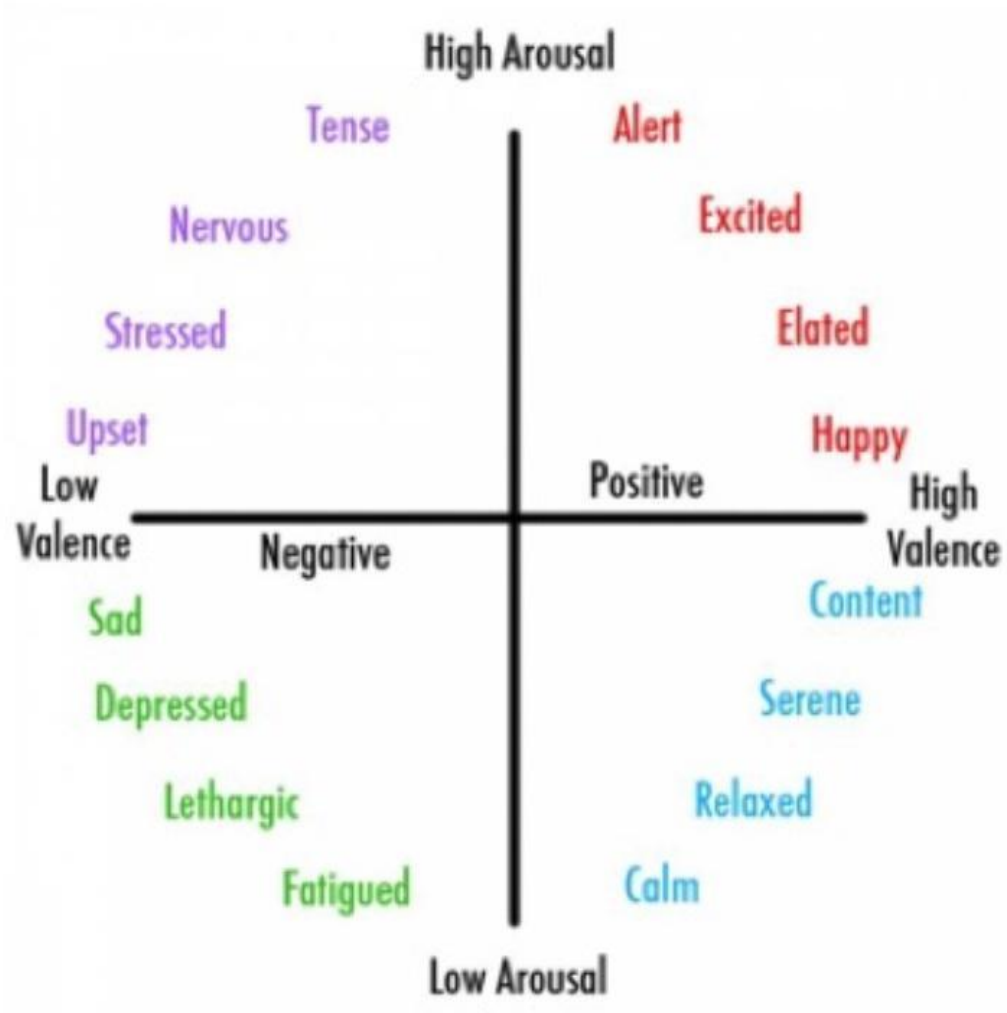
Introduction to Technical Writing

Dr. Sarah Egan Warren, Class of 2024

Technical Communication Check In

Whenever we have a Tech Comm class, you will complete a quick Communication Check In activity.



Agenda

Basics

Examples

Resources

The Basics & Examples

This class covers Big Picture Technical Writing. It is NOT exhaustive or comprehensive. It is intended to be a reminder / reference. Questions about technical writing? Ask SEW.

Basics

- Audience
- Claim/Evidence
- Topic Sentences
- Transitions
- Parallelism
- Chunking
- Concision, Precision, Revision
- Grammar
- Proofreading/Editing
- Formatting

Audience

Adjust to the expectations, needs, wants of your audience

- Make it relevant (BLUF, WIIFT, Why Before How)
- Choose your vocabulary
- Use precise language

IT DEPENDS!

