

Search Support for Exploratory Writing

Jonas Oppenlaender¹, Elina Kuosmanen¹, Jorge Goncalves², Simo Hosio¹

¹ University of Oulu
{first.last}@oulu.fi

² University of Melbourne
{first.last}@unimelb.edu.au

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The Problem: **Complex Search** Needs

- *Cheap* camp grounds with an *epic* view
- *Fine art* galleries accessible via *wheelchair*
- *Mediocre* movies with *epic visual effects*

Sources on the Web

Online Search Engines (Google),
Open Knowledge Bases (Wikipedia),
Social Media (Twitter),
Social Networks (Facebook),
Question & Answer websites (Quora),
Crowdsourcing Platforms (Mechanical Turk)

The Problem

- Online search engines are optimized to support the most popular queries
- Difficulty to get an overview of information space
- Cognitive effort

Need to support complex search and discovery of unpopular information

Aim

Support
searchers...

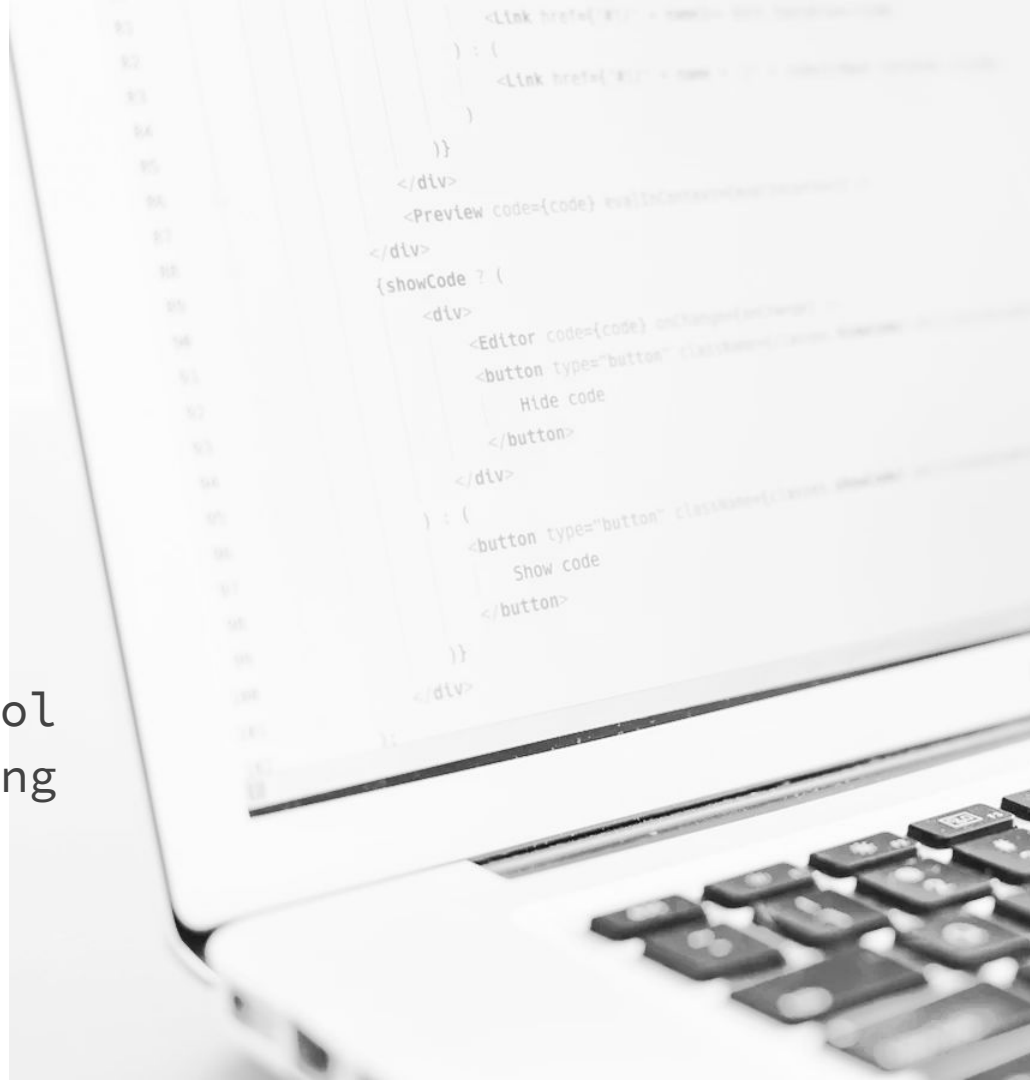
- ...to get an overview of the information space
- ...in finding relevant information quickly

