Literature Review

Research Methods for Human-Centered Computing

Literature Review

Today's goal:

Teach you how to review, manage, and cite literature

Outline:

- Finding related works
- Managing the papers you want to cite
- Citing papers correctly

But first...

Study participation task

Study participation

Goal: experience what it is like to participate in a study

Task: participate in a research study (e.g. at Clemson, online)

Instructions:

- Participate in a research study on campus or online
- Write a report with details of your experience (see assignment on Canvas)
- Submit as a PDF

Deadline: Oct 9

Literature review

How to find related works?

Literature review

Purposes of reviewing the literature:

- Provide a context for your research
- Avoid duplication effort
- Argue relevance of your work
- Find relevant theories
- Identify potential problems in conducting the research
- Identify “acceptable” practices of the field

Resources:

dl.acm.org, ieeexplore.ieee.org, scholar.google.com

Types of papers

Overview(s) of the topic(s)

Example: let's say you do research on the privacy of children online...

Find overview papers on:

- the privacy of children online (might not exist)
- children's Internet usage (not necessarily privacy)
- children's privacy (not necessarily online)
- online privacy (not necessarily children's)

Types of papers

Factoids

Useful to describe the state of the world

E.g. number of people who have a smartphone, number of teens who are on Facebook over time, etc.

Sources:

Pew (pewresearch.org), world bank, United Nations, dictionary, wikipedia*

Could be work that argues why you work is important

Types of papers

Theory/theories

What theoretical lens are you going to use?

- Petronio's Communication Privacy Management
- Altman's Privacy Regulation Theory
- Smith et al.'s APCO model

No matter which one you choose, you may have to argue in your paper why you are not using the others!

Types of theories

I. Taxonomic theories (describe "what is")

E.g. a framework for classifying something

II. Theory for explaining (describe what and why)

E.g. a generalization of qualitatively observed phenomena

III. Theory for predicting (describe what will be, but not why)

E.g. a behavioral phenomenon such as the "default effect"

E.g. Moore's law

Types of theories

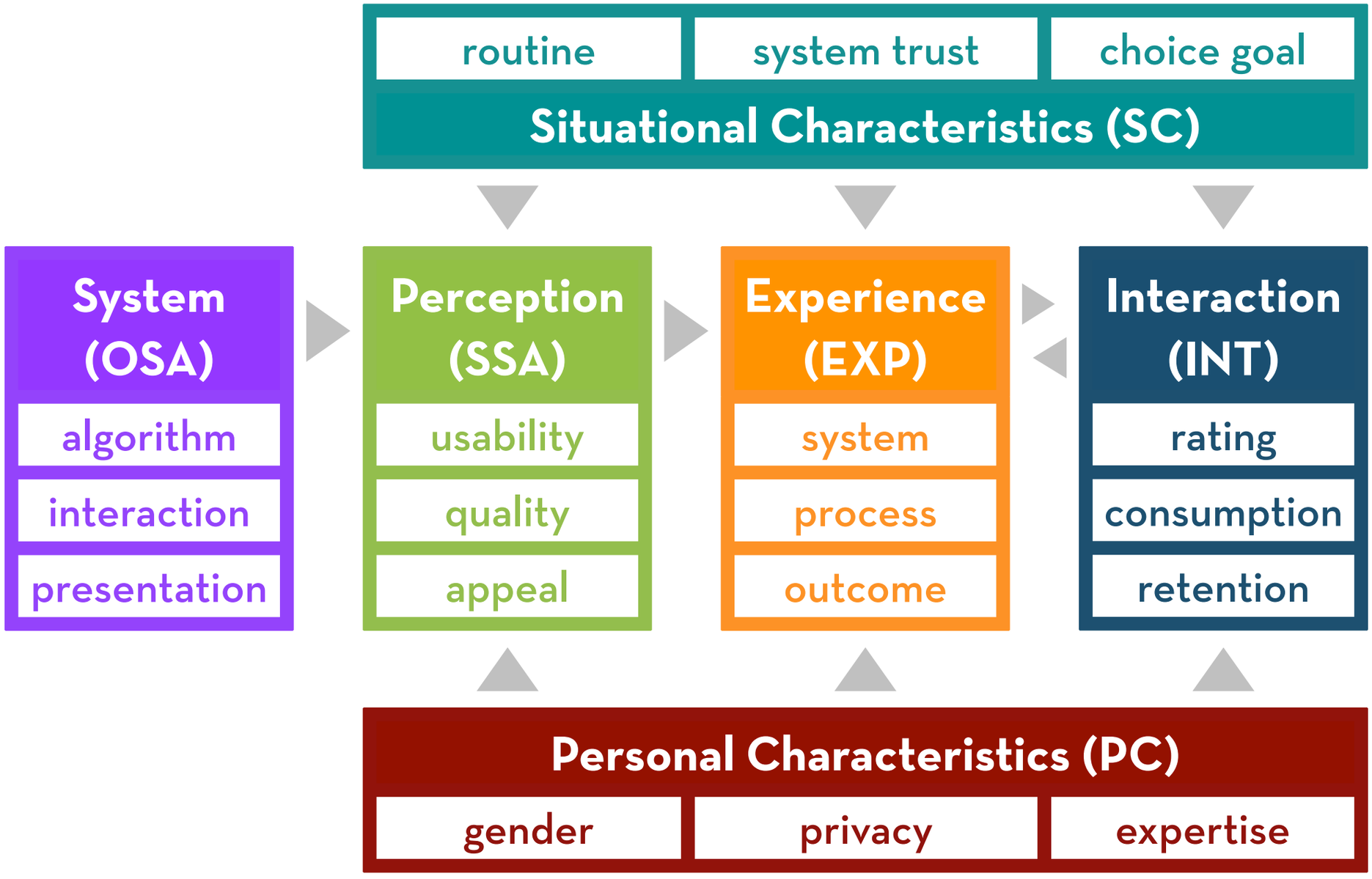
IV. Theory for explaining and predicting ("EP theory")

