Fall 2018 SALTISE Mini-Grant Report: Investigating How Students Learn by Rescuing Historical Weather Data

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Agenda

DRAW Background

Project Outcomes

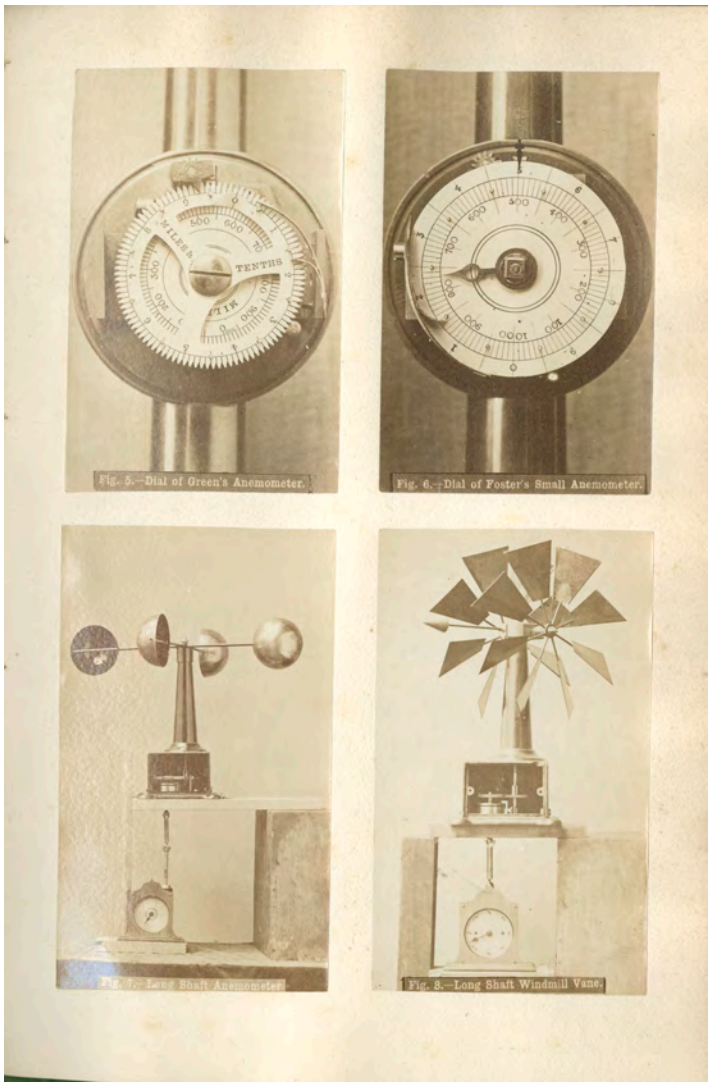
Future Work

DRAW

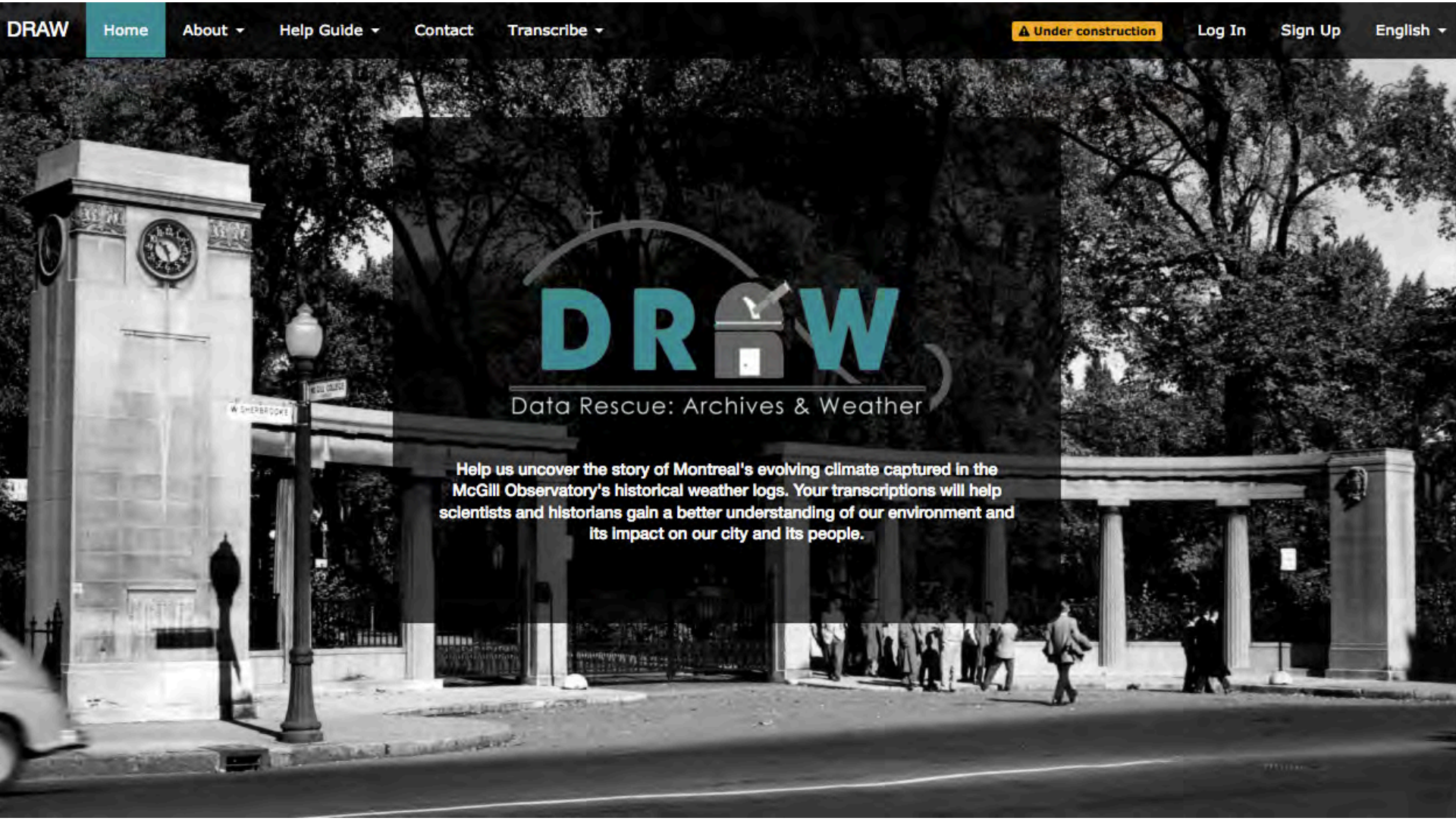
Data Rescue: Archives & Weather

Rescuing Weather History of McGill University and Montreal

Find it online: https://citsci.geog.mcgill.ca/


MILES
TENTHS
Fig. 5.—Dial of Green's Anemometer.
Fig. 6.—Dial of Foster's Small Anemometer.
Fig. 7.—Long Shaft Anemometer.
Fig. 8.—Long Shaft Windmill Vane.


M 1908 II
M 1908 I
M'07 II
M'07 I
M'06 I


DRAW
Home
About
Help Guide
Contact
Transcribe
Under construction
Log In
Sign Up
English
DRAW
Data Rescue: Archives & Weather
Help us uncover the story of Montreal's evolving climate captured in the McGill Observatory's historical weather logs. Your transcriptions will help scientists and historians gain a better understanding of our environment and its impact on our city and its people.

