Literature Review (CHI, CSCW, other journals)

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The following are my one page designs/summaries of papers from various Human Computer Interaction conferences (CHI, UIST, CSCW) and science communication articles.

My goal in this design exercise was to condense complex information down into a single, coherent visual that concisely explained the goals, methods, and results of each study.

Explain like I am a Scientist: The Linguistic Barriers of Entry to r/science

Authors: Tal August, Dallas Card, Gary Hsieh, Noah A. Smith, Katharina Reinecke | Conference: CHI 2020

Research problem: **"specialized language used in *r/science* has a gatekeeping effect, preventing participation by people whose language does not align with that used in *r/science*."**

Dataset: **1.8 m posts** and **66.6 m comments** from r/science and 11 other large subreddits (r/news, r/pics, r/funny...) from Jan 2018 - Dec 2018

RQ1 + findings

A) **The r/science community uses specialized language.**

B) r/science posts and comments contain more:

References to scientific studies

"**researchers have**", "**study finds**"

Hedge phrases

"**according to**", "**likely to**"

Fewer questions and personal references

"**what is**", "**do you**", "**when I**"

RQ2 + findings

A) **r/science users that don't match the community's language are more likely to leave.** In comparison to experienced users, transient authors used **more**...

Personal words

"**I**, **my**, **feel**"

and **fewer**...

Words discussing scientific findings

"**abstract**", "**journal**", "**reference**"

Results

- **Posts contain more topic words** (*Trump*, *cells*) and thus vary more than comments
- **Notably underused words are profanity and political terms** (frequently used in other subreddits)
- First posts differ less than first comments (people follow posting rules more closely) across transient and experienced users
- **Over time users will match the language of r/science**

Further discussion

- One potential way to welcome newcomers is to **provide feedback on first contributions** to help users follow community norms
- Language models can identify unusual words to **reduce jargon**
- **r/science could offer different interface views**; color code posts and comments that are intended for a broader audience.

Exploring the Effects of Technological Writing Assistance for Support Providers in Online Mental Health Community

Authors: Zhenhui Peng, Qingyu Guo, Ka Wing Tsang, Xiaojuan Ma | Conference: CHI 2020

Research problem: "**Writing tools that offer feedback for support providers' comments in online mental health communities, as well as support providers' perception of such tools, are under-investigated.**"

System: **MepsBot** (**Me**ntal health **p**eer **s**upport **Bot**), is a writing tool that offers providers in-situ writing assistance in either assessment (AS) or recommendation (RE) mode.

Abbreviations

IS = Informational Support
ES = Emotional Support
AS = Assessment mode
RE = Recommend mode

Method

Recruited 30 university students to provide feedback with MepsBot to three postgraduates seeking help with depression-related issues

H1 Findings:

a. Participants are confident their post-comments provided more IS and ES

b. Participants are significantly more satisfied with their post comments

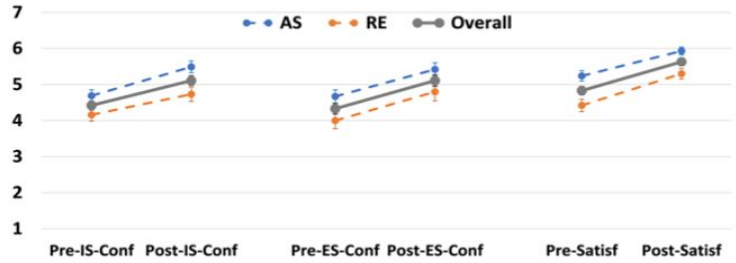
c. Ratings on post-comments are higher in AS than RE mode

H2 Findings:

a. Compared to RE mode, AS mode is perceived significantly easier to use

b. AS mode was not confirmed to be more likeable than RE mode

c. AS mode was not confirmed to be less useful in helping users write comments



Means and std errors of user confidence on 7-point Likert scale

Discussion

- MepsBot could operate in dual modes; AS mode if the comment is of high quality or RE mode if the comment is too short/low IS/ES.
- MepsBot could offer other dimensions for evaluating a comment such as grammar, relevance to post topic, or linguistic norms in the community.

Heteroglossia: In-Situ Story Ideation with the Crowd

Authors: Chieh-Yang Huang, Shih-Hong Huang, Ting-Hao Kenneth Huang
Conference: CHI 2020

Research problem: **"Authors struggle to come up with ideas throughout the writing process, yet modern writing tools fail to provide on-the-spot assistance for writers when they get stuck."**

System: **Heteroglossia**, an add-on for Google Docs that allows writers to elicit story ideas from the online crowd using their text editors.

