

Promoting Inclusion & Accessibility through Universal Design for Learning: Sharing UBC Examples and Practices



Panelists:

Meghan Allen, Associate Professor of Teaching, UBCV Computer Science

Strang Burton, Associate Professor of Teaching, UBCV Linguistics

Tamara Ebl, Lecturer, CPA-CA, UBCO Faculty of Management

Facilitators

Afsaneh Sharif, CTLT Faculty Liaison

Nausheen Shafiq, CTLT Curriculum Consultant

Sue Hampton, CTLT Educational Consultant



UBC Point Grey Campus (Vancouver)

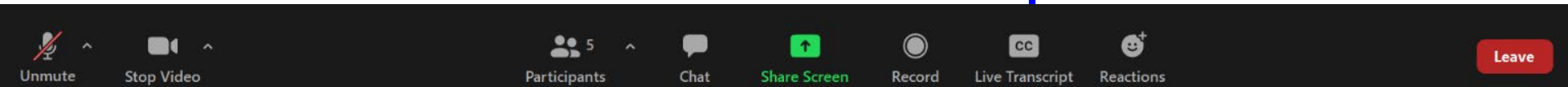
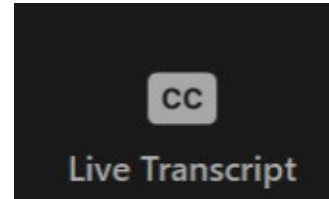
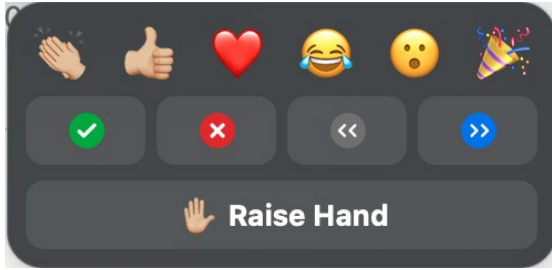
located on the traditional, ancestral, and unceded territory of the xwməθkwəy̓əm (Musqueam) People.



UBC Okanagan Campus (Kelowna)

located on the unceded territory of the Syilx (Okanagan) Peoples.

Zoom Features



Introductions: Panelists



- **Strang Burton** - Associate Professor of Teaching, Department of Linguistics, UBC Vancouver



- **Tamara Ebl** - Lecturer, Faculty of Management, UBC Okanagan



- **Meghan Allen** - Associate Professor of Teaching, Department of Computer Science; Vantage College; UBC Vancouver

Introductions: Facilitators



- **Afsaneh Sharif** - CTLT Faculty Liaison



- **Sue Hampton** - CTLT Educational Consultant



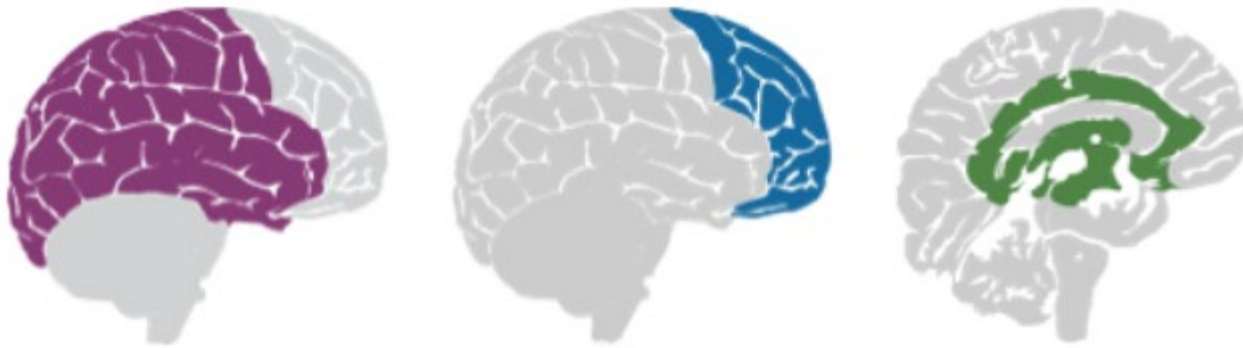
- **Nausheen Shafiq** - CTLT Curriculum Consultant

Agenda and Format

- What is universal design for learning (UDL) and why is it important?
- UDL Principles for Effective Instruction
- UBC Examples from Panelists
- Q&A
- Wrap up

What is Universal Design?

