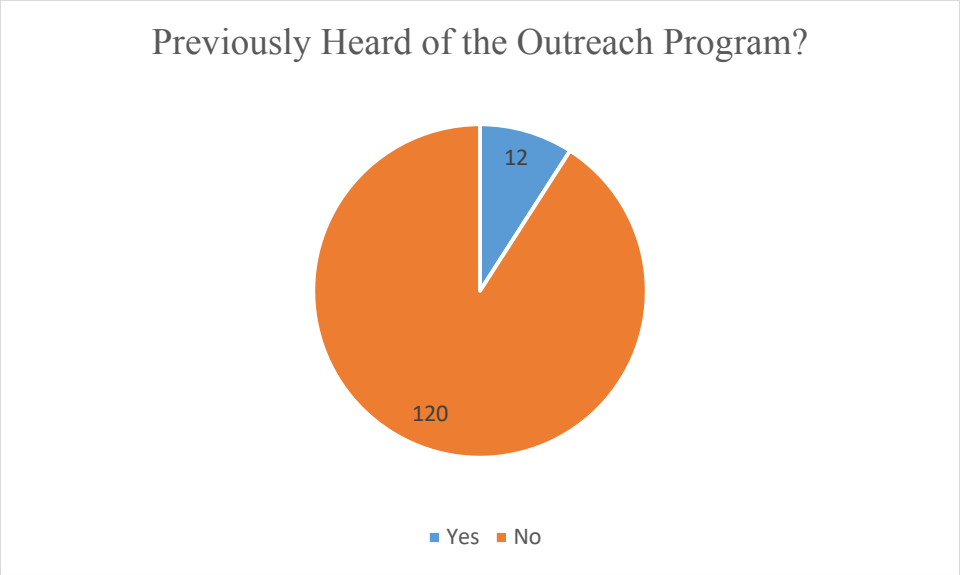
- ☐ Keynote speakers
- ☐ Interactive demos
- ☐ Lectures from experienced researchers
- ☐ Lab tours
- ☐ Other

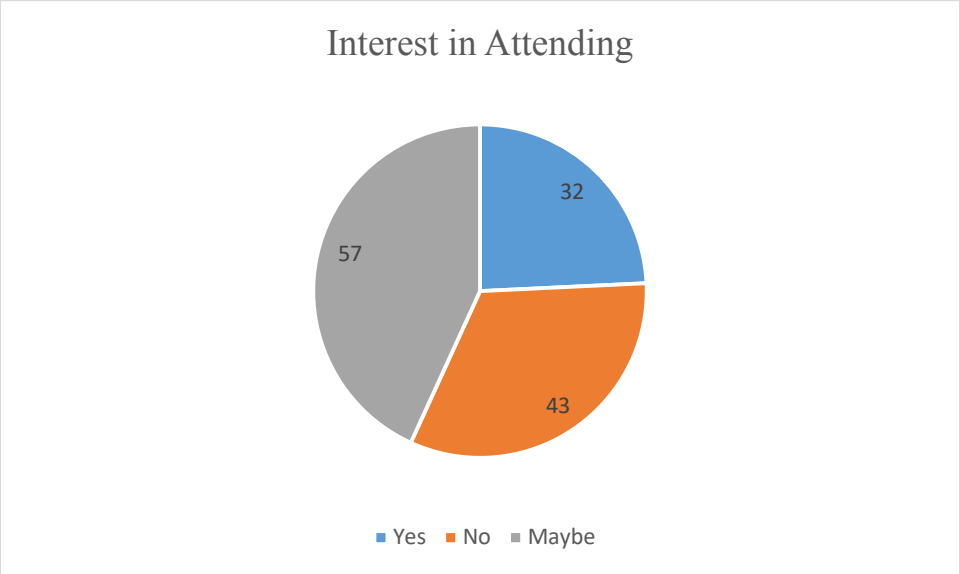
Are you a teacher or a student?
(Only emailed to staff, N/A)