Study 1 (Pilot): Understanding the effects of role play strategy

1. Can the roleplay strategy produce semantically further story ideas?
Yes, the role play strategy generated semantically further ideas

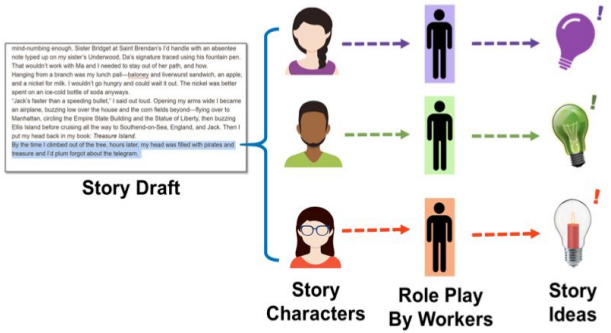
2. What are some trade-offs of using this strategy?
→ Task structures and creativity have some tradeoffs; too little structure = unfocused, sprawling narratives, while too much structure stifles creativity

Study 2: Findings from interviews after user-testing Heteroglossia

1. Heteroglossia is useful in generating inspiration and novel ideas
2. ***Writers benefit from Heteroglossia in different ways***
   → Figuring out the next part of a story, fleshing out a character's traits)
3. The roleplay strategy doesn't fit some use cases
4. Working with stranger workers had trade-offs (less pressure but also more nerve-wracking)
5. ***Had difficulty handling overwhelming number of story ideas*** (too many responses)

Method (for Study 2)

Recruited two creative writers and asked them to write a 1000 word story in three days. Writers also must use Heteroglossia at least three times.



Crowd workers were asked to imagine themselves as characters and write stories + generate plot ideas.

Comparing Effectiveness and Engagement of Data Comics and Infographics

Authors: Zezhong Wang, Shunming Wang, Matteo Farinella, Dave Murray-Rust, Nathalie Henry Riche, Benjamin Bach

CHI 2019

Research problem: **"Comics are an increasingly popular medium for explaining complex scientific concepts. However, empirical evidence comparing the effectiveness and engagement of infographics, comics and illustrated texts is still lacking."**

Hypotheses:

H-Accuracy: We expect participants' understanding of stories to decrease along this order; **comic, infographic, illustrated text**

H-Engaging: We expect comic and infographic to be more engaging than illustrated text

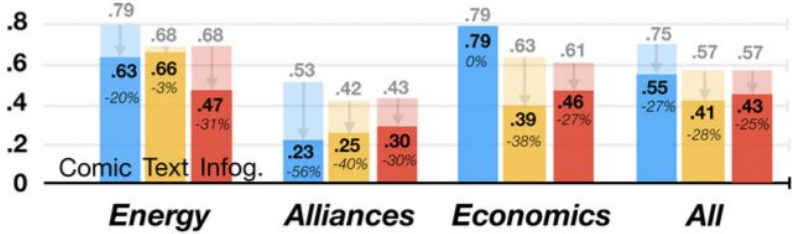
H-Memorability: We expect comic to increase retention of information compared to the other formats

H-Accuracy, H-Engaging, and H-Memorability all partially or fully confirmed

Method: **participants looked at 3 stories, each in a different format** (comic, infographic, illustrated text)

Comics (1st place):

- **"Comics created a story in your head"**
- Breaking down complexity into individual pieces was useful
- **It was easy to understand information in steps**
- Visual repetitions were distracting for some participants
- **Spatial attributes** (e.g. black dashed lines) a**re better remembered in non-comic formats**



Mean results for understanding after 1-4 weeks. Upper numbers indicate original values, lower numbers indicate results after 1-4 weeks. (*Comic = blue, Illustrated Text = yellow, Infographic = red*)

Illustrated text (3rd place):

- Some participants liked the ability to look up information on demand
- Jumping between text and picture was difficult
- **Difficult bridging verbal and visual**

Infographics (2nd place):

- **Rated highly for exploration** by providing overview and detail
- **Easier to understand for spatial relations, harder for time or linear relations**

Causal Effects of Brevity on Style and Success in Social Media

Authors: Kristina Gligoric, Ashton Anderson, Robert West
Conference: CSCW 2019

Research problem: **"What is the causal effect of brevity on message success? What are the linguistic traits of brevity? When is brevity beneficial, and when is it not?"**

Research Questions

RQ1: What are the causal effects of brevity on the success of social media content?
RQ2: What are the linguistic traits of brevity?
RQ3: When is brevity beneficial, and when is it not?