Audience Example

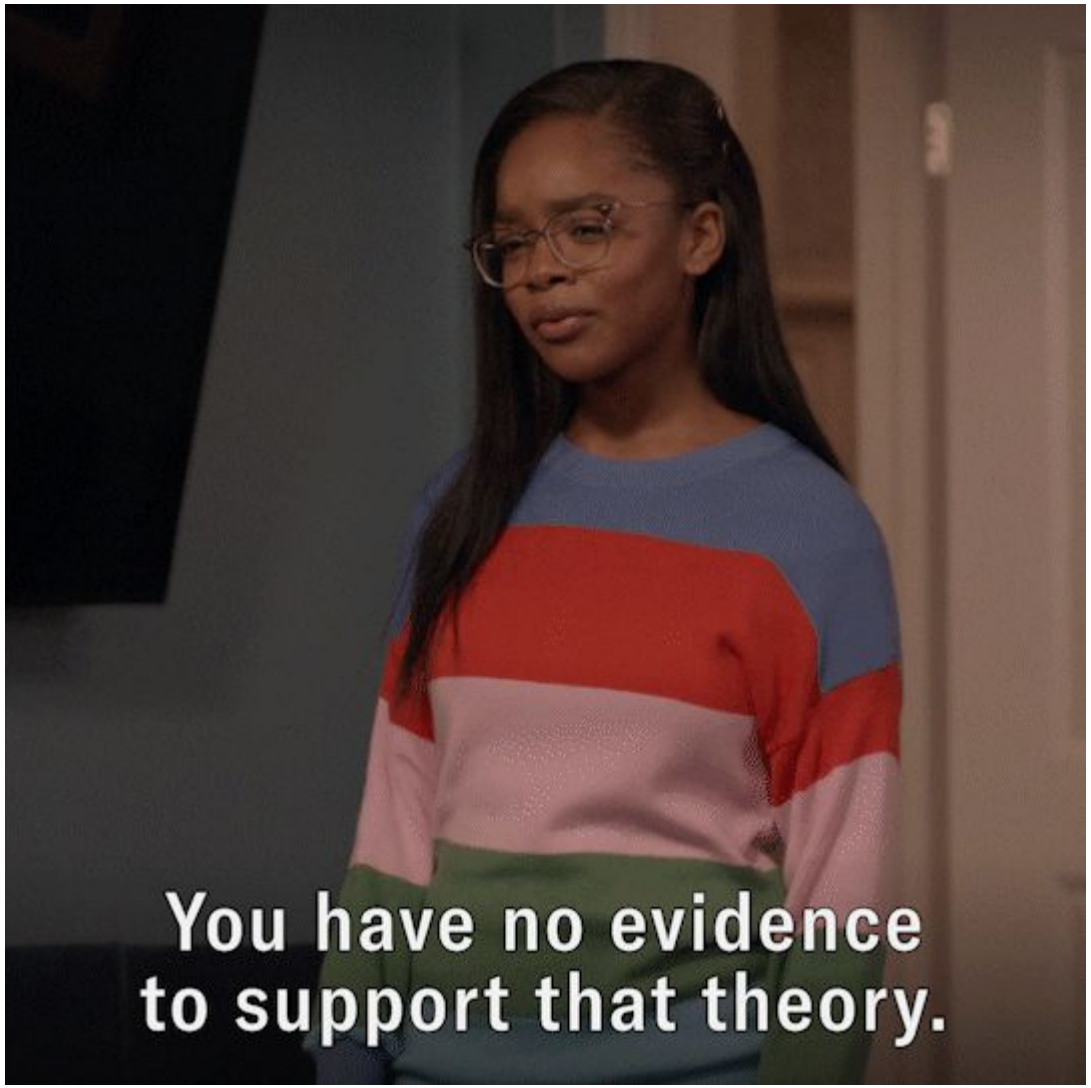
Explain machine learning in 5 levels of difficulty: https://youtu.be/5q87K1WaoFI

NOVICE
“Machine learning is a way that we teach computers to learn things about the world by looking at patterns and looking at examples of things.”

EXPERT
“When you're collecting data from the real world and then building machine learning systems that automate decisions based on that data, all of the biases and problems that are already in the real world then can be magnified through that machine learning system.”