The design of products and environments to be usable by all people to the greatest extent possible, without the need for adaptation or specialized design (Mace, 1985).



What is Universal Design for Learning?

“Is a set of principles for curriculum development that give all individuals equal opportunities to learn.” It is the proactive design of our courses to ensure they are educationally accessible regardless of physical or sensory abilities.

Universal Design for Learning Analogy

Universal Design (UD)	Universal Design for Learning (UDL)
Physical Environment	Instructional Environment
Physical barriers may exist in our architectural environment	Learning barriers may exist in our curricular environment
Proactive design of physical space	Proactive design of curriculum and instruction
Physical retrofitting can be costly and is often inelegant	Instructional accommodations can be time consuming and difficult to implement

UDL Foundations: Brain-Based Learning Networks

Brain-based research indicates three distinct yet interrelated learning networks
(Rose, Meyer, Hitchcock, 2005):



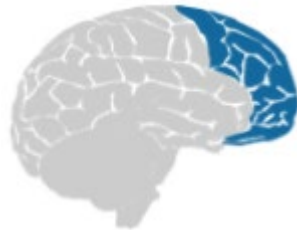
Recognition Networks: The “**What**” of Learning

How we gather facts and categorize what we see, hear, and read. Identifying letters, words, or an author’s style are recognition tasks.



Affective Networks: The “**why**” of learning

How learners get engaged and stay motivated. How they are challenged, excited or interested. These are affective dimensions.



Strategic Networks: The “**how**” of learning

Planning and performing tasks. How we organize and express our ideas. Writing an essay or solving a math problem are strategic tasks.

UDL Principles for Effective Instruction



Recognition Networks

Provide multiple means of **Representation**

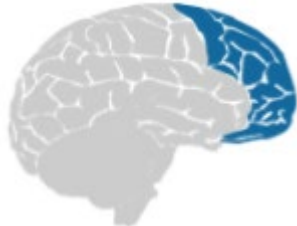
For resourceful, knowledgeable learners, present information and content in different ways.



Affective Networks

Provide multiple means of **Engagement**

For purposeful, motivated learners, stimulate interest and motivation for learning.