Dataset

Sampled **60 tweets** between Dec 2017 and Aug 2018 that were exactly 250 characters

RQ1

- 250-character tweets can be reduced to ~165 characters.
- We observe that the **optimal relative shortening is 10-20 %**

RQ2

In original tweets:

- Articles (**the**)
- Intensifiers (**so**)
- Linking words (**as**, **therefore**, **because**)
- Determiners and quantifiers (**that**, **many**, **which**)
- Certain punctuation marks (**...**)

In edited tweets:

- **&**
- **/**
- **-**
- **?**
- **!**
- **dems**
- **reps**
- Affects (**nice**, **love**, **nasty**)
- Perceptual words (**look**, **feel**, **hear**)

RQ3

Successful strategies:

Omitting quantifiers (**any**, **few**), articles (**a**), and linkers (**so**, **therefore**)

Ineffective strategies

Deleting hashtags (such as **#cyberpsa**, **#gonetopot**, and **#maga**), question marks, and exclamation marks

Love in Lyrics: An Exploration of Supporting Textual Manifestation of Affection in Social Messaging

Authors: Authors: Taewook Kim, Jung Soo Lee, Zhenhui Peng, Xiaojuan Ma
Conference: CSCW 2019

Research problem: **"Little research has explored how to directly improve the quality of affectionate communication in text"**

System: Lily (**L**ove **i**n **Ly**rics), an interactive system which helps users enrich their expressions of affection in online text-chat.

Dataset
Obtained **18,777 lines of lyrics** from **862 songs** from Spotify's "*Most loved*" category.

Participants + Procedure
Recruited five couples (5 females, 5 males) aged 18 to 26 to chat using Lily over three consecutive days

System Implementation and Considerations

NON-CLICKABLE
Disabled auto-completion feature to encourage effort

RANDOMIZATION
Lines were randomly selected from top 0.1% in semantic similarity

REAL-TIME
Recommendations showed up after user typed two words

RQ1: (How) could Lily help users amplify or reshape their affectionate expressions?	- **Originality (novel stimuli) in affectionate interactions brought couples closer together** - Couples utilized recommendations as new subjects when they ran out of topics to talk about
RQ2: How would users **perceive** the use of technology to assist affectionate communication?	- Participants pointed out that **Lily can improve both long-term and short-term relationships** - **Inspirations from Lily translated into actual affectionate actions** (sunset watching)
RQ3: What aspects of Lily should be considered to improve its **performance**, **usability**, and **user experience**?	**- The non-clickable feature was well-liked, but sometimes discouraged users from putting effort into their writing** - While Lily gave good recommendations for affectionate communication, **it didn't work well within instrumental conversations** (shorter phrases also produced poorer recommendations) - **Genuineness** was a concern (participants didn't like that messages were unoriginal)

Scientists on Twitter: Preaching to the choir or singing from the rooftops?

Authors: Isabelle M. Côté* and Emily S. Darling
Journal: Facets Journal

Research problem: **"Does Twitter only allow scientists to promote their findings to other scientists or can it reach a broader, non-scientific audience?"**

Dataset

→ Selected **110 Twitter profiles** from list of Ecology, Evolutionary, and Marine Biology (EEMB) researchers.
→ Found 64,666 unique Twitter followers of the 110 faculty members.

Methods

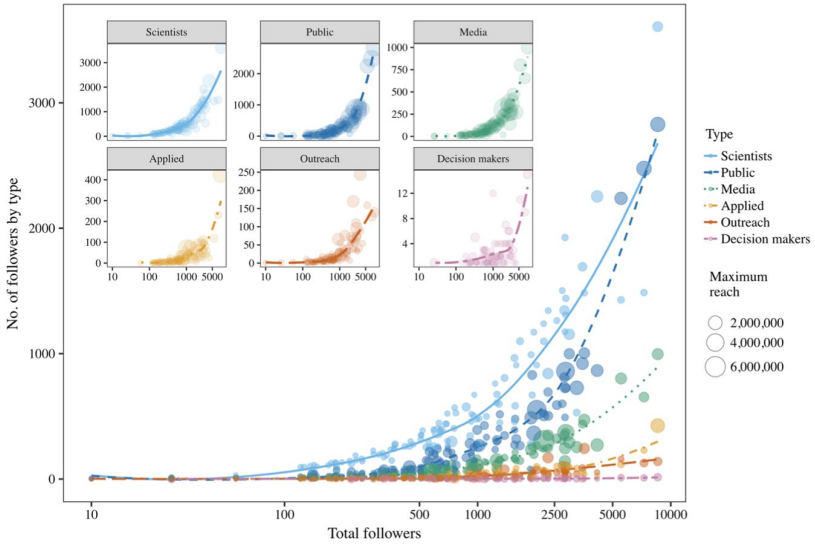
1. For each Twitter profile, they obtained the number of followers of that profile, and 2. Classified each follower based on their 160-word Twitter profiles into one of 10 types of profiles