E.g. a model describing the workings of a phenomenon

V. Theory for design and action (describe what and why)

E.g. methodologies and prescriptions for design and development, such as Nielsen's heuristics

EP theory


routine
system trust
choice goal
Situational Characteristics (SC)
System (OSA)
algorithm
interaction
presentation
Perception (SSA)
usability
quality
appeal
Experience (EXP)
system
process
outcome
Interaction (INT)
rating
consumption
retention
Personal Characteristics (PC)
gender
privacy
expertise

Design theory

1. Visibility of system status
2. Match between system and real world
3. User control and freedom
4. Consistency and standards
5. Error prevention
6. Recognition rather than recall
7. Flexibility and efficiency of use
8. Aesthetics and minimalist design
9. Help users recover from errors
10. Help and documentation

Types of papers

Works whose "gap" you will attempt to fill

A list of existing papers with a flaw:

- they make an unproven assumption
- they ignore an important variable
- they find something they cannot explain
- they use a certain framing/theory, but you have found a better one

Always use juxtaposition when covering related work!

How does this work relate to your work?

Types of papers

Work that support (an) assumption(s)

Usually you cannot account for everything in your study

> You may have to make some assumptions that the reader must accept as "true" to buy into your argument

You better have ample evidence from other work for these assumptions!

> Usually well-established phenomena, e.g. "intention-behavior gap", "choice overload", "improving usability will improve user satisfaction"

Types of papers

Work that contains support for your hypotheses

Since you are going to test the hypothesis, the evidence does not have to be ironclad

- could be based on qualitative results
- could be in different field / system / type of user
- could be anecdotal

If all your hypotheses are already fully and exactly supported by previous work, your research is pointless!

Types of papers

Work with similar methods

Defend against reviewer objections

> "You should have used a different methodology" is hard to fix!
>
> Defend against such criticism by citing existing work that uses the same method

Also useful to avoid pitfalls

> What is *not* a good method to use?

Finding papers

Keyword search

You may have to revisit this once you have a better understanding of the terminology of the field

Forward citation search

- Look at the references of papers you are reading (preferably newer papers)
- Single out specific references based on citations in the text
- Use DOI where possible! Otherwise: Google Scholar / Clemson library title search

Types of papers

Work with aligned conclusions

Your work will likely draw some higher-level conclusions in the discussion and conclusion sections of the paper

- It is nice to cite work that came to a similar conclusion via a different route
- This is a good way to couch your work in the context of existing work/evidence

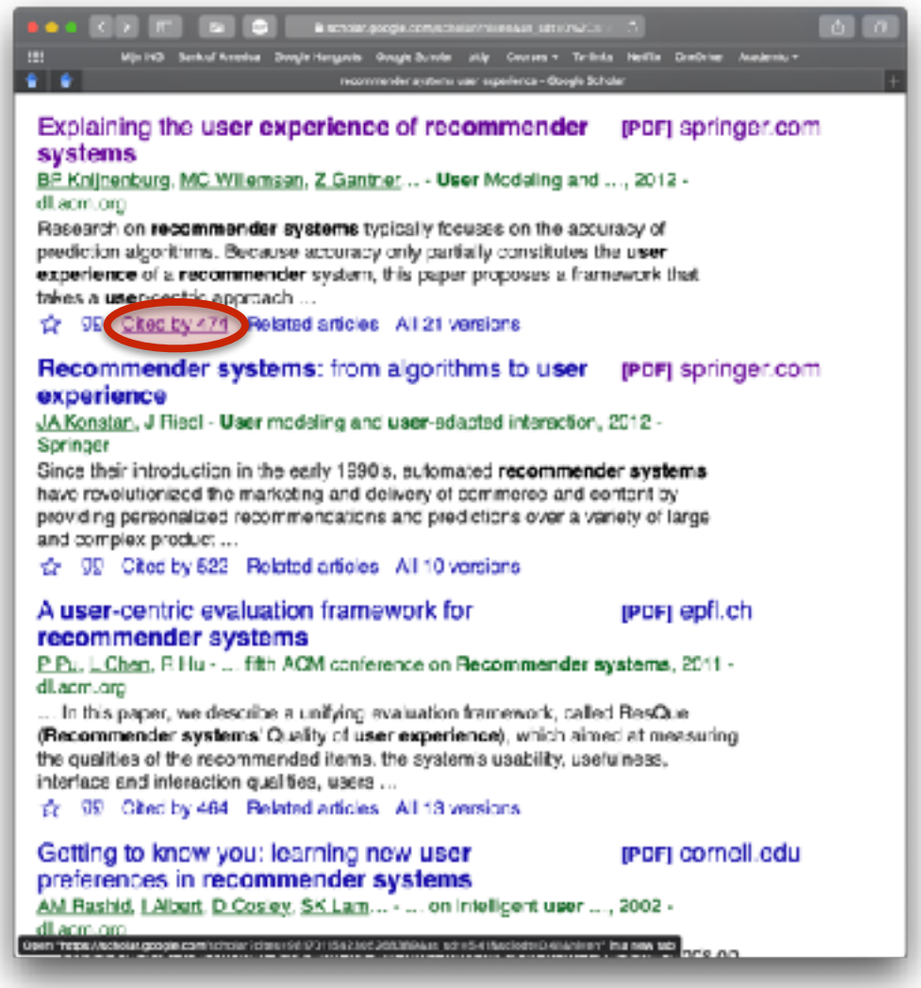
The best advice is based on evidence from multiple studies!

