WWEST Partners

October 10, 2013

NSERC CRSNG
Chair for Women in Science and Engineering BC and Yukon Region

UBC Engineering

Westcoast Women in Engineering, Science & Technology

Lead Sponsors:

BC hydro
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UBC — a place of mind — THE UNIVERSITY OF BRITISH COLUMBIA

Agenda

- 9:00 Welcome
- 9:15 Metrics: Effective Measurement for Non-Profits
  - 9:15 Why?
  - 9:30 How?
  - 10:00 Break
  - 10:15 Resources and Tools
  - 11:00 Breakout Working Groups
- 12:00 Networking Lunch
  - New application abstract discussions
- 1:00 Partner Program Restructuring
- 1:15 Past Partners – Reminder of Reporting Requirements
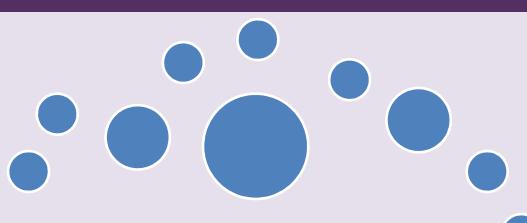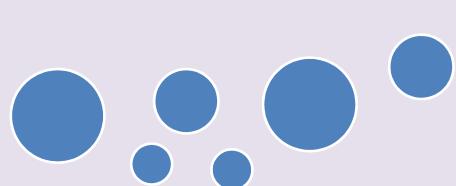- 1:30 Project Updates and Best Practice sharing
- 3:00 End Time

WHVEST
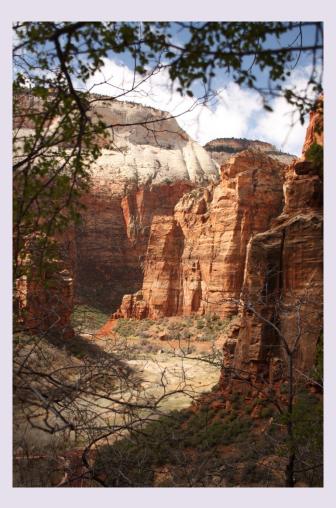
Metrics:

Effective Measurement for Non-Profits

Vivian Meng, B.A.Sc.

Jennifer Pelletier

Why Metrics?

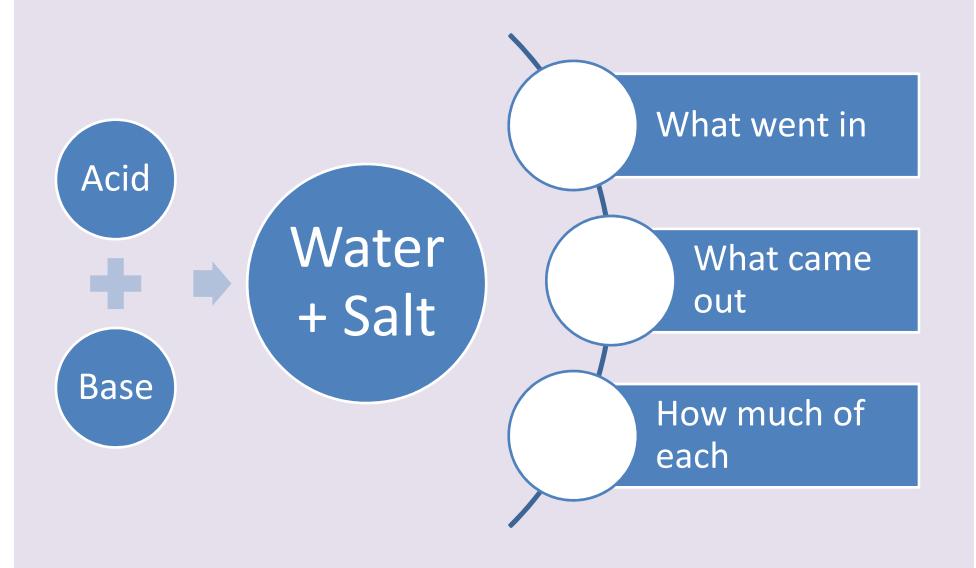The first step to achieving something is figuring out what you actually want.