Day of Week.	Day of Month	Local Time.	Barometer. Observed.	Att'd. Ther.	Corrected for instrumental error.	Reduced to Temp. 32°	Reduced to Sea-level.	Temp. of the Air Observed	Temp. of the Air Corr'd.	Wet Bulb. Observed	Wet Bulb. Corr'd.	Diff.	Pressure of Vapour.	Relative Humidity.	Dew Point.
11		148	30.120	28	30.133	30.134	30.355		9.0		8.0	1.0	051	78	
		4 "	30.102	24	30.113	30.126	30.348		7.0		5.8	1.2	043	77	
		7 "	30.102	24	30.113	30.126	30.348		7.5		7.0	0.5	051	89	
		10 "	30.077	25	30.090	30.099	30.319		9.4		8.4	1.0	052	79	
Friday	12	1 "	30.016	25	30.029	30.038	30.257		12.5		11.2	1.3	058	75	
		4 "	29.992	26	30.005	30.014	30.232		13.0		11.0	1.0	061	80	
		7 "	29.988	24	30.001	30.013	30.232		12.0		11.2	0.8	063	84	
		10 "	29.978	24	29.991	30.003	30.222		11.9		11.0	0.9	062	82	
		1113	29.978	24	29.991	30.003	30.222		11.9		11.0	0.9	062	82	

2018 Mini-Grant Project Outcomes

1. One peer reviewed research paper for special issue of the *Journal of Community Engagement and Scholarship*

2. Curriculum book

3. Hiring of two researchers to find archival materials for the course module

4. Educator's Corner on the DRAW website

Winter 2018 Course Module

Implemented as a three-week curriculum at Dawson College in the Research Methods course (300-300-DW - Section 07)

There were 26 students in course, with 21 participating in the research

- 8 male and 13 female students
- Aged 17- to 20-years-old
- All from social sciences or psychology