Context: “Exploratory Writing”

- Cognitive exploration (“thinking on paper”) with the aim of gathering information
- Exploring & reflecting upon a topic, understanding different perspectives
- Typically: multiple complex searches

GAS

A crowd-powered web-based tool
supporting exploratory writing



GAS Data Model

Ideas: Solutions to a given problem

Criteria: Search dimensions

Ratings: Assessment of how well idea fulfills the criteria

GAS Query Interface

①: Criteria with sliders for faceted filtering of ideas

②: Ordered list of ideas

Discover treatment ideas for low back pain

Set a criteria configuration (left column), hit "query ideas" and we'll fetch you a few best-matching options!

Instructions:

! = You have not specified a value for this criterion.

Specify Criteria:

Cost (Cost to the patient)

>>>Desired level: (1-100): 1

Speed (Speed of effect)

>>>Desired level: (1-100): !

Duration (Duration of effect)

>>>Desired level: (1-100): !

Efficiency (Efficiency in general)

>>>Desired level: (1-100): 100

Query ideas!

Reset criteria

Results:

#1: Exercise in general

Distance to optimal: 39.

Exercise in this case means purposefully being active, with the goal of getting in better shape / increasing fitness, or simply for the joy that is produced by physical exercise.

#2: Stretching

Distance to optimal: 46.2.

Increasing the mobility of the back with careful stretching. This also works for stiff muscles, overall aiming to improve the situation by mobilising the back.

#3: Treating secondary conditions

Distance to optimal: 49.9.

Treating other conditions than low back pain itself, such as smoking, passive lifestyle, obesity.

#4: Information, education

Distance to optimal: 50.2.

Information refers to making the patient understand better everything about the pain: reasons, different options to treat it and what is the forecast. This all is done to not just treat the patient, but to motivate the patient to participate and do whatever can be done to remedy the situation.

#5: Ergonomics

Distance to optimal: 58.

Changing the ways how one works, such as organizing the workplace, getting better tools, furniture, organizing schedules to support the condition, etc.

#6: Strength training

Distance to optimal: 59.

Strength training aims for increasing stamina and power. Especially core muscles should be improved, e.g., by pilates-style training.

Within-Subject User Study (n=24)

- 2 short writing tasks (“articles”)
- 2 criteria per task
- 2 conditions:
 - OSE: Online Search Engine (Google)
 - OSE+GAS: Online Search Engine + GAS
- Questionnaire
 - Mental effort, task difficulty, usefulness, adherence to criteria, writing quality
- Follow-up interview

Three Crowdsourced Knowledge Bases

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	T1. RACISM	T2. LBP	T3. DIETS
	What are good means to prevent everyday racism?	What are good ways to treat low back pain?	What are good weight-loss diets?
Contributors	1,515	353	70
Ideas	84	108	21
Criteria	5	4	6
Assessments	13,654	9,001	8,607
Collection	organic	organic	Prolific
Criteria source	Sociologists	MDs, physiotherapists	Website visitors

