A Cognitive Theoretical Approach of Rhetorical News Analysis

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Motivation

- ⇨ Authors preserve their rhetoric, creativity and knowledge in stories while writing cognitively rich documents like news, article or book.
- ⇨ A good narrative not only conveys the underlying message but also leads readers to a better conceptual understanding of the discussed topic.
- ⇨ News writing falls under the genre of storytelling.
- ⇨ Understanding news in terms of reading and writing

Reading

What we want?

- ⇨ Language understanding
- ⇨ Conceptual understanding

Educated

Enriched

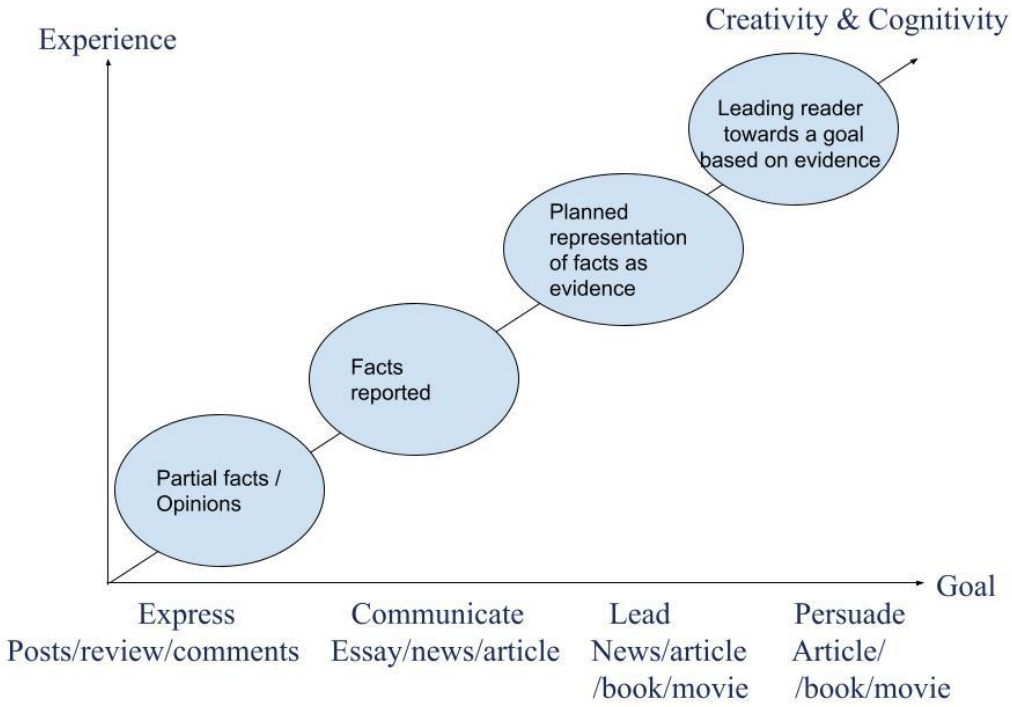
Entertained

Facts = What, When, Who, Where, Why, How

Writing

What & Why to communicate?

- ⇨ Language perception
- ⇨ Conceptual perception
- ⇨ Emotional perception
- ⇨ Creative perception



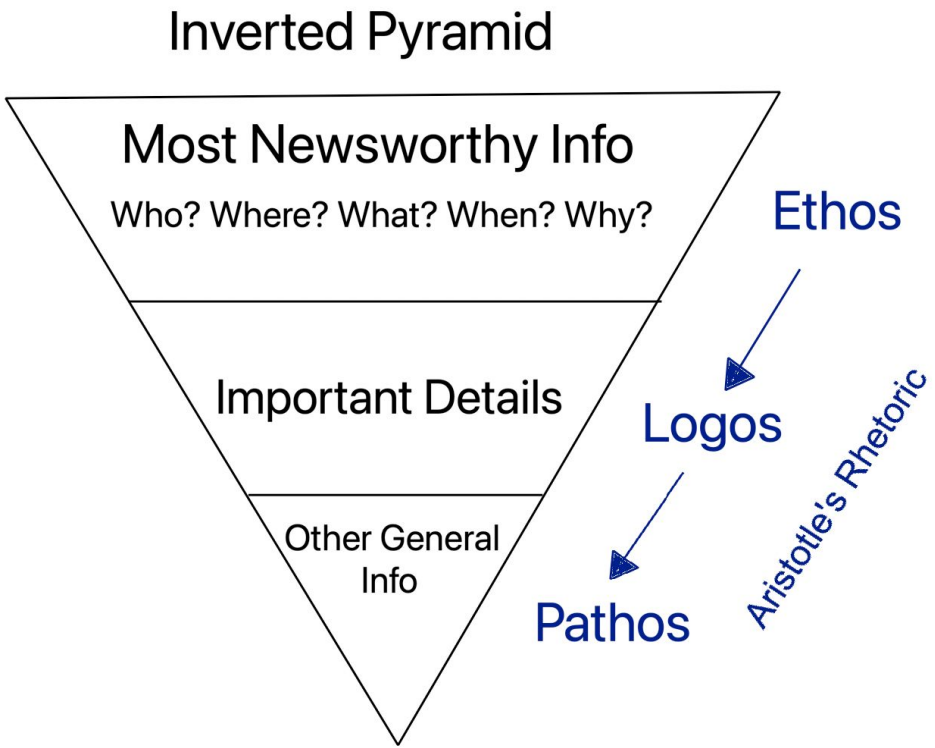
Facts = What, When, Who, Where, Why, How