The second step is to figure out how to know if you are moving in the right direction.
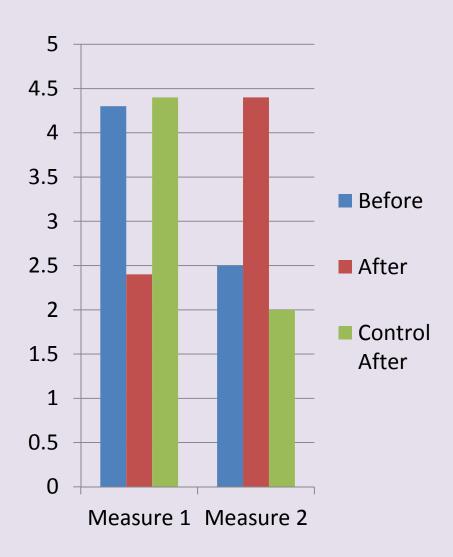
Acid

Base

Water + Salt

What went in

What came out

How much of each

Questions Answered

- Are you making progress towards your objective?

- What is working?

- What can be improved?

- Can you prove effectiveness to your stakeholders?

Which is better?

A or **B**

A: 80% of the participants said they were very likely to continue in SET as a result of this workshop

B: 80% of the women participants had a statistically significant increase in their occupational self-efficacy, an indicator of career persistence, as a result of this workshop

B

80% of the women participants had a statistically significant increase in their occupational self-efficacy, an indicator of career persistence, as a result of this workshop

- an actual change (statistically significant)

- effect attributable to workshop (increase)

- measurable construct (occ. self-efficacy)

- what the results mean (women will persist)

What Funders Expect

New initiative
- How you will measure success that year
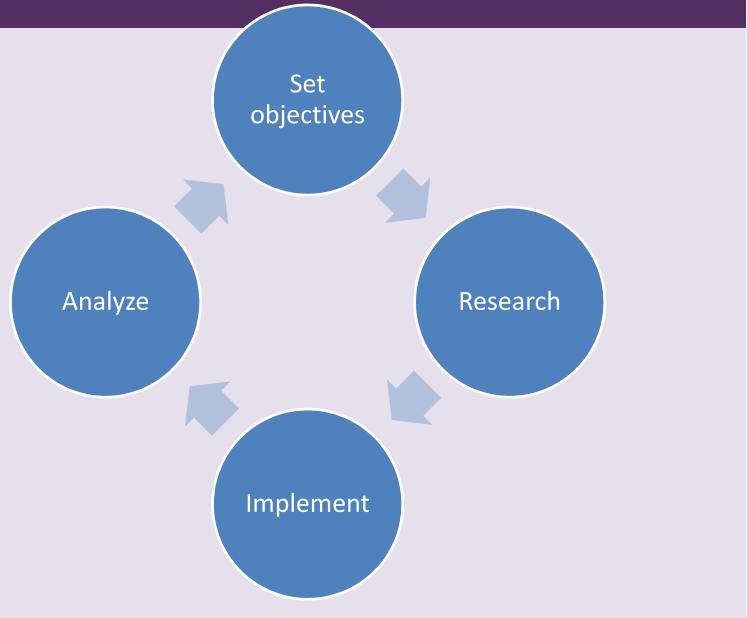- Limited complexity is okay

"Young" initiatives
- Results from previous year(s)
- Plans for more comprehensive measurement that year

Mature initiatives
- Proven short term effectiveness
- Strong metrics for specific objectives
- Longitudinal measurement underway / results available

How?

Set objectives

Research

Implement

Analyze

Objectives

- What are you trying to achieve?
- Avoid ambiguous words

Good
or
Bad?