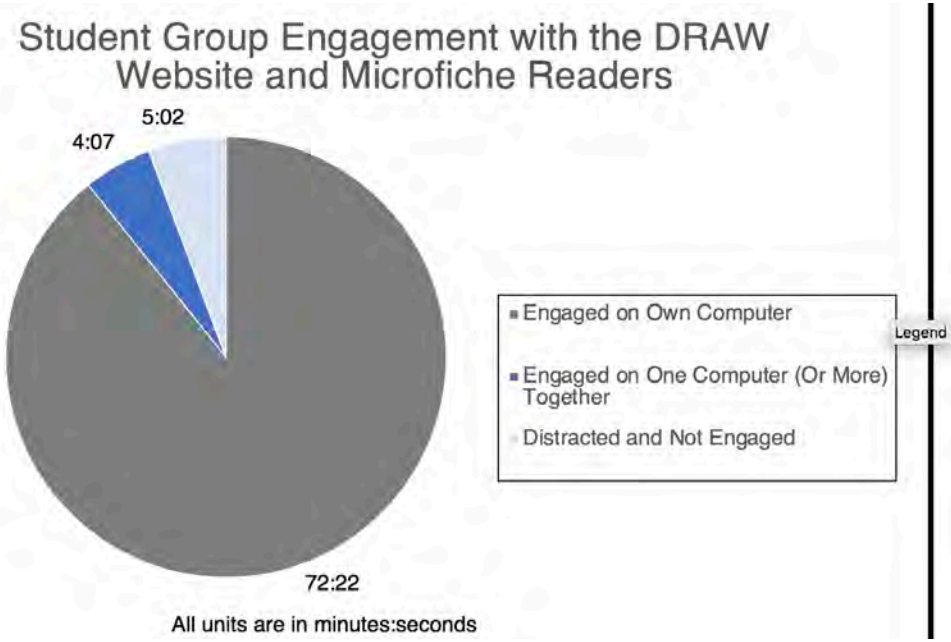
Problem and Objective

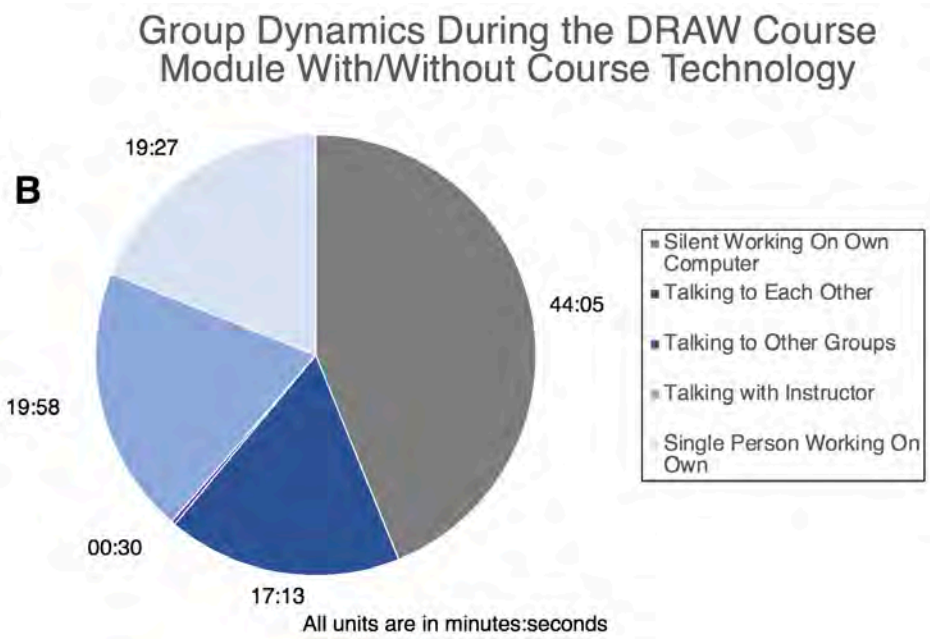
1. Not easy to determine what knowledge transfer takes place during citizen cyberscience projects (Haklay, Mazumdar & Wardlaw 2018)

2. Classroom based educational research allows examination of such knowledge transfer (Ryan et al. 2018)

3. We Investigated how students learn during citizen science that also aids in recovery of knowledge about their community's historic relationship with climate and weather

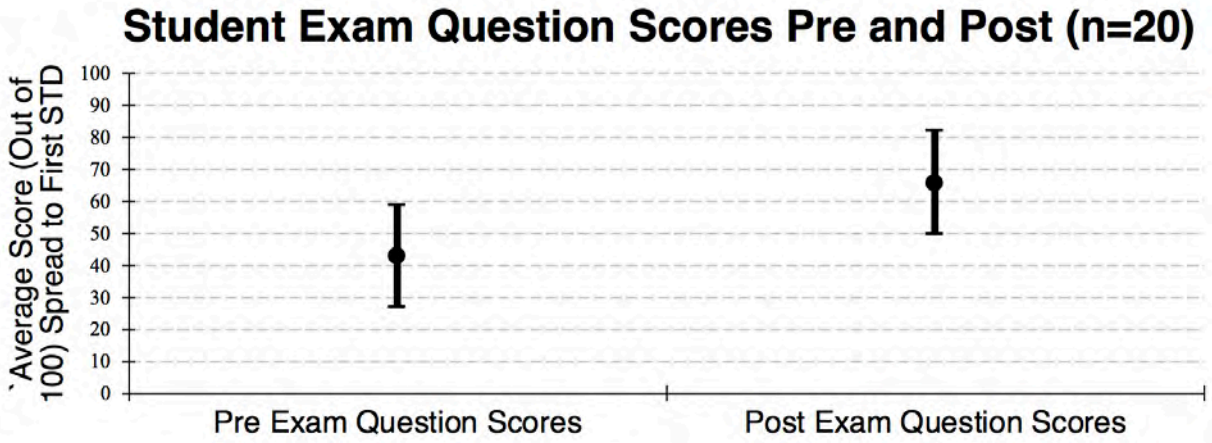
Results


Student Group Engagement with the DRAW Website and Microfiche Readers
5:02
4:07
72:22
Engaged on Own Computer
Engaged on One Computer (Or More) Together
Distracted and Not Engaged
All units are in minutes:seconds