Claim/Evidence

Make your statement and support it with details (facts, figures, statistics)



Claim/Evidence Example

MISSING EVIDENCE

“Carolyn is a fantastic team member.”

CLAIM WITH EVIDENCE

“Carolyn proved to be a fantastic team member when she quickly identified the problem in our Python code.”

Topic Sentence

- Introduces the main idea of the paragraph
- Establishes the order of information in paragraph

Topic Sentence Example

WEAK

“Changes will improve production.”

BETTER

“Based on our findings, we recommend implementing two new protocols to increase production.”

Transitions

- Move from one topic to the next
- Improve flow and readability throughout

Transitions Example

- First, second, third
- Next
- Finally
- In addition
- However
- In conclusion

Parallelism

- The use of identical or equivalent syntactic constructions in corresponding clauses or phrases.
(from Dictionary.com)

Use similar structure for each phrase.

START YOUR LISTS THE SAME WAY

Parallelism Example

NOT PARALLEL

- assisting a Ph.D. student with dissertation research on intergroup conflict and aggression
- responsible for planning, the schedule and the running of experiments
- conduct literature reviews and wrote papers on intergroup conflict and violence

PARALLEL

- assisted a Ph.D. student with dissertation research on intergroup conflict and aggression
- planned, scheduled, and ran experiments
- conducted literature reviews and wrote papers on intergroup conflict and violence

Chunking

- Separating ideas into smaller sections or “chunks” to make it easier to read.

Chunking Example

NOT CHUNKED

The ESM models were evaluated for white noise up to lag 16. The white noise tests indicated that white noise did not exist in the current linear models since the p-values were less than the 0.001 significance level[1] for both Tuscan and Phoenix. The null hypothesis for the white noise test was white noise while the alternative hypothesis was that there was still correlation left to be modeled. For Tuscan, the average, max, and minimum p-values were all less than 0.0001. For Phoenix, the max p-value was 0.0960, the average p-value was 0.0239 and the minimum p-value was 0.0001. The lack of white noise highlights the possibility to improve upon the results from the ESM models. In order to create better, non-ESM models, the data needed to be stationary. However, as both the Phoenix and Tuscan data are trending as shown in figure 1, they are both non-stationary data sets. In order to figure out how to turn these non-stationary data sets into stationary data sets, the Augmented Dicky Fuller (ADF) test associated with trend was used. The Dickey-Fuller test is used to determine whether a unit root (a feature that can cause issues in statistical inference) is present in an autoregressive model. The formula is appropriate for trending time series like prices. The null hypothesis for the ADF test was non-stationarity requiring the stochastic approach of differencing to achieve stationarity while the alternative hypothesis was stationarity around the trend requiring the deterministic approach of linear regression. The lag 2 test, which analyzes 3 lags of Y, was used. A significance level of 0.001 was utilized to account for sample size. The high trend p-values for Phoenix indicated a stochastic trend. Low trend p-values for Tuscan indicated a deterministic trend. Based on these results, to achieve stationarity, we suggest differencing to remove the Phoenix trend and regression to remove the Tuscan trend.

Chunking Example

CHUNKED

The **ESM models** were evaluated for **white noise** up to lag 16. The white noise tests indicated that white noise did not exist in the current linear models since the p-values were less than the 0.001 significance level[1] for both Tuscan and Phoenix. The null hypothesis for the white noise test was white noise while the alternative hypothesis was that there was still correlation left to be modeled. For Tuscan, the average, max, and minimum p-values were all less than 0.0001. For Phoenix, the max p-value was 0.0960, the average p-value was 0.0239 and the minimum p-value was 0.0001.The lack of white noise highlights the possibility to improve upon the results from the ESM models.

In order to create better, **non-ESM models**, the data needed to be **stationary.** However, as both the Phoenix and Tuscan data are trending as shown in figure 1, they are both non-stationary data sets. In order to figure out how to turn these non-stationary data sets into stationary data sets, the **Augmented Dicky Fuller (ADF)** test associated with trend was used. The Dickey-Fuller test is used to determine whether a unit root (a feature that can cause issues in statistical inference) is present in an autoregressive model. The formula is appropriate for trending time series like prices. The null hypothesis for the ADF test was non-stationarity requiring the stochastic approach of differencing to achieve stationarity while the alternative hypothesis was stationarity around the trend requiring the deterministic approach of linear regression. The lag 2 test, which analyzes 3 lags of Y, was used. A significance level of 0.001 was utilized to account for sample size. The high trend p-values for Phoenix indicated a stochastic trend. Low trend p-values for Tuscan indicated a deterministic trend. Based on these results, to achieve stationarity, we suggest differencing to remove the Phoenix trend and regression to remove the Tuscan trend.