We want to increase children's *interest* in science

We want to make people more *informed*

We want to *increase awareness* about the benefits of gender diversity in the technical workplace

We want to help women *stay in the field* of engineering

Using Common Sense

What does "interest" really mean?
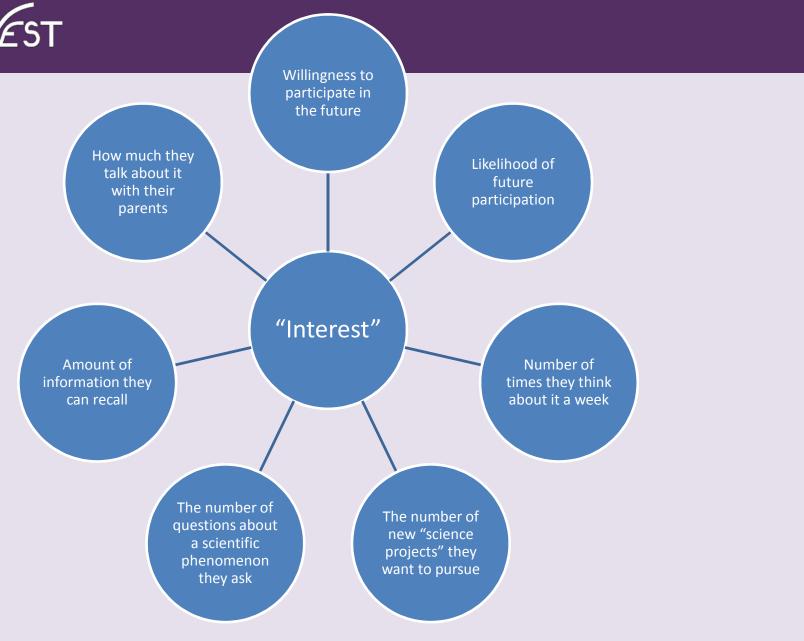
Who is your target group? All children in the world?

What aspect of science?

We want to increase children's interest in science

Look at the Literature

- You can look at previous research to guide your measurement

- WWEST has done this in two different ways – using existing surveys and designing new ones

- We will talk about accessing research resources in later sections

Case Study 1 – Self-Efficacy

Objective: To show a positive change in the likelihood of women staying in SET

Psychology literature shows that occupational self-efficacy is one of the best predictors of career persistence

Validated occupational self-efficacy surveys are available in the literature

Case Study 2 - Awareness

Objective: To show an increase in awareness of the value of gender diversity

No surveys were found in the literature

Research was done to determine what questions would demonstrate a change in awareness so a custom measure could be created

What is a validated measure?

- Developing sets of questions
  - Qualitative vs. quantitative
  - Subjective vs. objective
  - Likert-type responses for agreement to a statement
  - Yes/no binary questions
  - Numerical counts of frequency
  - Continuous scale (less often)
  - Negative and positive connotations

Increase your validity

- Research concepts and constructs you should test for by reviewing literature
  - Wikipedia is a good place to start
  - Academic journals are good for follow up
- Get experts to review your questions!
  - Subject area experts (e.g., childhood development)
  - Analysis experts
- Develop an overall score
- Run pilot studies to test validity and reliability

Implementation

- To measure change, or impact, you need a baseline
- Baselines can be established in different ways
  - Ensure you do not introduce bias in your design
  - Pre/post designs
  - Retrospective designs (may be biased)
  - Control groups
- Determine how to match/link responses