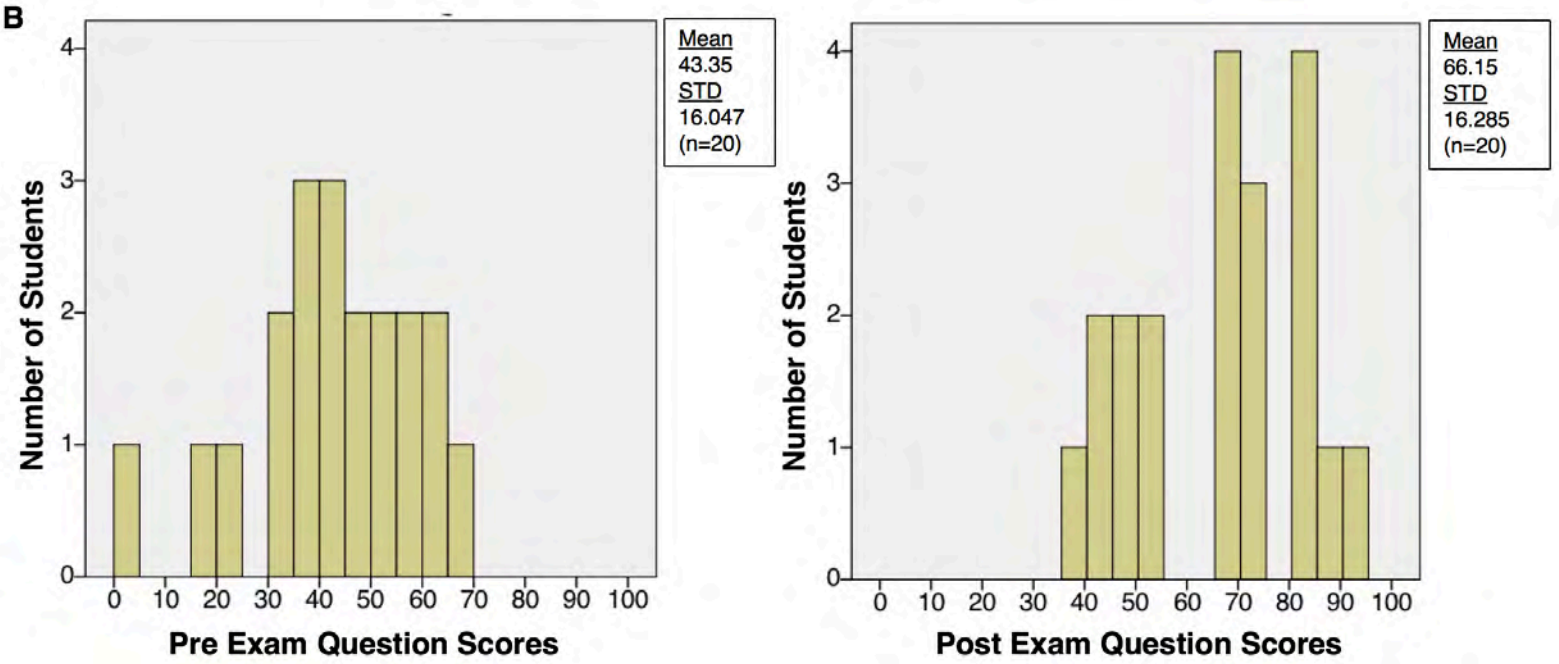

Group Dynamics During the DRAW Course Module With/Without Course Technology
B
19:27
44:05
19:58
00:30
17:13
Silent Working On Own Computer
Talking to Each Other
Talking to Other Groups
Talking with Instructor
Single Person Working On Own
All units are in minutes:seconds

Results

A


Student Exam Question Scores Pre and Post (n=20)
`Average Score (Out of 100) Spread to First STD
100
90
80
70
60
50
40
30
20
10
0
Pre Exam Question Scores
Post Exam Question Scores

B


Number of Students
Mean
43.35
STD
16.047
(n=20)
Pre Exam Question Scores
Number of Students
Mean
66.15
STD
16.285
(n=20)
Post Exam Question Scores

Results

“It is a more interactive class and you go to class and you’re like, ‘Oh, I’m actually going to do something, I’m not just going to sit and take notes and like listen to lectures.’”