Concision, Precision, Revision

CPR for your writing.

Concision

- Use short paragraphs ~150 words
  - Long paragraphs are hard to read and signify lack of clarity, cohesion, organization

- Use short sentences ~15-20 words
  - Long sentences limit comprehension

Concision Example: Avoid Nominalizations

Avoid Nominalizations (verbs used as nouns)

We have made an estimation that you will need an initial investment of between $290,000 and $605,000. (17 words)

We estimate that you will initially invest between $290,000 and $605,000. (11 words)

Concision Example: Avoid Nominalizations

Avoid Nominalizations (verbs used as nouns)

in violation of — **violate**
provide an illustration of — **illustrate**
conduct an examination of — **examine**
make provision for — **provide for**
make a contribution — **contribute**
provide a description of — **describe**
submit an application — **apply**
take into consideration — **consider**
have a discussion about — **discuss**
provide responses — **respond**
make inquiry — **inquire**
provide assistance — **assist**
place a limitation upon — **limit**
provide protection to — **protect**
reach a resolution — **resolve**
makes mention of — **states or says**
are in compliance with — **comply**

Concision Example: Substitute Prepositional Phrases

Prepositions indicate relations between nouns, pronouns, and verbs. Common examples include ***of, for, with, between, on, at, in, off, to***.

Concision Example: Substitute Prepositional Phrases

1. Substitute an Adverb for a Prepositional Phrase

- Original: The politician responded to the allegations with forceful vehemence (9).
- Revised: The politician responded vehemently to the allegations (7).

2. Use Possessives in Place of a Prepositional Phrase

- Original: She was disturbed by the violent images in the movie(10).
- Revised: She was disturbed by the movie's violent images (8).

3. Delete Unnecessary Prepositional Phrases

- Original: The best outcome for this scenario would be an incremental withdrawal (11).
- Revised: The best outcome would be an incremental withdrawal (8).

Precision

Writing that limits questions, misunderstandings, and ambiguity

Precision

- Quantify and specify findings
- Use consistent terminology
- Minimize ambiguity

NOTE: Sometimes being precise requires more words instead of fewer, so do not sacrifice clarity for concision.

Precision Example: Quantify & Specify

- Include necessary details, exclude extraneous information
- Use quantitative rather than qualitative descriptions

LESS PRECISE
“The development rate was fastest in the higher temperature treatment.”

MORE PRECISE
“The development rate in the 30°C temperature treatment was 10% faster than development rate in the 20°C temperature treatment.”

Precision Example: Quantify & Specify

We were able to identify key attributes of potential customers who may wish to buy products from Commercial Banking.

What are those "key attributes?" How many? Which products?

The visual shows that our recommended model generated relatively accurate predictions.

What does "relatively accurate predictions" mean? MAPE?

We determined age to be the biggest factor affecting pump failure rates.

Newer or older pumps? Is there a point at which pumps are more or less likely to fail? Less than 2 years? More than 3?

Precision Example: Use Consistent Terms

- Borrowers/Homeowners/Owner
- Manager/Boss/Administrator/Director/Lead
- Customers/Clients/Shoppers/Consumers/Patrons
- Variables/Factors/Measures
- Users/Participants/Subjects

PICK ONE AND USE IT.

*Adapt to your audience!

Precision Example: Minimize Ambiguity

- Limit unclear antecedents/dummy subjects: “It is” and “There are”

“It is apparent from this table that the most significant variable affecting the outcome is the size of the company.”

Revised: “Table 2 shows that the most significant variable is company size.”

“There are many challenges that analysts face when interpreting large sets of data.”

Revised: “Analysts face challenges when interpreting large sets of data.”