Results

As expected, scientists formed the majority of followers of tweeting scientists. These followers had the lowest Twitter reach on average.

→ Beyond ~450 total followers, the rate of accumulation of scientists increased significantly

→ Similar inflection points exist for general public, media, and outreach groups, but at ~870-960 followers



Discussion

Results show that audience heterogeneity rises over time as number of followers increase.

→ High numbers and diversity don't guarantee that messages will be read and understood

→ Non-scientists might be positively inclined to consume scientific information

→ Decision-makers are a crucial group that should be engaged by scientists

What's next for Science Communication? Promising Directions And Lingering Distractions

Authors: Matthew C. Nisbet, Dietram A. Scheufele | Journal: American Journal of Botany

Research problem: **"Deficits in public knowledge are the culprit driving societal conflict over science, when in fact, science literacy has only a limited role in shaping public perceptions."**

Deficit model: Too often, journalists, science media, and "irrational public beliefs" are blamed for the improper transmission of technical details in scientific conflict. Facts are assumed to be universally interpreted in the same way; if they aren't, science media is to blame.

From transmission to dialogue

Sociologist Bryan Wynne proposed a set of mental rules lay publics likely use when evaluating scientific advice:
→ Do public predictions by scientists prove to be true?
→ Do scientists make use of available knowledge?
→ Are scientists open to criticism/willing to admit error?
→ Do the social and institutional affiliations of scientists have a track record of trustworthiness?
→ Have long-term/irreversible consequences of science been seriously evaluated? By whom?

Framing: Frames are interpretative storylines that help scientists communicate what is at stake in a societal debate to activate participation from wider, more diverse publics.

Examples of issues and problematic framing:

1. Climate change

Why did Republicans dispute the validity of climate change in 2007?
→ ***The issue has historically been framed in ways that reinforces partisan divisions***

2. Evolution

→ Oxford University biologist Richard Dawkins has argued that ***religion is comparable to a mental virus*** and ***religious believers are delusional***
→ He uses his authority to denigrate various social groups, giving the false narrative that scientific establishment has an anti religion agenda. This fuels the ***conflict frame*** ("God vs. science")

Conclusions

Public dialogue that matters
Significant resources need to be spent on sampling, recruitment, and turnout for public meetings (deliberative forums, town meetings)

Connecting to public values
Resources should be spent on understanding how various groups will filter or reinterpret information given their personal value systems

"*Going broad*": Beyond elite audiences
Outreach efforts favor elite audiences. Support must be given to the information poor to fill knowledge gaps

Science media literacy curriculum
Science organizations should partner with universities, social scientists, and journalists to develop "civic science media literacy" curricula

“Ordinary Science Intelligence”: A Science-Comprehension Measure for Study of Risk and Science Communication, with Notes on Evolution and Climate Change

Authors: Dan Kahan | Journal: Journal of Science Communication

This paper describes the “Ordinary Science Intelligence” scale (OSI_2.0), the motivation for it, the process used to develop it, its psychometric properties, and the utility of OSI for testing the relationship between science comprehension and applications of science.

OSI is a tool to help investigate how individual differences in science comprehension contribute to public perceptions of risk and facts

OSI_2.0 is a *latent variable* measurement instrument

The questions in OSI_2.0 are thought of as observable (or manifest) indicators of unobservable (latent) cognitive capacity that enables individuals to acquire scientific knowledge

Examples of types of Items in OSI_2.0

Scientific “fact” items | **All radioactivity is man-made** [True or False]

Scientific “method” items | **A doctor tells a couple that their genetic makeup means they’ve got one in four chances of having a child with an inherited illness. Does this mean that if their first child has the illness, the next three will not?** [Yes/No]

Quantitative reasoning | **If the chance of getting a disease is 20 / 100, this would be the same having a _____ % chance of getting the disease.** [open ended: 20 or equivalent]

Cognitive reflection items | **A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost?** [open ended: 5]