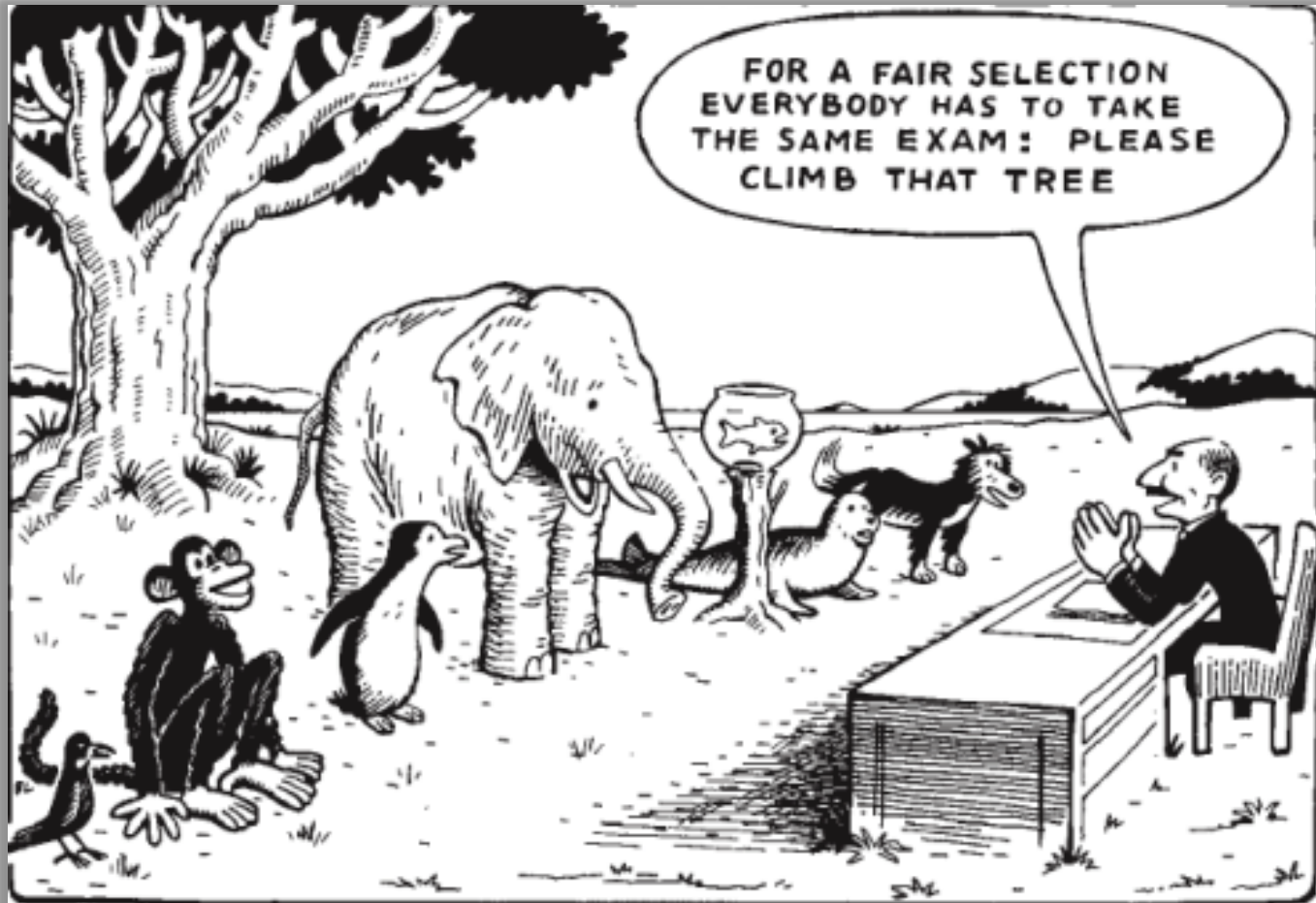


Strategic Networks

Provide multiple means of **Action and Expression**

For strategic, goal-directed learners, differentiate the ways that students can express what they know.

Educationally, Does one Size Fit All?



Questions about UDL and Delving into UBC Practices

Panel Format

Question: “How are UBC instructors putting UDL principles into practice?”

- I. Strang Burton: Principle of Representation
- II. Tamara Ebl: Principle of Engagement
- III. Meghan Allen: Principle of Action & Expression
- IV. Q&A

Recognition Network (What)

Supported by multiple means of representation

Inclusive Naming in Examples

One principle of UDL:

Engagement

Look for ways to motivate learners and sustain their interest. ...

Give assignments that feel relevant to their lives

Source (emphasis added):
<https://www.understood.org>

How my mc examples
used to look...

*Fred is learning Mandarin, and he
learns 4 word-families each week...*

*Suppose two children, call them 'Mary'
and 'Sue' are of equal intelligence...*

How my mc examples
look now...

*Juma is learning Mandarin, and he
learns 4 word-families each week...*

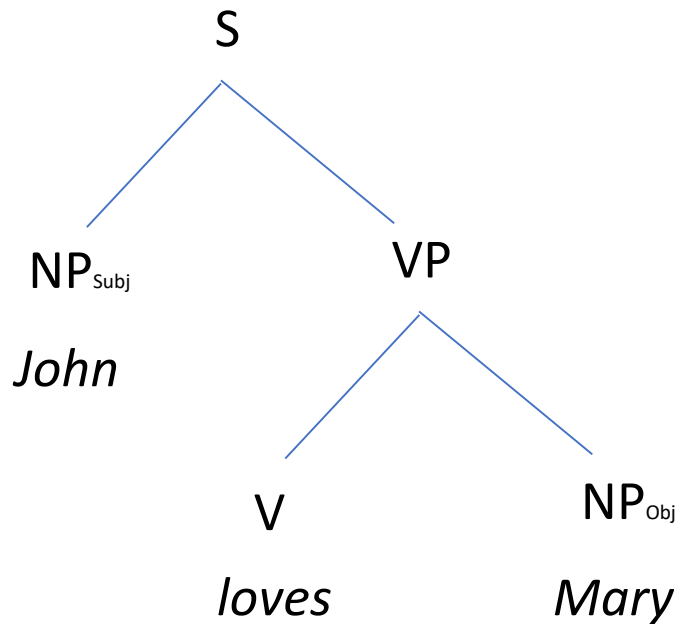
*Suppose two children, call them 'Mary'
and 'Chae-Yeong' are of equal
intelligence...*