Precision Example: Minimize Ambiguity

- Limit ambiguous conjunctions
  Since = time
  As = while
  Because = causality

Imprecise: Data for two participants were incomplete ***since*** these participants did not report for follow-up testing.

Precise: Data for two participants were incomplete ***because*** these participants did not report for follow-up testing.

Imprecise: We wanted to reduce the vibration of the fan at the exhaust **as** the exhaust ducting was cracking.

Precise: We wanted to reduce the vibration of the fan at the exhaust **because** the exhaust ducting was cracking.

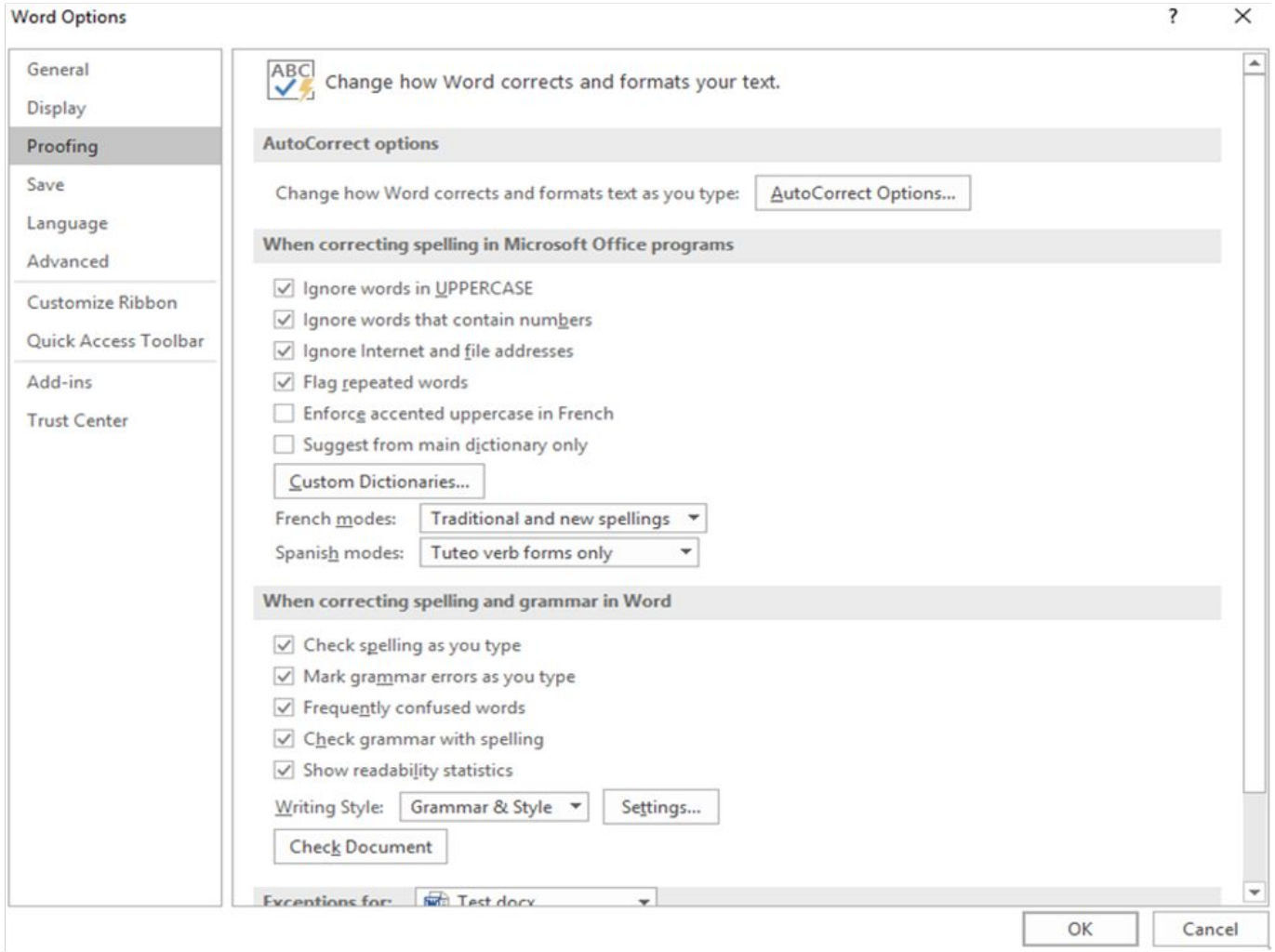
Revision

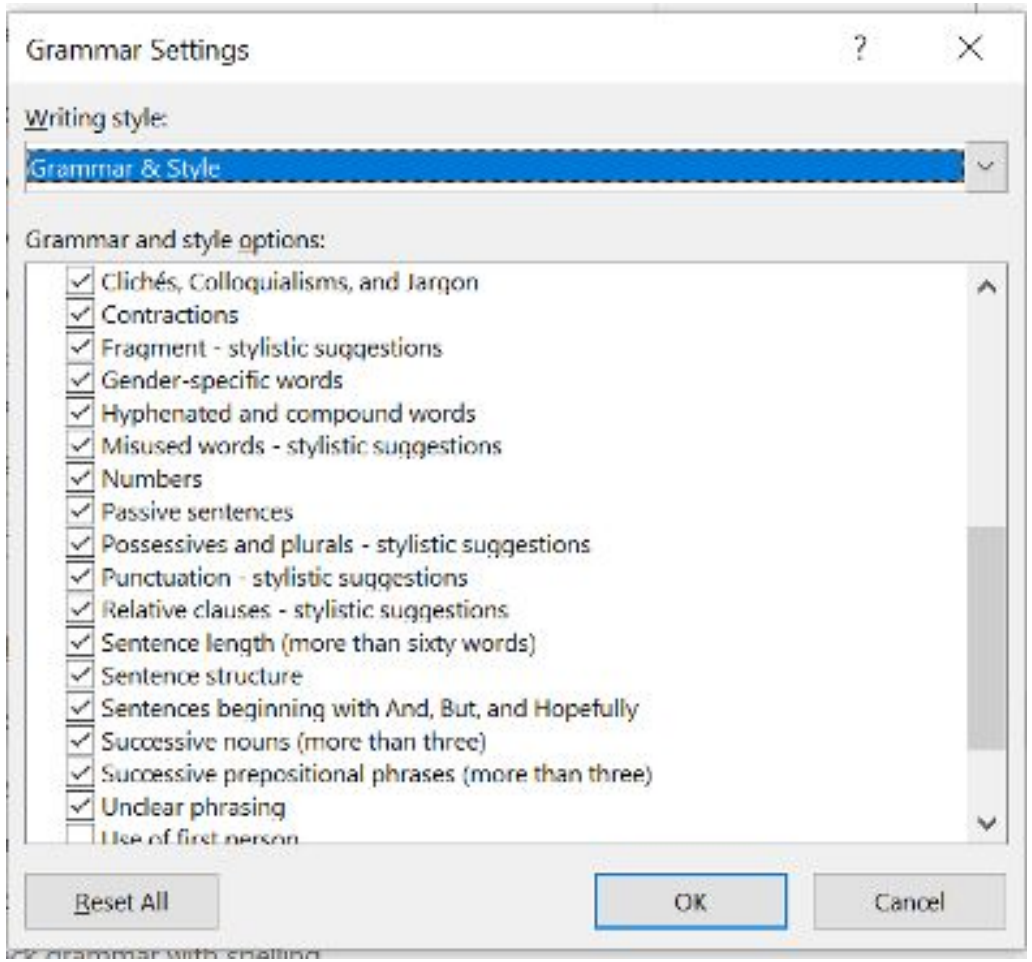
Use Grammarly

Use Word Grammar & Style Check (Practicum work!)

Revision: Word Grammar and Style Check

Click Proofing > Settings





Resources

If you have a favorite grammar or writing resource, please share!

Look it up, test yourself

- Michael Alley from Penn State Kahoot self-paced guide and quiz
- Guide to Grammar and Writing
- Grammar Girl

When in doubt, Google it!