News writing

- Inverted pyramid structure
  - Safe transfer to next news
  - Engage reader

- Controlled information flow

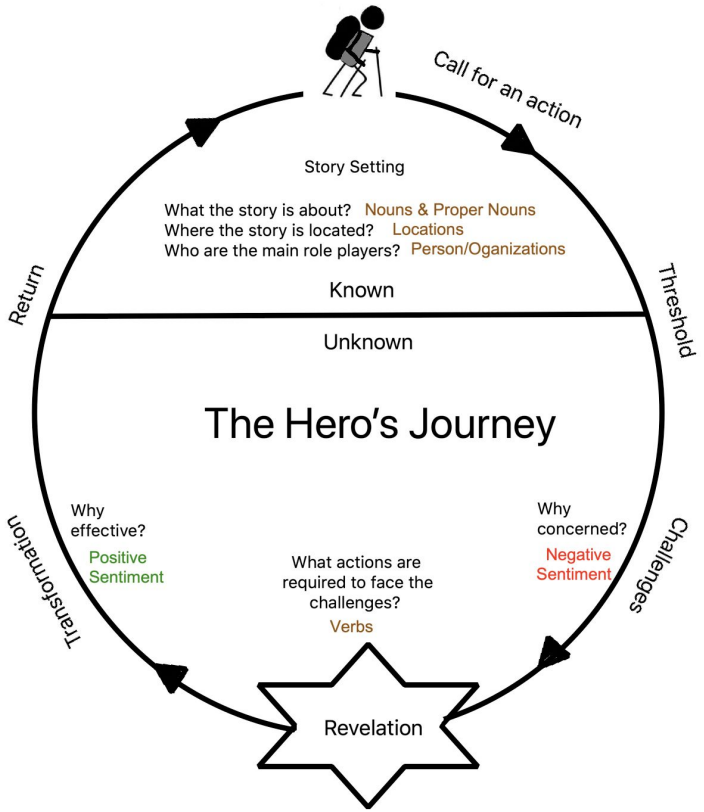
- Facts are preserved in What, When, Who, Where, Why and sometimes How.



Story planning

How to communicate?

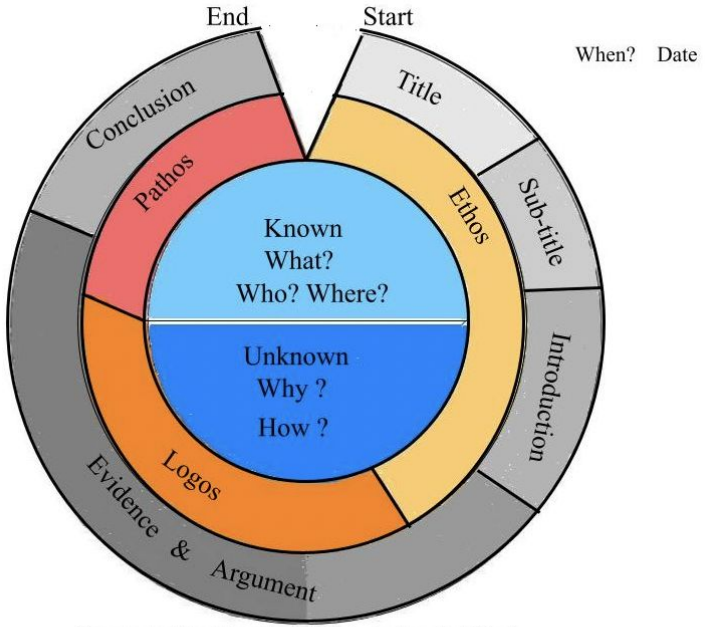
- ⇨ The story brings ***structure*** in the language (written or oral) for ***communication***.
- ⇨ Human brains process ***structural information*** significantly better than unstructured information [1].
- ⇨ Stories have ***frameworks*** that provide authors with a ***writing pattern*** for capturing the ***reader***. Ex: "***Aristotle's Rhetoric***" ("***Ethos***", "***Logos***" and "***Pathos***") [2], Joseph Campbell's "***The Hero's Journey***" [3] (call for solving an intention, climax, actions for solving the problems, resolution) etc.