Analysis

First – don't panic. The names of the tests are provided to help with Google-ing. We recommend talking to a statistician if possible to get assistance.
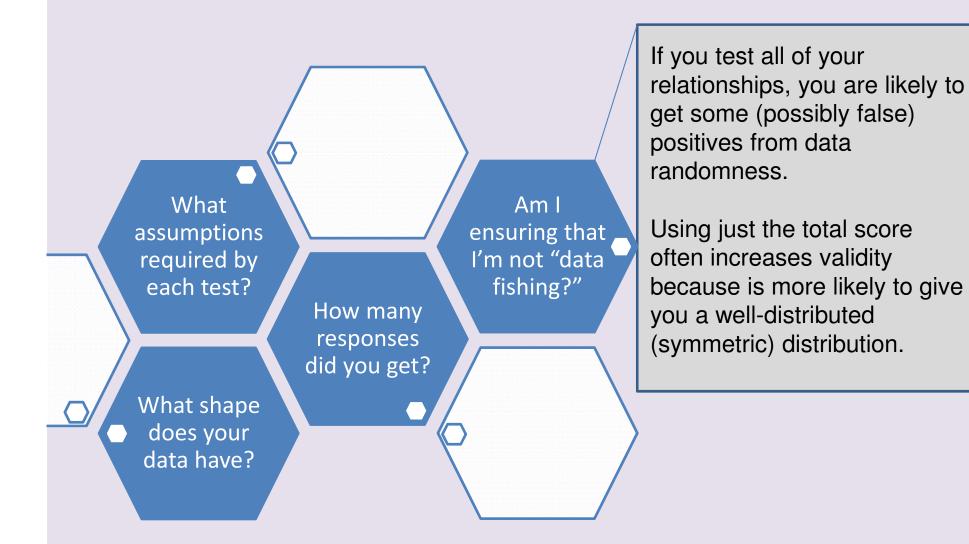
Descriptive Statistics

- Score changes
- Histogram
- Boxplot

Inferential Statistics

- Paired t-test
- Wilcoxon signed rank test
- Binomial sign test

Things to think about

WWEST

What assumptions required by each test?

What shape does your data have?

How many responses did you get?

Am I ensuring that I'm not "data fishing?"

If you test all of your relationships, you are likely to get some (possibly false) positives from data randomness.

Using just the total score often increases validity because is more likely to give you a well-distributed (symmetric) distribution.

Tools & Resources

Free online handbooks that step you through the basics:

A Basic Guide to Program Evaluation by Carter McNamara

http://www.tgci.com/magazine/A%20Basic%20Guide%20to%20Program%20Evaluation.pdf

Program Evaluation Methods: Measurement and Attribution of Program Results. Third Edition. Review Practices and Studies.

http://www.tbs-sct.gc.ca/cee/pubs/meth/pem-mep-eng.pdf

Research Basics

- Judging good resources from bad resources is the same as in any other profession:
  - If in a journal, peer-reviewed? Respected?
  - Is it often-cited?
  - What does the organization do? (academic or implementor)
  - How extensive is their study? How many subjects? How extensive was their reliability testing?

Accessing Journals

- Google scholar provides some access
- Alumni can access journals in person, and sometimes online, at their alma mater's libraries
- Vancouver Public Library has access to some references - any Metro Vancouver resident can use that facility
- Your local library (including public) can request items via InterLibrary Loan from other locations
- Those affiliated with a university can get reciprocal borrowing privileges at other institutions for free
- UBC (including Okanagan) allows free in-person public use. See the circulation desk if you need a guest ID for logging in

Writing Objectives

- Involve your stakeholders when you write your objectives, if possible

- Look to your mission and vision for guidance

- Put yourself in the shoes of community members at large and those of your sponsors – are you targeting what matters the most?

- An objective does not necessarily set the event – it just clarifies an outcome that should result from it

- For measurement, pick 1-2 key outcomes

- Possible resource:
  http://ctb.ku.edu/en/tablecontents/sub_section_main_1087.aspx

- Are you asking the right questions that reflect what you are trying to measure?
  - http://www.socialresearchmethods.net/kb/measval.php
  - Content validity is particularly important
- Talk to content-area experts and have them give you feedback
- If possible, consult psychometricians or evaluation experts from counselling psychology

Approaching Experts

- If the request is polite, reasonable, and scoped, most researchers are usually happy to help non-profit organizations
- Request ~20 minutes of their time, and be prepared to come to them on their schedule
- Have specific questions you want to ask, and drafts there for them to review (if applicable)
- Take detailed notes or ask if you can record the meeting. Consider bringing two people
- Always send a thank you card afterwards

Matching Paired Data

- If you are doing pre/post matching, you may wish to use anonymous identifiers to maintain confidentiality
  - Challenging because people forget what they write
  - WWEST created a scheme for Creating Connections that you are welcome to use (most appropriate for adults)
  - Literature (journal access needed) available at http://erx.sagepub.com/content/34/5/391.short