Next

TIPS

Thanks for the Feedback

Summer Practicum

Writing Practice - 10 minutes a day

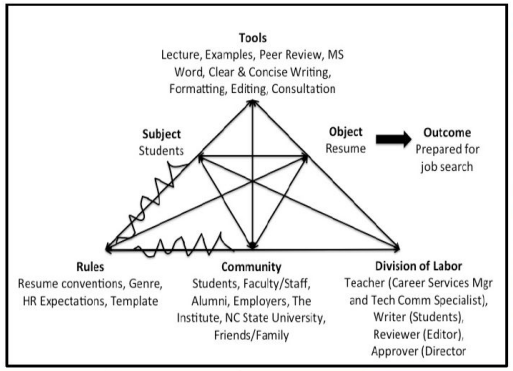
One-on-one writing feedback starting in fall.

Options for writing practice (or do your own!)

- Create “one pager” for topics to be used as study guides
- Reflect each week on what you learned, what you are working on
- List what you accomplished, what you are doing, what obstacles you face (like a stand-up)
- Draft content for professional development portfolio
- Work on career documents
- Practice explaining complex idea to novice audience
- Fill out a weekly SWOT analysis
- Enter content into an accomplishment journal
- Write creatively about any topic

Week 6: Sociocultural Learning

From Last Semester



Cultural Historical Activity Theory (CHAT) offers us a way to "look carefully at the system's culture and its history—how things came to be as they are, and came to be viewed in ways that they do" (Fenwick, 2009, p. 238). Ultimately, CHAT provides an opportunity to view learning as a social practice and a "historical form of human activity" (Sawchuk, 2003, p. 37) that is more than just a "cognitive phenomenon" (Livingstone & Sawchuk, 2004, p. 57). By looking at learning in this way (as a social action influenced by culture and history), it is possible to uncover unknown or unacknowledged challenges to learning and explore ways to overcome them.

From the Reading

Topics
Situated Learning
CHAT
Experiential Learning
Self Regulated Learning

5 Perspectives on Experiential Learning
- reflective (constructivist)
- interference (psychoanalytic)
- participation (situated)
- resistance (critical cultural)
- co-emergence (enactivist-neuroscience and evolutionary theory)

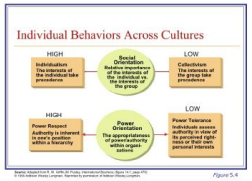
"Social systems in this view are produced and reproduced in everyday social interaction by the recursive relationship of the social and cultural conditions that structure those systems."
~Niewolny

"Context as container" is problematic.
Niewolny & Fenwick articles

Fenwick's hesitation to put theories into categories is important for me to remember because of my inclination to create visuals that simplify complex ideas. Fenwick's 5 categories are "constructed" as she indicates; therefore, I have to avoid the temptation to assign too much credibility to each category. There are overlaps and similarities that need to be acknowledged. The topology is just a helpful way to discuss the ideas. I plan to use Fenwick's theories as a "prescriptive basis" and as "interpretive tools" to better create and understand different adult learning environments.

From Class Lecture

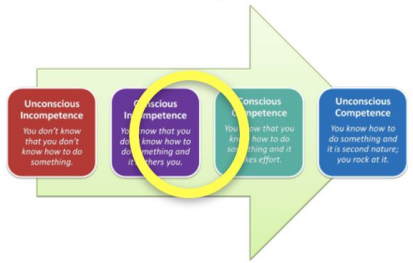
It was helpful to learn about **Bandura**. I agree that people with strong beliefs in **self-efficacy and self-regulation** are able to set stretch goals and not quit. Maintaining a **diagnostic focus** is appealing to me and I hope to employ that in my own studies.



Considering differences in **individual vs. collective** cultures and the impacts of teaching and learning is not something I have explored prior to this class.

Recursive—we both shape and are shaped by cultural practices.

This line drawing helps me better understand the recursive nature of learning. I can see parallels with Noel Burch's Conscious Competence Model.



Revisiting CHAT this week and reading more about experiential learning theories, situated learning, and self-regulated learning, I have begun to move along the continuum from Conscious Incompetence toward Conscious Competence. I am far from landing firmly in the Conscious Competence category, but I felt a certain sense of confidence with the readings this week because of my previous exposure. However, I know that the more I learn, the more I realize I need to learn—there's the rub!

What I **K**now	Want I **W**onder	What I **L**earned

Strengths	Weaknesses
•	•
•	•
•	•
Opportunities	**Threats**
•	•
•	•
•	•

Monday	
Tuesday	
Wednesday	
Thursday	
Friday	

Ask me a question.