“I had never actually thought of [climate and meteorological research] before this class, like I had never been introduced to it. So everything that we’ve been doing over, like transcribing the data and even just looking at the booklets with all the climate in it, I’ve never seen that before.”

“Montreal is a very diverse city, so I think it would be interesting for people who come here and for people who’ve even grown up here, to know historically. And I guess part of that is the climate because there was lots of extreme weather—heat or snowstorms—that affected the population a lot.”

“I basically learned that anyone could be doing it kind of thing. I always thought it had to Bill Nye the science guy kind of people. I didn't know that a normal person could be useful to actually do stuff and that really shocked me.”

Conclusions

Three attributes (Meinke, 2006):

1. *Salience,* or the perceived relevance of the science;

2. *Credibility*, or the perceived technical quality of the work done to generate it; and,

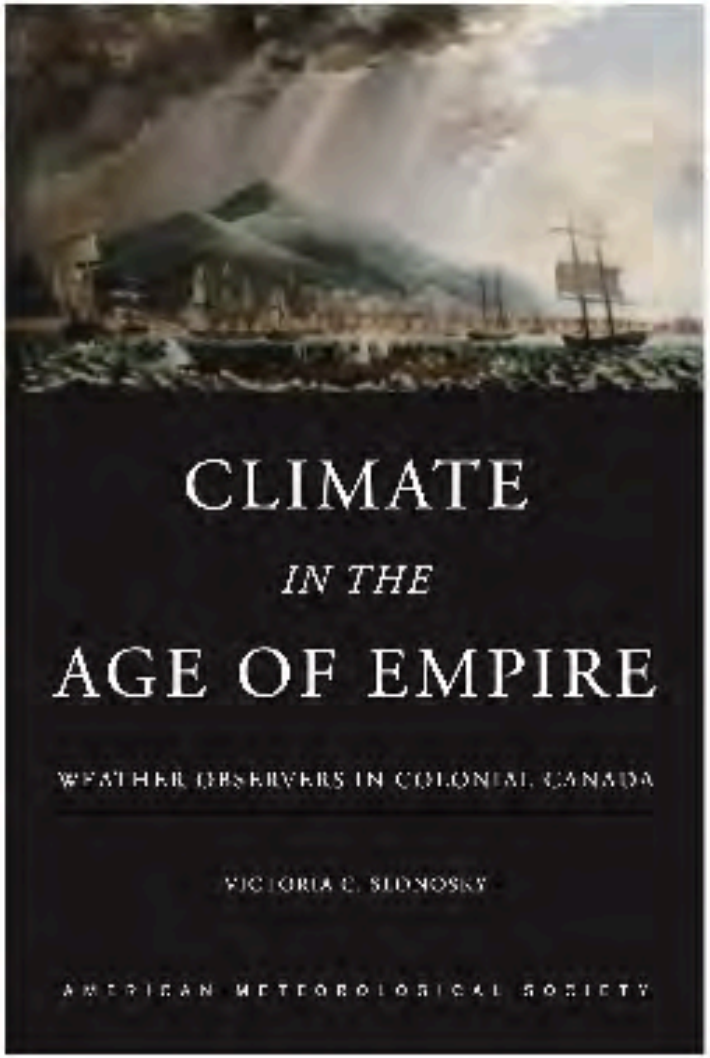
3. *Legitimacy*, or the perceived objectivity of the translation process.

Future Work

1. Finish second paper comparison of this work versus adults in workshops at McGill University for *Citizen Science: Theory and Practice*

2. Final edits to curriculum book and printing

3. Creation of educator's corner with slide deck, curriculum book PDF, and additional archival resources for students



Victoria Slonosky's Book

List Price: $35. Available wherever fine books are sold.