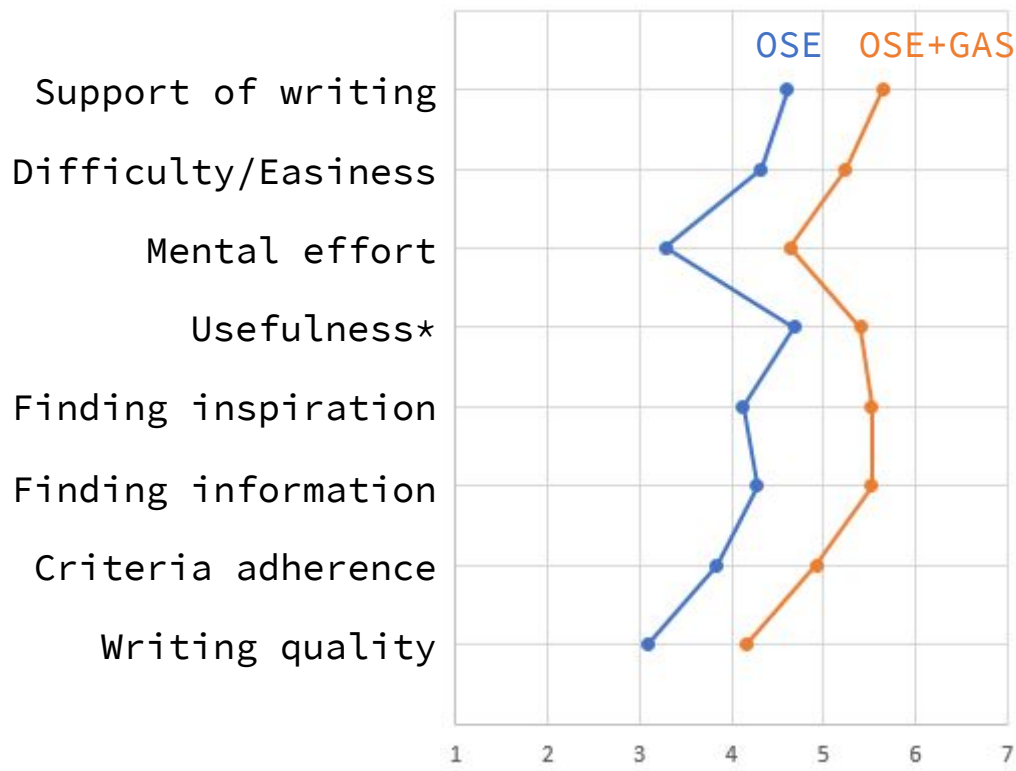
Writing Task: Example

Write an article about a way of curing lower back pain that incurs a ***high cost*** to the patient and has a ***high efficiency***.

Data Analysis

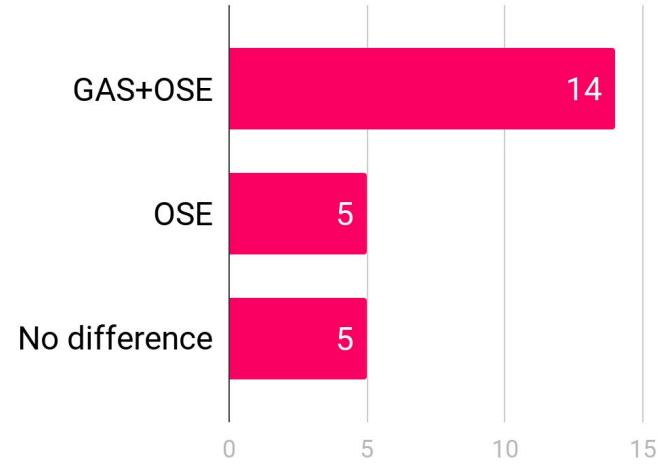
- Quantitative
 - Likert-scale questionnaire items
- Qualitative:
 - Thematic coding (Braun and Clarke 2006) of interview notes