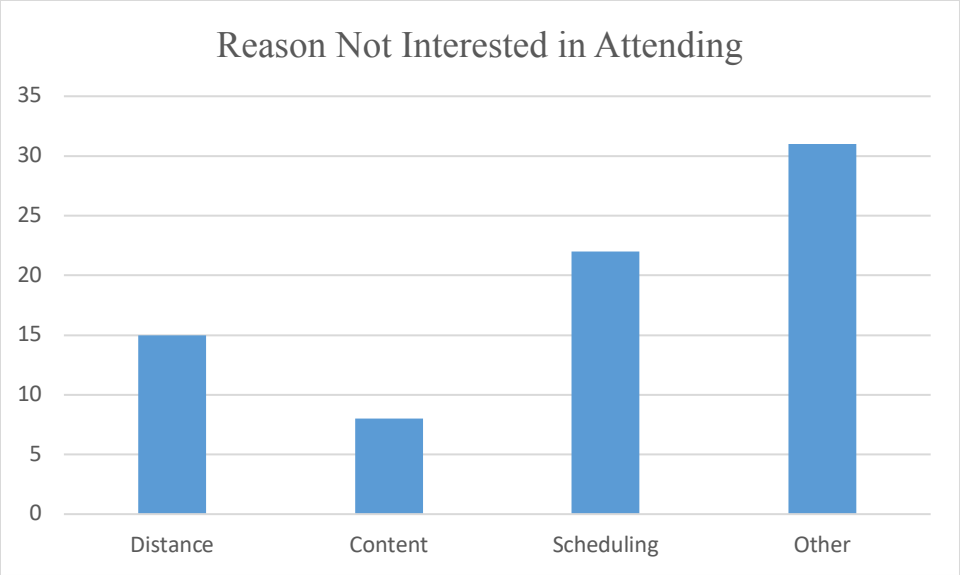
Which school are you from?

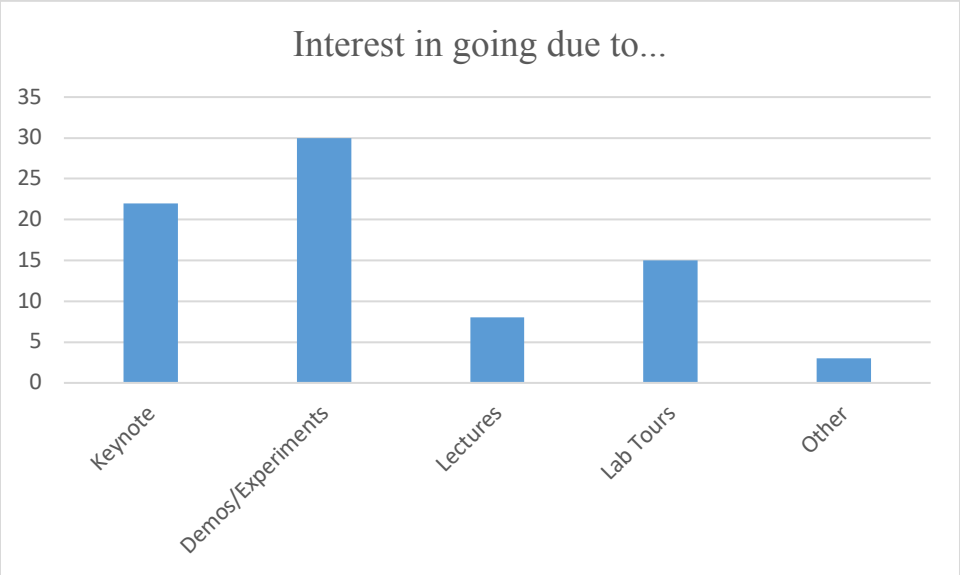
_____.

Raw Data


Previously Heard of the Outreach Program?
12
120
Yes
No


Interest in Attending
32
57
43
Yes
No
Maybe


Reason Not Interested in Attending
35
30
25
20
15
10
5
0
Distance
Content
Scheduling
Other


Interest in going due to...
35
30
25
20
15
10
5
0
Keynote
Demos/Experiments
Lectures
Lab Tours
Other