You can order from the American Meteorological Society website!

Thank You!!!

Contact Me:

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References

Cooper, C. (2016). *Citizen science: How ordinary people are changing the face of discovery.* New York, NY: The Overlook Press.

Haklay M., Mazumdar S. & Wardlaw J. (2018). Citizen science for observing and understanding the Earth. In: P.P. Mathieu & C. Aubrecht (eds.) *Earth Observation Open Science and Innovation (pp. 69-88)*. New York, NY: Springer.

Meinke, H., Nelson, R., Kokic, P., Stone, R., & Selvaraju, R. (2006). Actionable climate knowledge: From analysis to synthesis. *Climate Research*, *33*, 101–110.

Ryan, C., Duffy, C., Broderick, C., Thorne, P., Curley, M., Walsh, S., Daly, C., Treanor, M. & Murphy, C. (2018). Integrating data rescue into the classroom. *Bulletin of the American Meteorological Society*, *99*(9), 1757-1764. https://doi.org/10.1175/BAMS-D-17-0147.1

Citizen science

"Think you need a degree in science to contribute to important scientific discoveries? Think again. All around the world. In fields ranging from astronomy to zoology, millions of everyday people are choosing to participate in the scientific process. Working in cooperation with scientists in pursuit of information, innovation, and discovery, these volunteers are following protocols, collecting and reviewing data, and sharing their observations. They are our neighbors, our in-laws, and people in the office down the hall. Their story, along with the story of the social good that can result from citizen science, has largely been untold, until now." (Cooper, 2016)

Symbol Guide

Observers sometimes used symbols or abbreviations to describe the weather with fewer words. Sometimes a letter and a symbol are associated to a single weather description, sometimes only a letter or only a symbol is attributed to the weather pattern. The table below lists common symbols used in the weather records.

Beaufort Letter	International Symbol	Meaning
b	...	Blue sky, cloudless.
c	...	Cloudy, but detached opening clouds.
...		Completely overcast.
...		Clearing weather.
d	...	Drizzling rain.
f		Foggy.
...		Mysty; i.e. hazy, caused by condesned vapour aloft.
...		Dust haze.
...		Smoke.
g	...	Gloomy, dark weather.
h		Hail.
...		Soft hail.
l		Lightning
p	...	Passing showers.
q	...	Squally wind.
r		Continuous rain.
s		Snow.
...		Flurries of snow.

Abbreviations and Symbols

Wind direction

- **N** - North
- **NNE** - North North East
- **NE** - North East
- **E** – East
- **ESE** – East South East
- **SE** – South East
- **SSE** – South South East
- **S** – South
- **SSW** – South South West
- **SW** – South West
- **WSW** – West South West
- **W** – West
- **WNW** – West North West
- **NW** – North West

Cloud types

- **Ci/C** - Cirrus: high and wispy clouds
- **Ni/N** - Nimbus: produces precipitation
- **St/S** - Stratus: a flat layer of cloud
- **Cu/K** – Cumulus: puffy pile of cloud
- **Cust** – Cumulo-stratus
- **Cicu** – Cirrus-cumulus
- **Clear** – Indicates clear sky.
- **Hid/Hidden** – Cannot see, usually due to darkness.
- **Fog/Foggy** – Used when the observer is surrounded by fog
- **Haze** – Used when mist or haze, consisting of condensed vapour, intervenes between the eye and the sky.
- **Smoke** – Indicates the presence of smoke.

DRAW Objective

The Data Rescue: Archives and Weather (DRAW, https://citsci.geog.mcgill.ca/) project allows volunteers to participate in the transcription of historical weather logs captured at the McGill University McLeod Observatory from 1863 to 1963.

The meteorological and climatological information contained in these logs needs to be transcribed in a digital format in order to be used for climate and weather research.

This work holds the potential to further public understanding of weather and climate and its impact on people by engaging citizens with science and cultural heritage.