Results

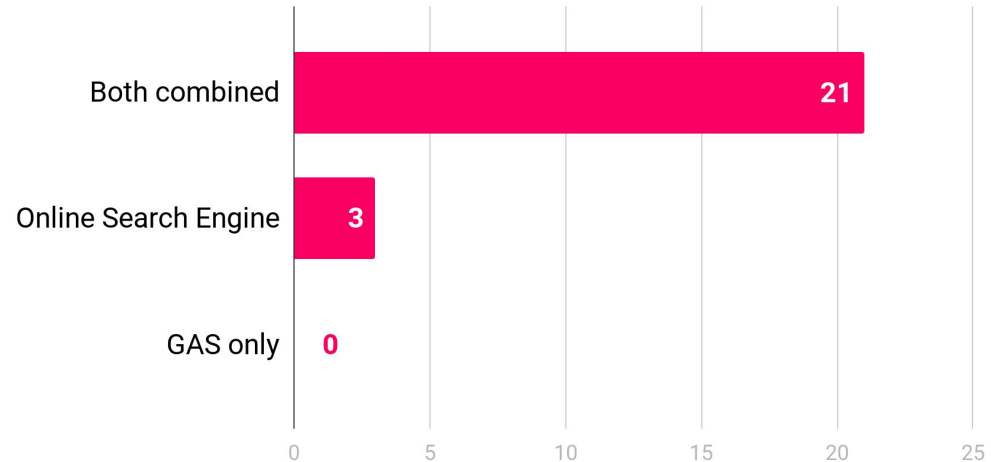


(* not significant)

- Which of your two articles is better?



- Which tool would you prefer for supporting article writing?



Exploratory Writing Framework

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<div>Challenges</div> <ul style="list-style-type: none">• Understanding the task• Finding information• Understanding information• Selecting information• Self-organisation• Time management	Search	<ul style="list-style-type: none">• Prior knowledge• Past experience• Habits• Process
	Generate Idea	<ul style="list-style-type: none">• Sources of inspiration• Trust
	Refine Idea	<ul style="list-style-type: none">• Extrinsic sources• Intrinsic sources
	Write	<ul style="list-style-type: none">• Writing skills

Exploratory Writing Strategies

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- **Source-of-Inspiration**

- Find “seed ideas” and google for more

- **Knowledge-Driven**

- Use intuition and prior knowledge

- **Structure-Driven**

- Develop structure and fill the blanks

- **Hybrid**

Limitations

- Upfront data collection required
- Laboratory experiment: observer effect, ecological validity
- Self-reported quality
- Extrinsic motivation

Conclusion

- GAS facilitates finding relevant information quickly
- GAS is a beneficial companion to online search engines
- GAS supports creativity: tap into the subjective views of the crowd

thx

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Motivation

Example

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average epic movies



The Top 50 Most Epic Movies - IMDb

<https://www.imdb.com/list/ls009321618/>

Jun 30, 2012 - The greatest **epics** of all time. Granted there may be a few missing because (while I have seen alot of **movies**) I haven't seen everything.

What movie was average until a twist made it epic? : AskReddit

https://www.reddit.com/r/.../what_movie_was_average_until_a_twist_made_it_epic/ ▼

36 answers

Sep 14, 2018 - Orphan. One of the weirdest endings to a big studio horror **film** I have seen. I won't spoil it but the **film** seems, on the surface, like the typical ...

What movie was average until a twist made it epic? - Quora

<https://www.quora.com/What-movie-was-average-until-a-twist-made-it-epic>

Sep 14, 2018 - I'll just put SPOILER at the beginning of this just in case, though I'll try to skirt around the details. Split - I expected there to be a twist, knowing ...