- Survey Monkey is a popular tool for online surveys, but does not meet some privacy standards (applicable to universities) as it uses US servers
- Consider paper-based vs. electronic
  – Paper typically gets a higher response rate
  – Electronic requires less data entry and can be done outside an event
- Those affiliated with a university may need to seek behavioural research ethics board approval

- Probabilistic linking of anonymous responses by software:
  - SAS (not free),
  - MTB (free! Relatively easy, step by step instruction here: http://www.uni-due.de/~hq0215/documents/safelink_mtb.pdf) http://soz-159.uni-duisburg.de/linkage/?Downloads::software,
  - LinkPlus: http://link-plus.software.informer.com/
  - RecordLinkage Package in R (free, have not tried this myself)

- Software for statistical analysis:
  - Even excel is capable of doing a t-test!, but other statistical tests may not be so convenient

- Free software! R http://www.r-project.org/- disadvantage: steep initial learning curve

WfWest Experts

- Minimal cost graduate student consulting: Short Term Consulting Service (STCS)
  - http://www.stat.ubc.ca/SCARL/HowSCARLHelp/Detail/STCS.php

- Free Statistical Consulting for by students of STAT551: open to NGOs
  - http://www.stat.ubc.ca/SCARL/HowSCARLHelp/Detail/stat551.php

What WWEST can offer

- Vivian is willing to review your study design and provide feedback and advice
  - Email wwest.student@mech.ubc.ca and copy wwest@mech.ubc.ca
  - Please give us at least two weeks lead time – more during exams/holidays
- All WWEST Partners are welcome to use the tools we have developed or adapted
- Remember that there is a specific top-up to funding available for measuring your impact

Find Resources Around You

- Are there experts on statistics, psychology, sociology, counselling, etc. involved in your organization or in your network?

- Are there people at a post-secondary institution near you that you can contact?

- Are you part of a national body that may have resources?

- Are there other WWEST Partners working on measuring the same thing?

Breakout Working Groups

- Break out into four groups:
  - Programs for kids
  - Conferences
  - Workshops and speakers (adults)
  - Longer-term programs (adults)
- Statistics experts are here to help you brainstorm
- 6 x 10 minute brainstorms – a new question will be posted every ten minutes.

WWEST Breakout Group Topics

- How do you define good objectives for this audience? What are some examples?

- What things can you measure in your area? How would you measure your examples?

- How can you implement the evaluations in your context?

- How can you analyze and report evaluations? Who are your stakeholders?

- What difficulties may you find?

- Individually, write an action plan.

Lunch

- Mini-meetings about new abstracts:
  - GEERing Up!
  - WiSE UBC-O
  - NCWiE
  - PIMS-YRC

Partner Program Restructuring

Funded Partners

- Direct funding
- Partners events (with travel subsidy)
- Networking & cross-promotion
- *New Initiative Grant*
- *Strategic Planning Extension*
- *Impact Measurement Extension*

Network Partners

- No funding
- Partners events
- Networking & cross-promotion

Affiliates

- No funding
- No Partners events
- Networking & cross-promotion

Reporting Requirements

- Per your WWEST Partners Agreement
    - Yearly report by December 31st each report
    - Final report at close of project / end of funding
    - Project budget (not organization budget), in spreadsheet format
    - One page summary – outcomes & year ahead
    - Results from evaluations and measurements (spreadsheet where feasible)
    - Minimum of 3 images WWEST can use with photo release (submit .jpg or RAW by email)
- Important part of us reporting back to our sponsors – plan for it!

Reporting Hopes

- We love profiling WWEST Partners projects on our website and via our mailing list and social media

- We often don't have staff time to write summaries, but if you write them, we'll post them!

- Note that photos must have photo releases

- Make sure to "like" us on Facebook & let us know so we can "like" you back

- Let us know if there is a specific post on Facebook you would like us to "share" – we pick some when we come across them, but the best way to ensure we see it is to email

Best Practices Discussions

PROJECT UPDATES