Finding papers

Backward citation search

For each “core” paper, check other papers that cite it

- Did they do something similar to what you are planning to do?
- How did they use the paper?
- Has the argument ever been refuted?



Finding papers

Backward citation search

For each "core" paper, check other papers that cite it

- Did they do something similar to what you are planning to do?
- How did they use the paper?
- Has the argument ever been refuted?

Systematic review

A systematic review is a review of the literature that is conducted in a methodical manner based on a pre-specified protocol and with the aim of synthesizing the retrieved information

Why do a systematic review?

- You are writing an overview paper
- You are writing the first big (journal) paper on a new topic
- You are conducting a meta-analysis

For meta-analyses, you often also want **unpublished** work!

Systematic review

A systematic review:

- Takes a lot of time and effort
- Involves a predetermined list of sources, keywords, search criteria (forward and backward search)
- Usually focused on a specific effect/phenomenon
- Includes useful categorizations of the found papers
- For meta-analyses: extract and standardize statistical results

Example

Caine, 2016:

> *We conducted a systematic literature review of all manuscripts published at CHI2014 and manually extracted data from each manuscript. We collected: the contribution type, presence or absence of a user study, sample size, number of studies per manuscript, setting, method, manuscript length, award status, student status and gender breakdown of participants. We used this data to generate summary information about typical sample size at CHI.*

Example

Setting	Studies	Mean	SD	Median
In-person[1]	379	18	12	15
Remote[1]	105	197	285	77
Combo	14	15	6	15
Not reported	21	20	11	20
Total	519	54	147	16

[1]Note: ln(n) used in the analysis to compare in-person and remote sample size distributions.

Table 7: Setting (in-person vs. remote)

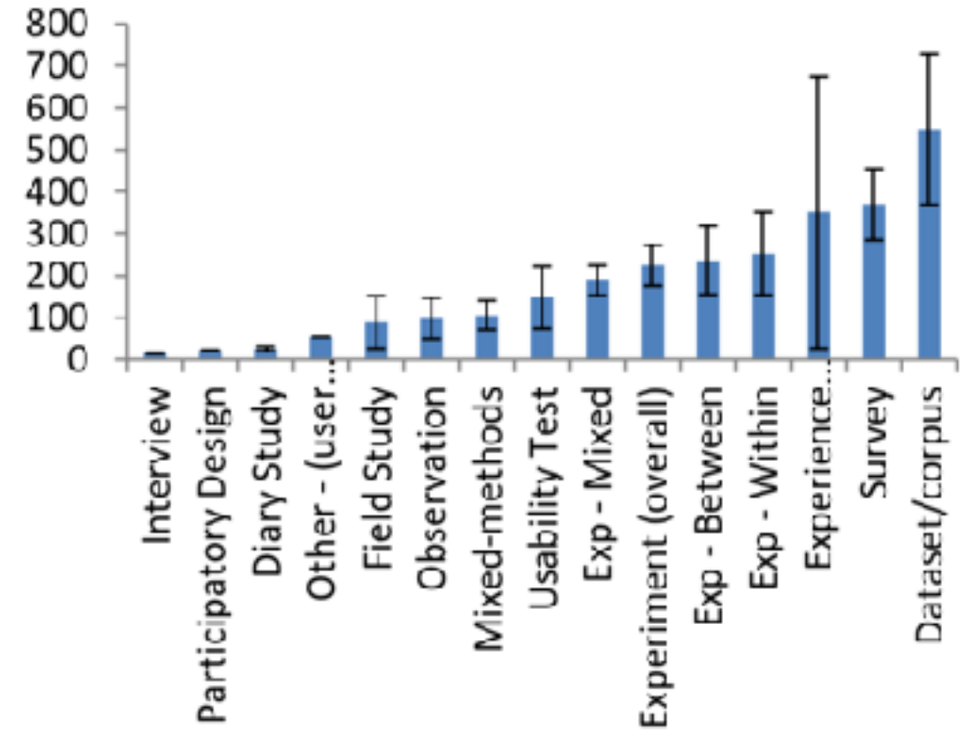


Figure 4. Mean sample size by method (SE) for remote studies.

Citation management

How to manage the papers you want to cite?

Citation management

Advantages:

- Simple (with good software you'll rarely have to type!)
- Create your own database of good papers
- Easy to organize, annotate and tag papers
- Easy to share with others

Don't try to do it manually!