A cross-cultural names resource:

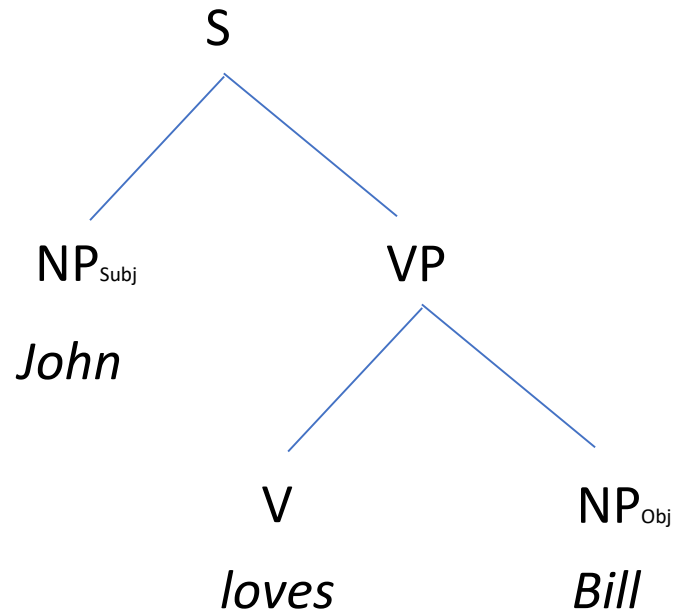
*'Behind the Name: The Etymology and
History of First Names -*

<https://www.behindthename.com/>

How my syntax trees
used to look...



My examples now
include ALSO...



Accessible PPT slides for Colour Blind Students

- What do your slides *look like* to colour blind students?
- What *problems* can arise for colour blind students?
- Quick tips for teachers

‘Green’ color blindness (a.k.a. ‘red-green blindness’)

- Affects 6% of males, 0.45% of females
- **Deuteranopia** = ‘blind’ to the color green
- **Deuteranomaly**=low capacity for seeing shades of green
- *Red, green, orange → all look yellowish, brownish*

Source: <https://www.colour-blindness.com/>

Full spectrum



Languages of India

Red = IE - Green = Dravidian

- **Sanskrit**
- **Malayalam**
- **Tamil**
- **Hindi**
- **Sinhala**
- **Kannada**
- ...

Deuteranopia

(1% of males in your class)



Languages of India

Red = IE - Green = Dravidian

- **Sanskrit**
- **Malayalam**
- **Tamil**
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- **Sinhala**
- **Kannada**
- ...

Deuteranomaly

(5% of males in your class)



Languages of India

Red = IE - Green = Dravidian

- **Sanskrit**
- **Malayalam**
- **Tamil**
- **Hindi**
- **Sinhala**
- **Kannada**
- ...

Blue-Yellow color blindness:

- Rare: only affects 0.01%
- Often due to injury, alcoholism, solvents.
- **Tritanopia** = 'blind' to the color blue
- **Tritanomaly** = low capacity for seeing some shades of blue

- *Blues, Greens → both look bluish-greyish*
- *Yellows → look pinkish*

Full spectrum



Languages of India

Blue = IE - Green = Dravidian

- Sanskrit
- Malayalam
- Tamil
- Hindi
- Sinhala
- Kannada
- ...

Tritanopia

(a very few of your students)



Languages of India

Blue = IE - Green = Dravidian

- Sanskrit
- Malayalam
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- ...

Tritanomaly

(a very few of your students)



Languages of India

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- ...