Story analysis

How to automate?

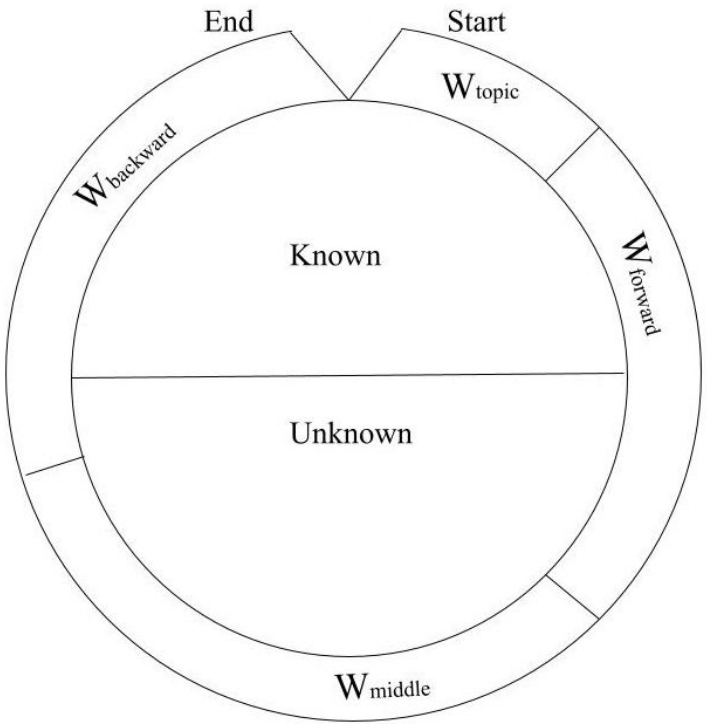
News



Document = (Identifier, Content, Date, Authors, Publisher)
Content = (Title, Abstract, Introduction, Related Work, Methodology, Result/Discussion, Conclusion)
Facts = (When?, Who?, Where?, What?, Why?, How?)

Story extraction

How to weight?



$n = Number\ of\ blocks$

$k = Number\ of\ words\ to\ select$

$W_{topic} = Topics\ that\ appear\ in\ all\ blocks$

$W_{forward} = K\ highest\ weighted\ topics\ having\ highest\ forward\ weights$

$W_{middle} = Topics\ that\ appear\ in\ more\ than\ n2\ blocks$

$W_{backward} = K\ highest\ weighted\ topics\ having\ highestbackward\ weight$

$W_{story} = W_{topic}.W_{forward}.W_{middle}.W_{backward}$

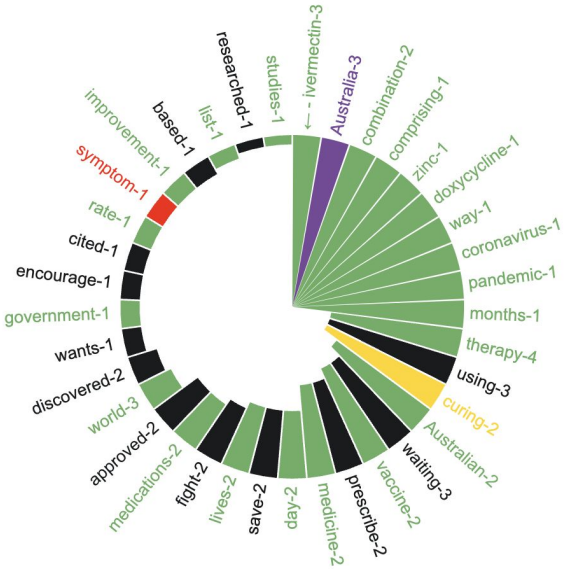
Story visualization

How to display?

- ⇨ D3 circular bar chart
- ⇨ Color represents the type of word
- ⇨ The length of the bar represents forward position weight.