- Lots of wasted time typing
- You'll end up citing less

Zotero

Browser plug-in (safari, chrome, firefox)

To pull in papers

Reference manager (mac, win, linux)

To organize, tag, and annotate

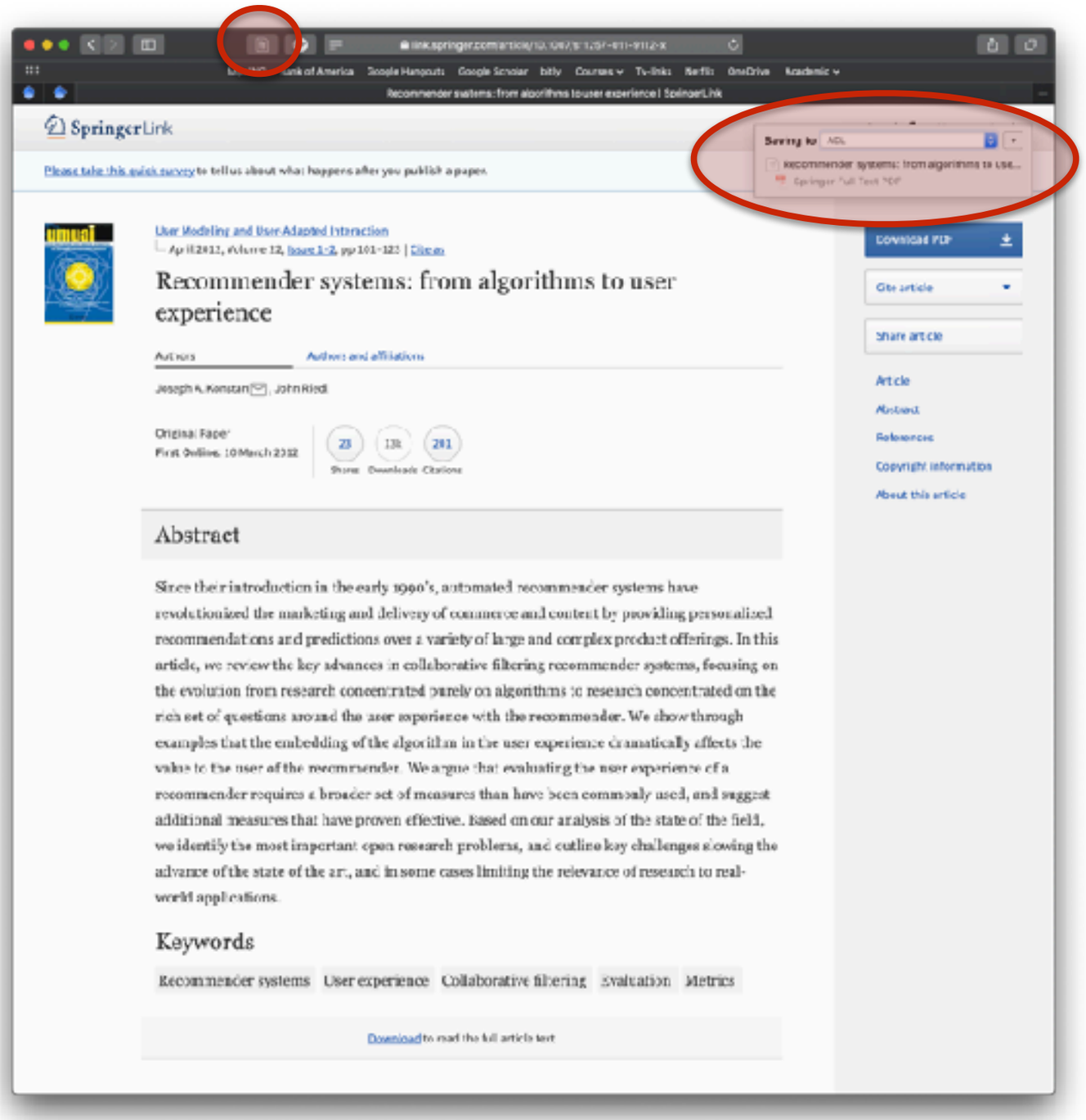
Word processor plug-in (word, google docs)