Simulator: <https://www.color-blindness.com/coblis-color-blindness-simulator/>

Total color blindness:

- Very rare, less than 0.003% of people
- Rod monochromacy – no colours, typically have other vision problems
- Cone Monochromacy – no or very limited colours (only one type of cone) but otherwise normal vision
- *Everything → looks greyish*

Full spectrum



Languages of India

Blue = IE (Indo-Aryan) -
Green = Dravidian
Red = IE (Other)

- Sanskrit
- Malayalam
- Tamil
- Hindi
- Sinhala
- Indian English

Rod Monochromacy (a very very few of your students)



Languages of India

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Blue Cone Monochromacy (a very very few of your students)



Languages of India

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- Sinhala
- Indian English

Quick tips:

- Never JUST color-code
- Add shape-symbols, textures, font differences, hue differences.
- Avoid certain color combinations:
 - Green + Any other color
 - Blue + Purple, Grey

Sources:

<https://wearecolorblind.com/>

<https://evopt.co/expert-tips-on-designing-for-color-blindness-from-a-color-blind-designer-infographic/>

Resources for Color Design:

- <https://wearecolorblind.com/>
- <https://evopt.co/expert-tips-on-designing-for-color-blindness-from-a-color-blind-designer-infographic/>
- <https://www.color-blindness.com/coblis-color-blindness-simulator/>

Communicating with members of the Deaf community as a non-signing person

- Practical resources for getting an interpreter
- Strang's one tip

Resources for ASL meetings:

- For live meetings/classes, you need to book a professional interpreter
- UBC supports this, but you need to book well in advance
- To book an ASL interpreter at UBC:
<https://webforms.students.ubc.ca/access/captioning-sign-language>
- Phone meetings are also possible, much easier to book

Strang's One Tip as a non-signing person:

Look at the person you are having a conversation with (NOT at the interpreter)

See Nigel Howard's discussion in the [recent ubc arts news article](#) on making higher education accessible

<https://www.arts.ubc.ca/news/making-higher-education-more-accessible-six-tips-from-arts-faculty-and-staff/>

Affective Network (Why)

Supported by Multiple Means of Engagement

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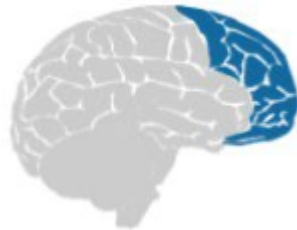
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Recognition Networks

Provide multiple means of **Representation**

For resourceful, knowledgeable learners, present information and content in different ways.



Affective Networks

Provide multiple means of **Engagement**

For purposeful, motivated learners, stimulate interest and motivation for learning.



Strategic Networks

Provide multiple means of **Action and Expression**

For strategic, goal-directed learners, differentiate the ways that students can express what they know.

What sparked your interest to attend this session today?

Please add a 'post-it note'

https://jamboard.google.com/d/1SxvKfYYeZt_T0e8GkIShXHNBJdodpnR39IqJxCRqgJE/edit?usp=sharing

Debrief: *What sparked your interest to attend this session today?*

You've just participated in, or at least witnessed, application of **UDL principles**

- ✓ Affective Networks (the 'Why' of learning)
- ✓ Using a creative means of **Engagement**

What experience has taught me ...

- **(6 Key Things)**

1) Safe Space

I. Mutual Respect & Understanding

- ✓ @ Welcome
- ✓ Course Syllabus

II. Names = Important 😊

III. 'Thank you in advance' (vs. 'Thou Shalt Not')

2) Perspective = Value

I. Everyone has a story ...

II. 2 Ears, 1 Mouth

✓ Reinforce / Reframe

III. Embrace the 'Imperfect'

3) Optimize Relevance, Value, and Authenticity

I. Interests and Goals

II. Apply to 'Real Life'

III. Encourage Participation & Imagination

- ✓ Hands-On Activities
- ✓ 'Creative Delivery'