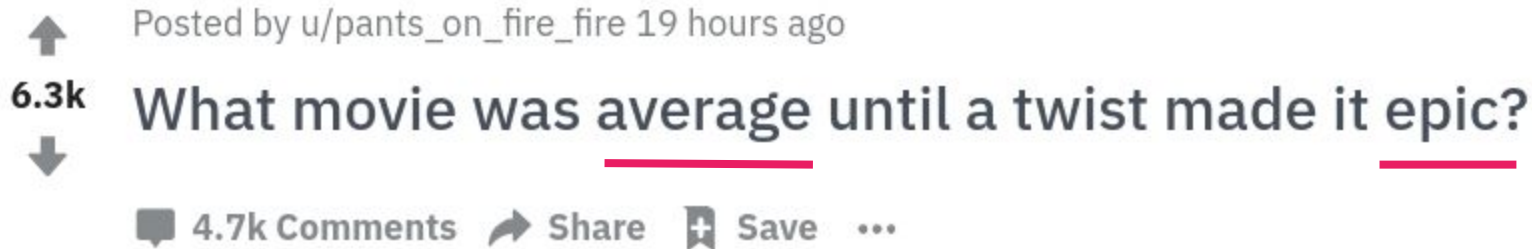
How long does the average Hollywood movie take to make? | Stephen ...

<https://stephenfollows.com/how-long-the-average-hollywood-movie-take-to-make/> ▼

May 7, 2018 - Across all these **movies**, the **average** production was announced ... Across all the **movies** studied, the **average movie** spent 146 days in pre-production. the idea of the next Star Wars **movie** or the next Narnia **epic**, so they ...

Example

— — —



Related Work

Crowdsourcing and Crowd-powered Search

- Crowdsourcing systems supporting search often fail to support exploration
 - One-off queries
 - Multiple queries
 - Post-query exploration of information space

Method

User Study

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1. Within-subject user study (n=24)

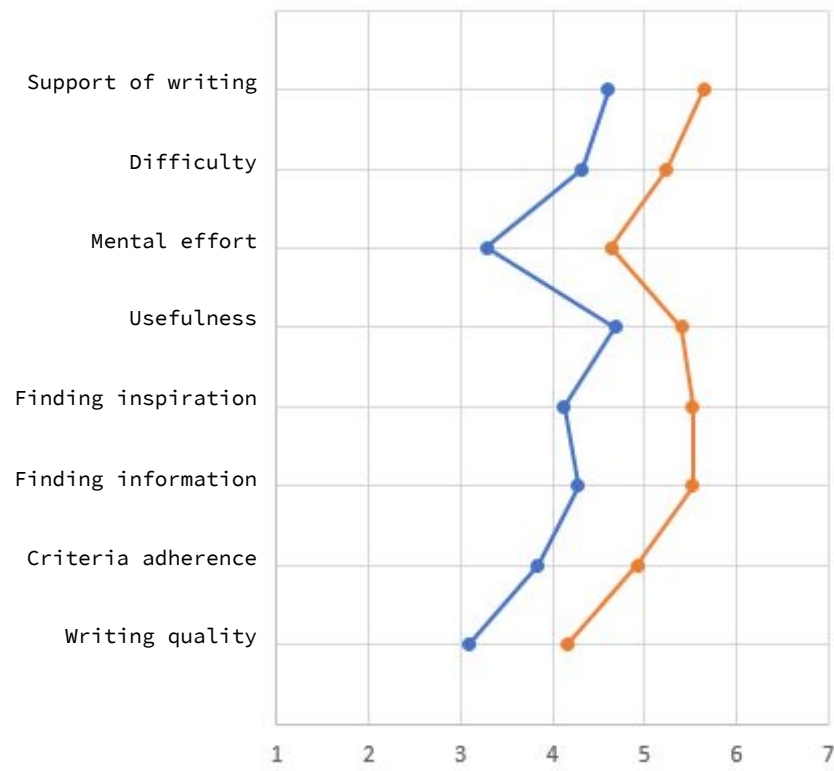
- 2 short writing tasks, 2 conditions:
 - Search Engine (Google)
 - Search Engine + GAS
- Questionnaire: Mental effort, difficulty, usefulness, adherence to criteria, quality
- Semi-structured interview

2. Workshop (n=6)

Results

Results

- support of writing
- less mental effort
- less difficult
- more useful
- adherence to criteria
- Writing quality



Conclusion