To cite with a single click

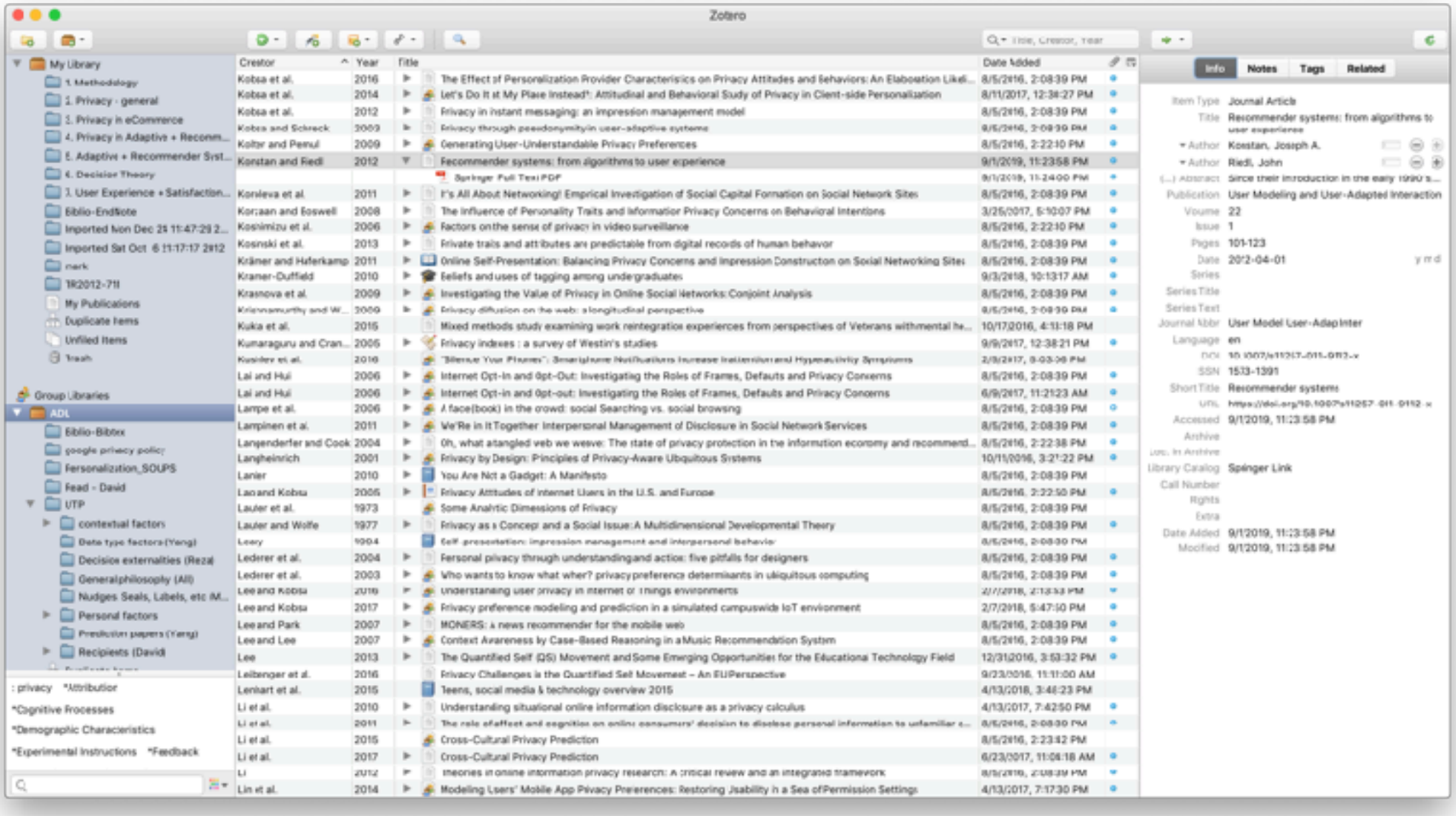
For LaTeX: export functionality

Free, multi-device, collaborative, very interoperable

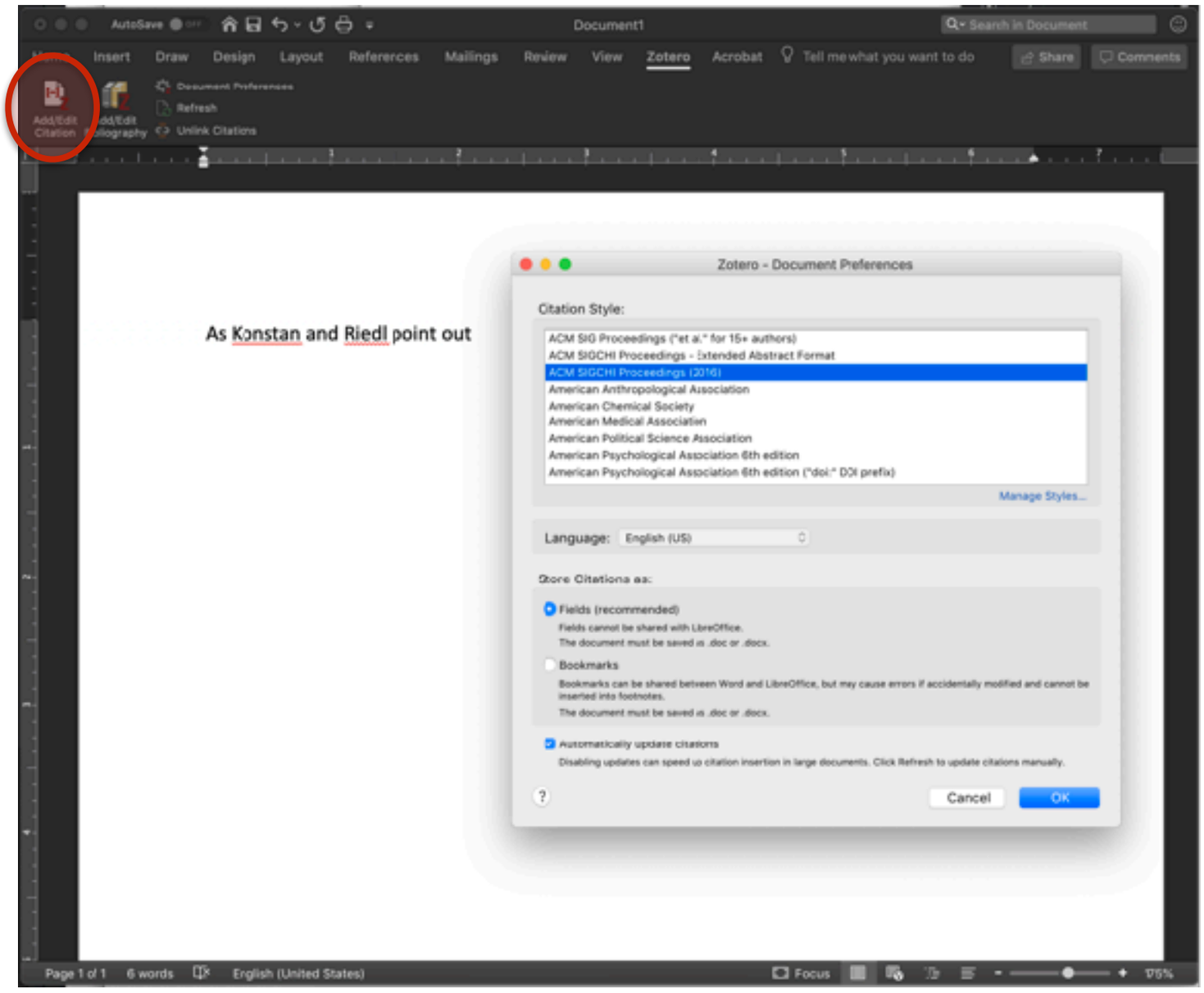
Demonstration



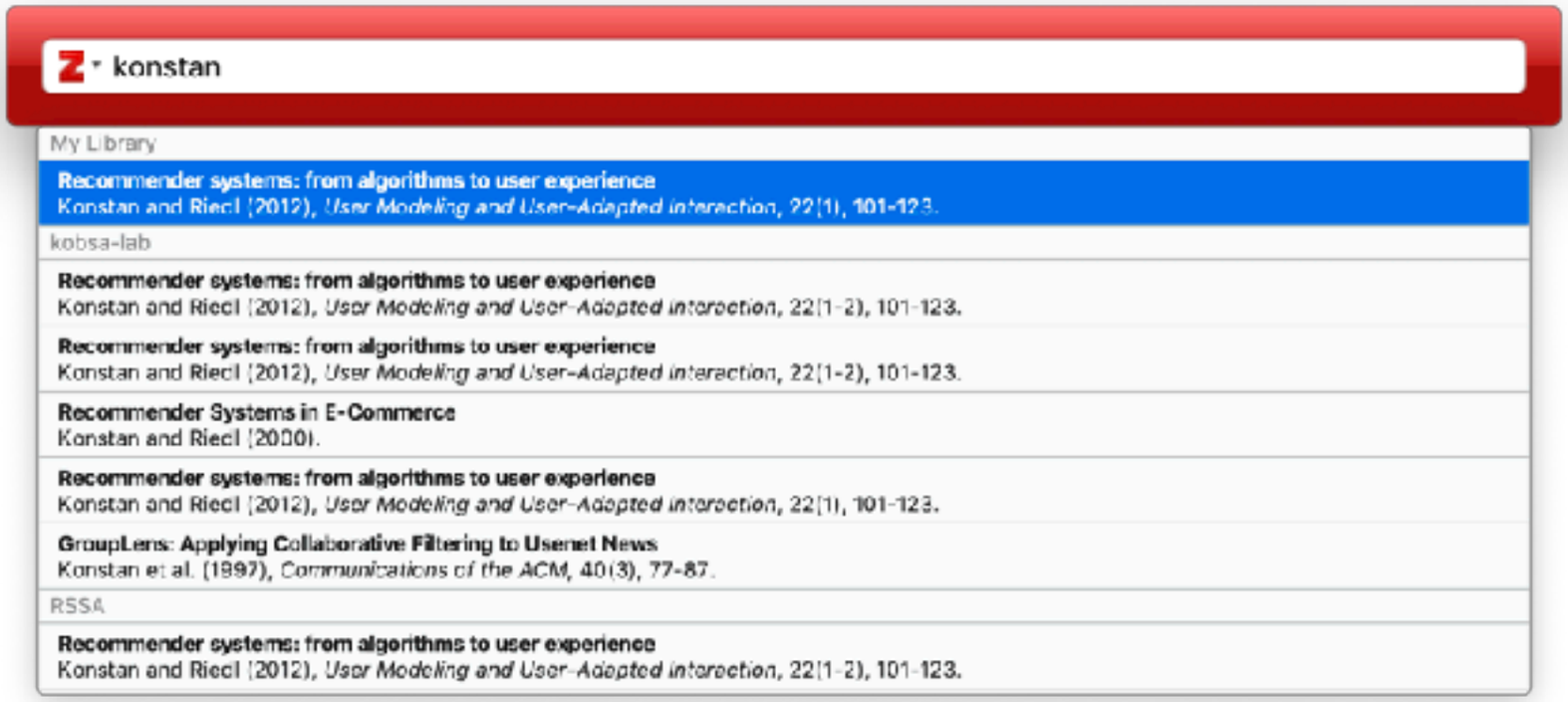
Demonstration



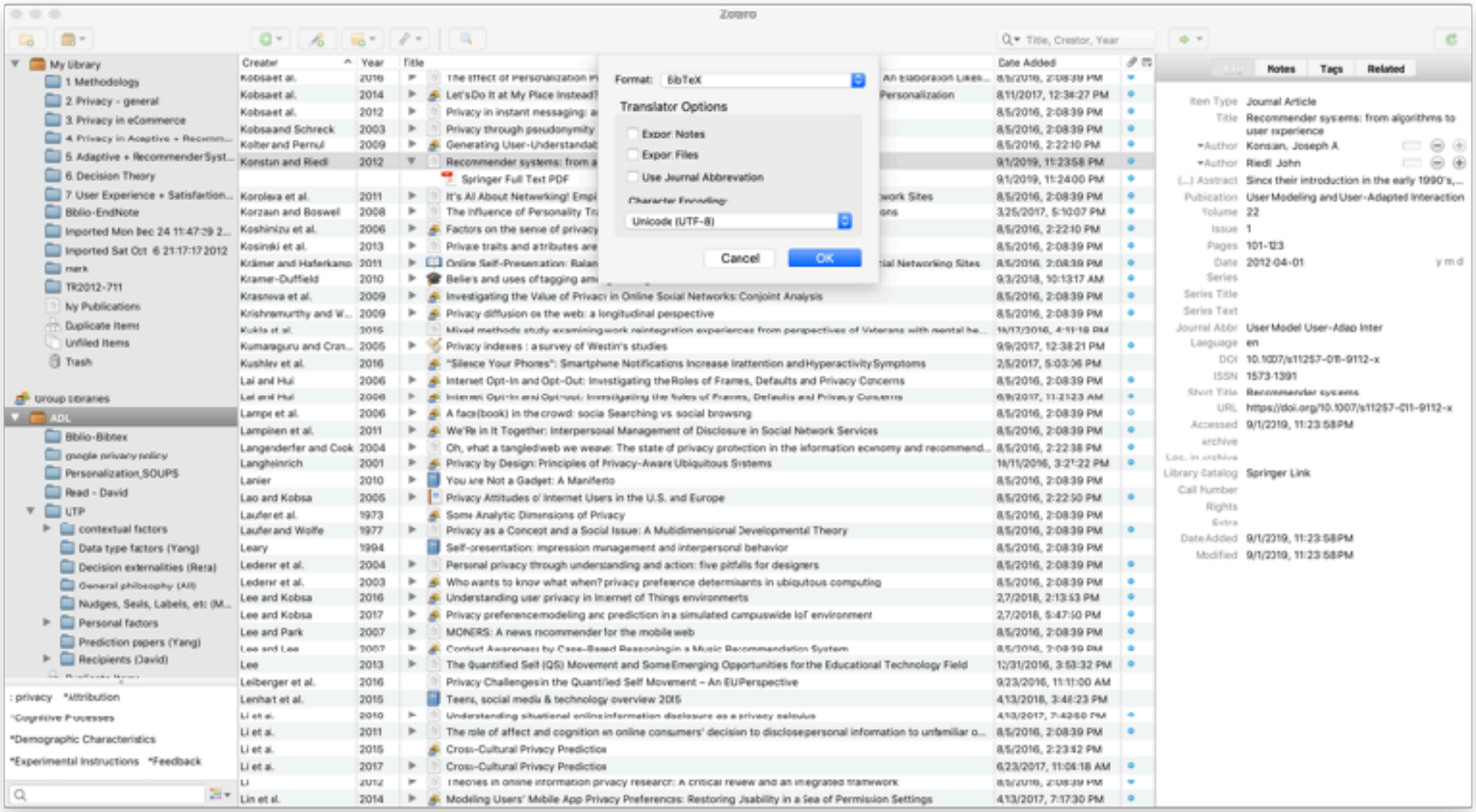
Demonstration



Demonstration



Demonstration



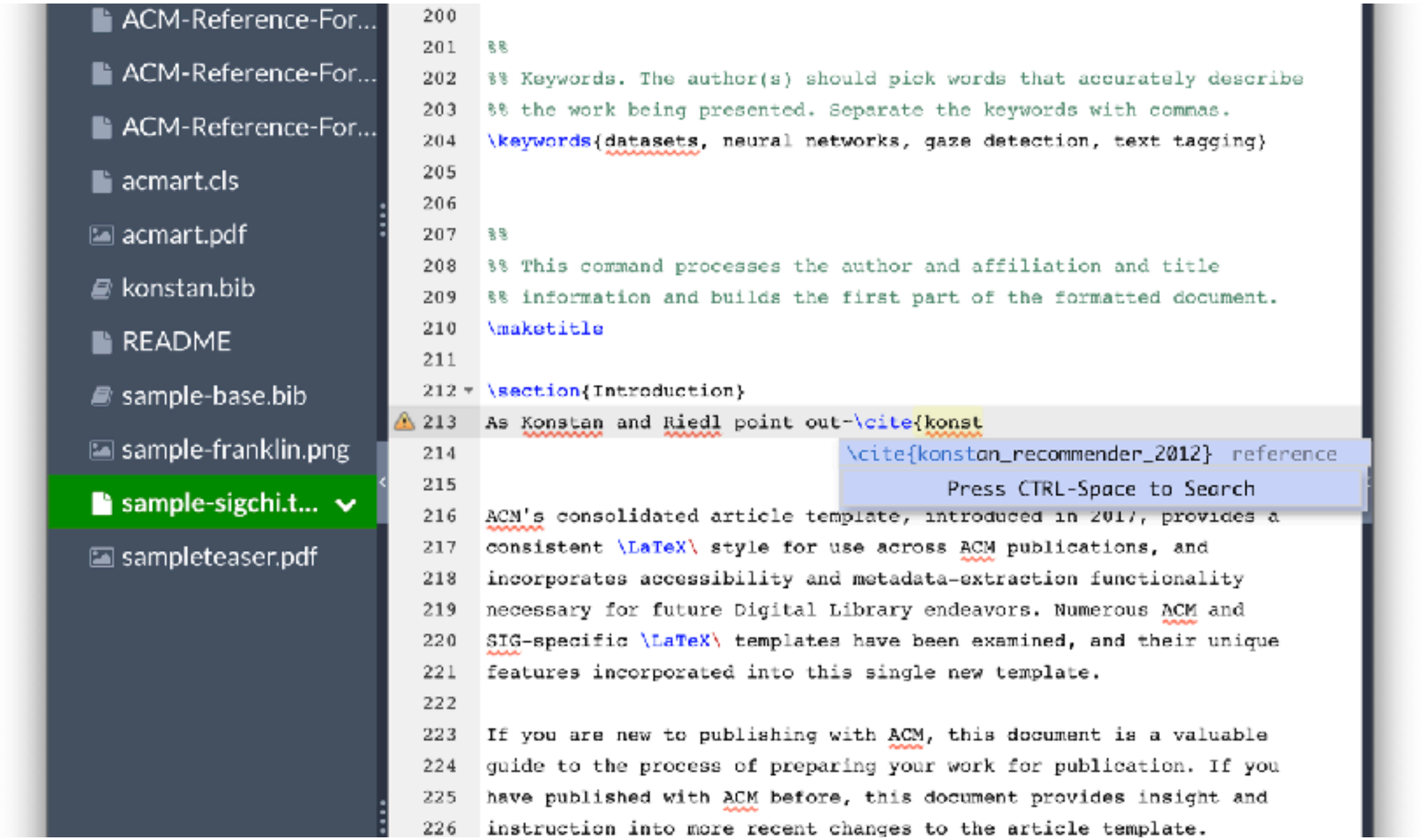
Demonstration

konstan.bib — Downloads

```
@article{konstan_recommender_2012,
    title = {Recommender systems: from algorithms to user experience},
    volume = {22},
    issn = {1573-1391},
    shorttitle = {Recommender systems},
    url = {https://doi.org/10.1007/s11257-011-9112-x},
    doi = {10.1007/s11257-011-9112-x},
    abstract = {Since their introduction in the early 1990's, automated recommender systems have revolutionized the
marketing and delivery of commerce and content by providing personalized recommendations and predictions over a variety
of large and complex product offerings. In this article, we review the key advances in collaborative filtering