4) Learning Community

I. . Start-of-Term

- ✓ Discussion Board Introductions
- ✓ Ice Breaker Activities

II. Peer-to-Peer Interactions

III. Team Charter

5) Self-Assessment & Reflection

I. 'Flipped' Classroom

II. Growth Mindset

- ✓ Practice Makes Progress
- ✓ Celebrate 'A-Ha!' Moments

III. Active Learning

- ✓ Student Self-Assessment
- ✓ Prof Assessment

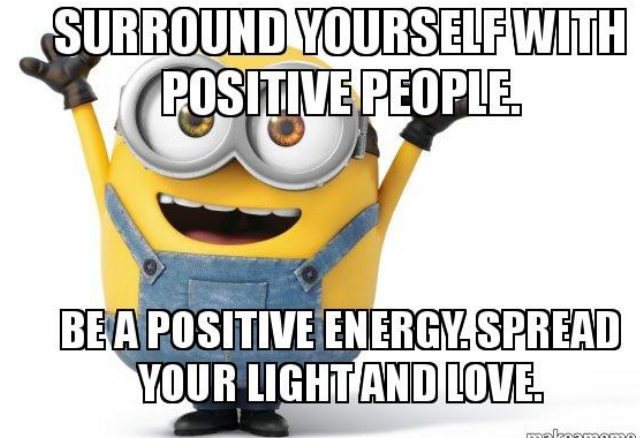
6) Contagious

Yawns are Contagious

BUT ...

So are:

- ✓ Smiles 😊
- ✓ Positive Energy



10 UDL Tips for Engagement

1. Create clear, specific goals
2. Minimize distractions
3. Present flexible assessment options
4. Provide frequent, formative feedback
5. Incorporate authentic and relevant examples
6. Ensure resources and supports meet the demands of a task
7. Increase opportunities for collaboration
8. Share examples and non-examples
9. Offer time for active reflection on learning and engagement
10. Support risk-taking

Strategic Network (How)

**Supported by Multiple Means of Action
and Expression**

Multiple Means of Action and Expression in CPSC 103



Strategic Networks

Provide multiple means of Action and Expression: The “how” of learning. Planning and performing tasks. How we organize and express our ideas. Writing an essay or solving a math problem are strategic tasks.

Implemented Through: Providing variety in practice opportunities and assessments (graded for correctness or completion)

10 UDL Tips for Assessment

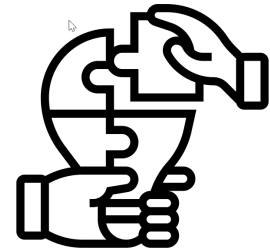
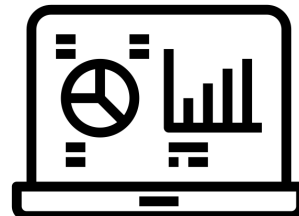
1. Align assessments to learning goals
2. Offer authentic opportunities for assessment
3. Assess engagement as well as content knowledge
4. Include frequent formative assessments
5. Reduce unnecessary barriers to access
6. Support learner variability through flexible assessments
7. Use and share rubrics to clarify expectations
8. Involve learners in assessing their learning progress
9. Reflect on summative assessments for future design
10. Build communities of practice that support reflective design

UDL Assessment tips applied in CPSC 103

1. Align assessments to learning goals
2. Offer authentic opportunities for assessment
3. Assess engagement as well as content knowledge

This course was designed with specific goals in mind. *If you are willing and able to meet the requirements, by the end of this course, you will be able to...*

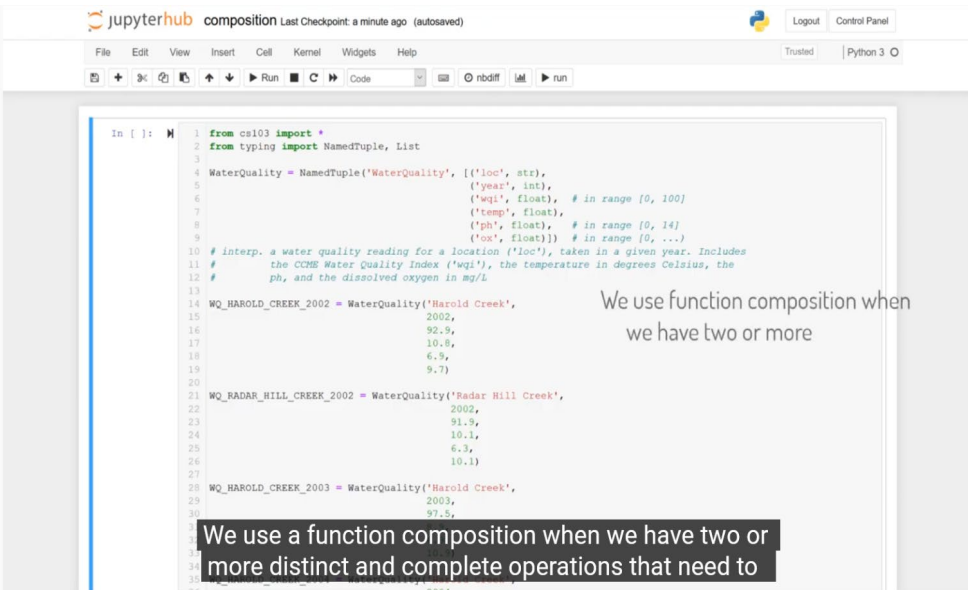
1. xxx
2. xxx
3. xxx
4. xxx
5. xxx
6. xxx
7. xxx