Australian GPs urged to prescribe ivermectin triple therapy to fight COVID-19

20/08/2020



Noun Action Person Location Organization Time Others Positive Negative

Cognitive reading writing experiment

How evaluated?

- ⇨ We have produced a demo system using a news collection.
- ⇨ Our experiment followed the ***within-group design***.
- ⇨ Each participant was given even number of comprehension tasks. In half of the tasks they were using ***the Visualization*** and the other task they will only be using the news page text.
- ⇨ We will compare the individual participant's efficiency, accuracy, the reader's confidence/satisfaction on the task and ease of the task.
- ⇨ We were using ***paired t-test*** for the comparison.
- ⇨ We had a sample size of 32 participants.

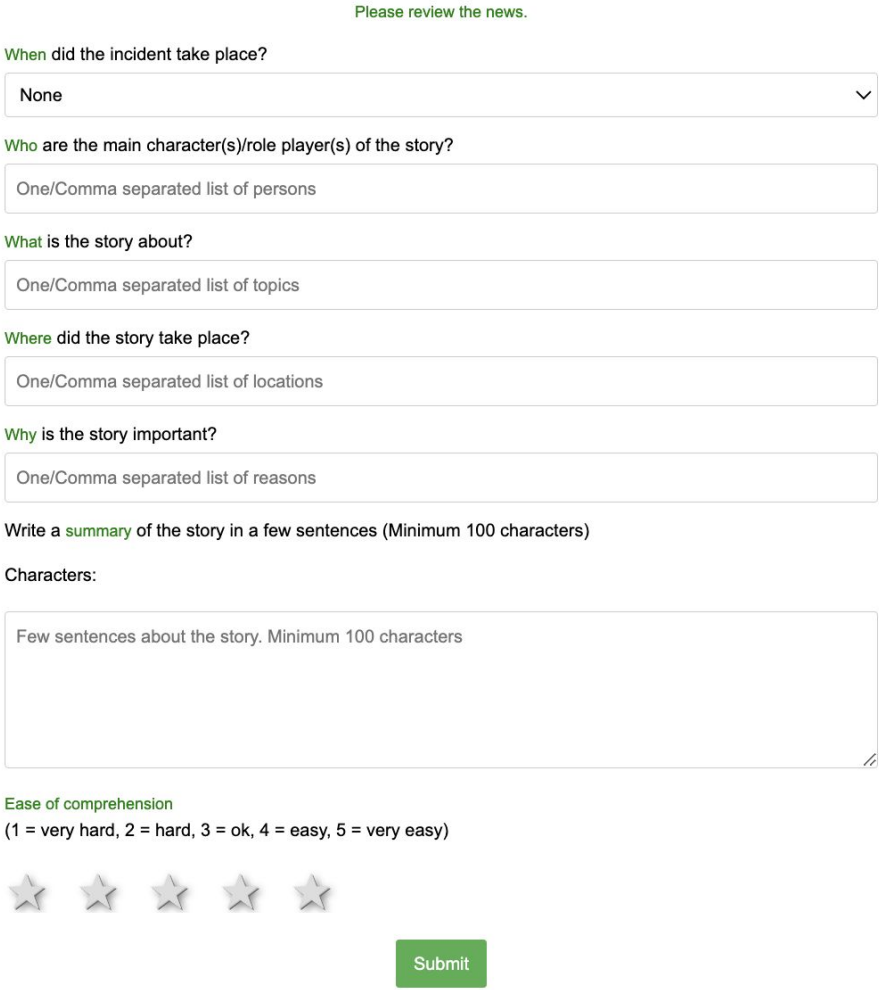
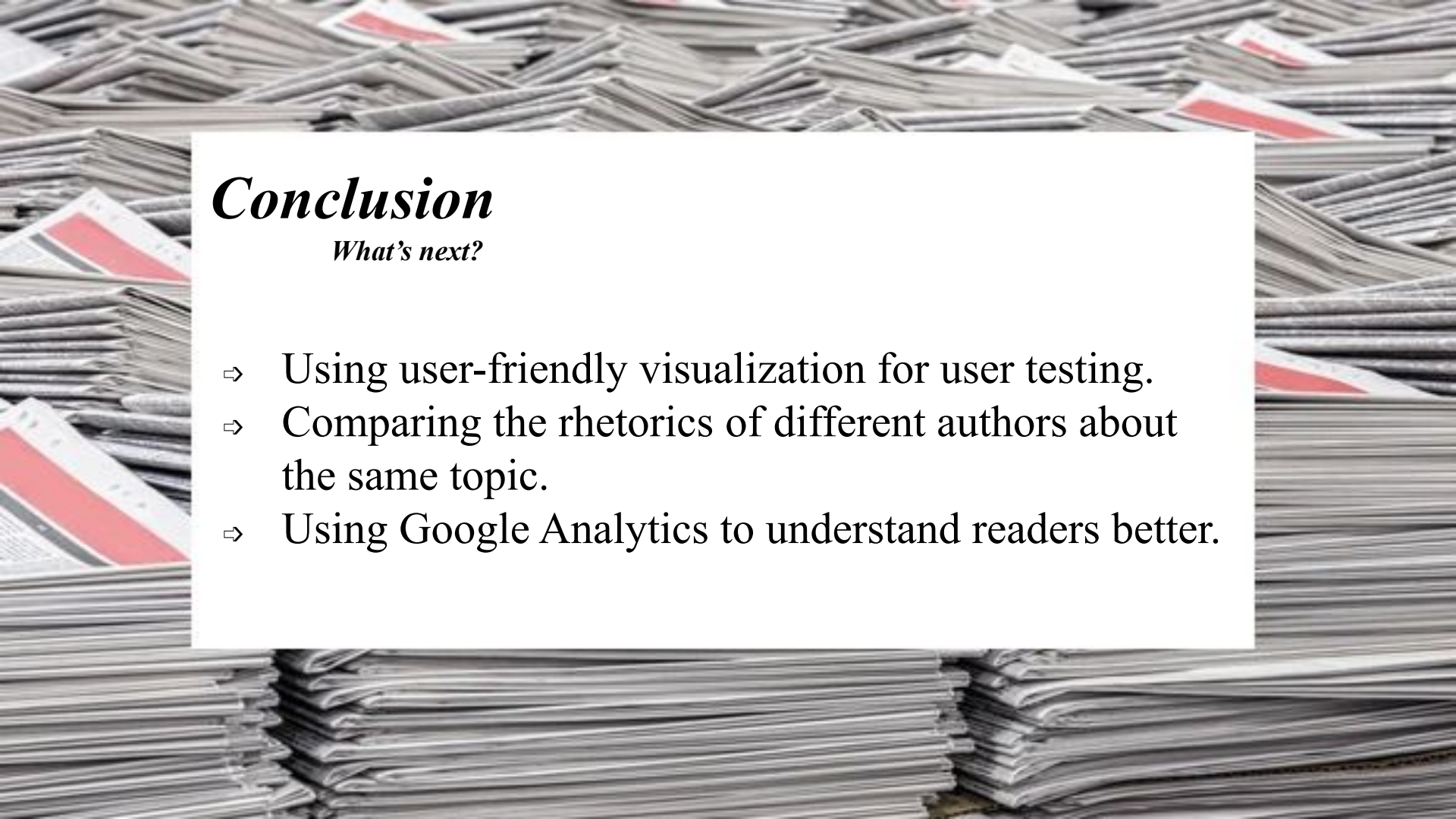