UDL Assessment tips applied in CPSC 103

5. Reduce unnecessary barriers to access

Provide course material in multiple ways



```
1 from cs103 import *
2 from typing import NamedTuple, List
3
4 WaterQuality = NamedTuple('WaterQuality', [('loc', str),
5                                             ('year', int),
6                                             ('wqi', float), # in range [0, 100]
7                                             ('temp', float),
8                                             ('ph', float), # in range [0, 14]
9                                             ('ox', float)] # in range [0, ...])
10 # interp. a water quality reading for a location ('loc'), taken in a given year. Includes
11 # the CQBE Water Quality Index ('wqi'), the temperature in degrees Celsius, the
12 # ph, and the dissolved oxygen in mg/L
13
14 WQ_HAROLD_CREEK_2002 = WaterQuality('Harold Creek',
15                                   2002,
16                                   92.9,
17                                   10.9,
18                                   6.5,
19                                   9.7)
20
21 WQ_RADAR_HILL_CREEK_2002 = WaterQuality('Radar Hill Creek',
22                                       2002,
23                                       91.9,
24                                       10.1,
25                                       6.3,
26                                       10.1)
27
28 WQ_HAROLD_CREEK_2003 = WaterQuality('Harold Creek',
29                                   2003,
30                                   97.5,
```

We use function composition when we have two or more

We use a function composition when we have two or more distinct and complete operations that need to

Module 6: Pre-Reading

So far, we have learned how to design functions and how to design data definitions. We've seen that the choices that we make when designing data definitions will affect the structure of the functions that take in those data types. We have learned how to create well-structured and readable programs that solve the problem we are trying to solve. Now we are ready to start solving bigger, more complex problems. In this module, we are going to learn how to break a bigger design problem into many sub-problems. Our goal is to focus each function design on one task, which allows us to create modular, readable, well-structured programs. These program characteristics are important considerations when we want our programs to be usable and modifiable.

The design recipes that you've already learned demonstrate why breaking a problem down into subproblems makes generating the solution easier. You similarly break tasks into subtasks all the time in your daily life in order to make larger problems easier to solve. For example, you may want to have friends over for a party. You break that larger task into many smaller tasks like sending out invitations, planning the menu, getting groceries, setting up entertainment, and so on. Each of these smaller tasks is more focused and easier to accomplish than the bigger one.

Sometimes a function design is complex enough that it's best to *decompose* it—break it down—into two or more function definitions. We have seen this already with the Reference Rule. The Reference Rule tells us that we very likely need to call a helper function when we see a reference to a non-primitive type in a template. The Reference Rule ensures that we keep the original function focused on one task by calling a helper function to complete a subtask. This week we will learn some more helper rules that help us break a single function design problem down into multiple function designs. Each function design focuses on performing one task.

Helper Rules

In general, you should create a helper function whenever part of a function you are designing seems to be a well-defined subtask. You should create a helper function for the subtask and call the new helper function from your original function. The below rules will help you determine when you need to write a helper function, but always remember the overarching rule of "one task per function": if a function is doing more than one task, break it down into helper functions.

- **Reference:** use a helper function at references to other non-primitive data definitions (this will be in the template)
- **Composition:** use a helper function for each distinct and complete operation that must be performed on the input data
- **Knowledge Domain Shift:** use a helper function if a subtask involves knowledge about a type or domain that is not the same as the type or domain of the function's parameters. (The reference rule is a specific case of knowledge domain shift!)

UDL Assessment tips applied in CPSC 103

5. Reduce unnecessary barriers to access

Provide flexible access to TA and instructor help with daytime and evening hours

TA office hours (Sep 14 until Dec 3; excluding stat holidays at UBC):

- **Mon 1-2pm:**
 - <https://ubc.zoom.us/j/67299335896> ↗
 - Passcode: 103
- **Mon 5-6pm:**
 - Meeting ID: 239 756 9491
 - Passcode: 103
- **Wed 4:30-6:30pm:**
 - <https://ubc.zoom.us/j/66116257524> ↗
 - Passcode: 103
- **Wed 6-7pm:**
 - <https://ubc.zoom.us/j/67778893714> ↗
 - Passcode: 103
- **Wed 8:30-10:30pm:**
 - <https://ubc.zoom.us/j/66062570799> ↗
 - Passcode: 103

Post Lecture Help Sessions

Two TAs are available to help after lectures. Students from either section are welcome

- **Tue Thu 11am-12pm**
 - <https://ubc.zoom.us/s/67591948280>
- **Tue Thu 3:30-4:30pm:**
 - <https://ubc.zoom.us/j/63790149377>

Meghan's office Hours:

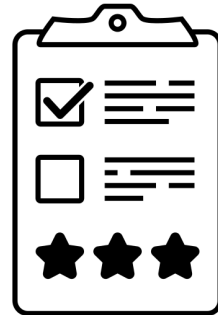
- Wednesdays, 1-2pm
<https://ubc.zoom.us/j/66382016250>
- Thursdays, 9-10pm
<https://ubc.zoom.us/j/61101677416>

UDL Assessment tips applied in CPSC 103

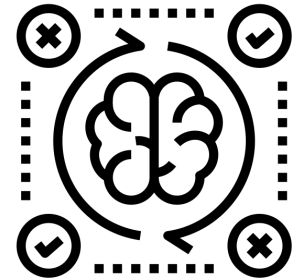
4. Include frequent formative assessments
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Worksheets



Project rubrics

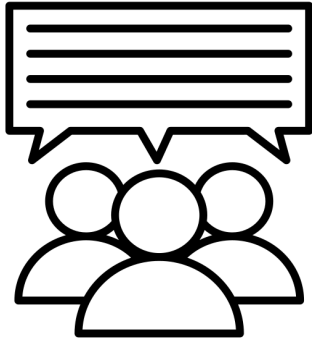


Self-assessment

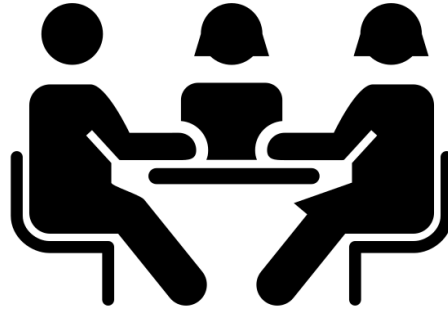
UDL Assessment tips applied in CPSC 103

9. Reflect on summative assessments for future design

10. Build communities of practice that support reflective design



Feedback from
students and TAs



Instructor reflection and
planning meetings

Wrap-up

What now?

- What did you learn? What facts or observation stood out?
- Why is that important?
- What patterns or conclusions are emerging?
- What actions make sense?

Resources

- **Introduction to Universal Design for Learning**
https://canvas.ubc.ca/courses/31444/pages/1-introduction-to-universal-design-for-learning?module_item_id=1153605
- **National Center on Universal Design for Learning**
<http://www.udlcenter.org/aboutudl/udlguidelines>
www.cast.org
- **UDL Universe**
<http://udluniverse.com/>
- **Nine Common Elements of UDL**
https://docs.google.com/document/d/1n9nWs5C0kGXfwjq1G8Tv-YqZz_NA17A-VAooOPcIlk/edit
- **Ensuring Access through Collaboration and Technology (EnACT)**
<http://enact.sonoma.edu>
- **OER Accessibility Toolkit**
<https://open.ubc.ca/teach/oer-accessibility-toolkit/>

Thank you!



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