Table 1
Scale of cognition

Criterion	Scale of cognition
Who	0-2 where 0 = wrongly understood ... 2 = well understood
Where	0-2 where 0 = wrongly understood ... 2 = well understood
What	0-2 where 0 = wrongly understood ... 2 = well understood
When	0-1 where 0 = wrongly understood, 1 = understood
Why	0-2 where 0 = wrongly understood ... 2 = well understood
Is summary interpretation true	0-1 where 0 = false, 1 = true
Quality of summary	1-5 where 0 = poor ... 5 = well written

Table 2
Experiment results

Criterion	Text(mean)	Visualization(mean)	P-value	Hypothesis testing with p = 0.05
Who	1.31	1.03	0.0175619	Reject null hypothesis
Where	1.80	1.47	0.0000929	Reject null hypothesis
What	1.63	1.53	0.2633649	Can't reject null hypothesis
When	0.66	0.55	0.1820127	Can't reject null hypothesis
Why	1.31	1.28	0.7512205	Can't reject null hypothesis
Is summary interpretation true	0.95	0.78	0.0019375	Reject null hypothesis
Quality of summary	3.03	2.39	0.0001664	Reject null hypothesis
Completion time	8.53 minutes	7.35 minutes	0.0182290	Reject null hypothesis
Ease	3.84	2.68	0.0000003	Reject null hypothesis



Conclusion

What's next?

- Using user-friendly visualization for user testing.
- Comparing the rhetorics of different authors about the same topic.
- Using Google Analytics to understand readers better.

Q & A
Discussion

Thank you