recommender systems, focusing on the evolution from research concentrated purely on algorithms to research concentrated
on the rich set of questions around the user experience with the recommender. We show through examples that the embedding
of the algorithm in the user experience dramatically affects the value to the user of the recommender. We argue that
evaluating the user experience of a recommender requires a broader set of measures than have been commonly used, and
suggest additional measures that have proven effective. Based on our analysis of the state of the field, we identify the
most important open research problems, and outline key challenges slowing the advance of the state of the art, and in
some cases limiting the relevance of research to real-world applications.},
    language = {en},
    number = {1},
    urldate = {2019-09-02},
    journal = {User Modeling and User-Adapted Interaction},
    author = {Konstan, Joseph A. and Riedl, John},
    month = apr,
    year = {2012},
    keywords = {Collaborative filtering, Evaluation, Metrics, Recommender systems, User experience},
    pages = {101--123},
    file = {Springer Full Text PDF:/Users/bknijnen/Zotero/storage/8XAADPRB/Konstan and Riedl - 2012 - Recommender systems
from algorithms to user exper.pdf:application/pdf}
}
```

Line: 20:2 | BibTeX | Tab Size: 4 | konstan_recommender_2012

Demonstration



Other options

Mendeley

Also free, owned by Elsevier

Endnote

Very popular but expensive

RefWorks

Free for Clemson affiliates

Papers

High usability, but Mac-only

Notes

Make sure to fix common problems in paper metadata:

- ALL CAPS TITLES
- Proceedings filed as journal article
- Missing page numbers, location, DOI
- Special character formatting

Use the correct citation style

May not always be available, unfortunately

Word plugin sometimes buggy

Citing papers

How to cite others correctly in your paper?

Citing papers

Citing correctly signals that you put effort into your paper

Common problems:

- Incorrect citation style / misspelled author names etc.
- Missing relevant work
- Incorrect / sloppy citations

Citation styles

Numbered, consecutively

This one is the easiest

Numbered, by last name

Very easy with the help of a reference manager

Names, year

Usually for journals

Citation styles

Numbered:

- Privacy is an undying problem in social media [1].
- Inline citation: As Author and Author point out [1], privacy is an undying problem in social media.
  - Better than "As [1] points out..."
- Quoted text: Author and Author write [1]: "Privacy continues to be a problem in social networks, including Facebook" (p. 193).
- Multiple citations: Multiple researchers note that privacy is an undying problem in social media [1, 6, 8–10].

Citation styles

The same, but for the "names, year" format:

- Privacy is an undying problem in social media (Author & Author, 2001).
- As Author and Author (2001) point out, privacy is an undying problem in social media.
- Author and Author (2001) write: "Privacy continues to be a problem in social networks, including Facebook" (p. 193).
- Multiple researchers note that privacy is an undying problem in social media (Author & Author, 2001; Johnson, 2012; Smith et al., 2009)

Disambiguation

Let's say you cite a paper with Dave Johnson as the first author, and another paper with Michael James Johnson as the first author...

(D. Johnson et al., 2001) and (M.J. Johnson et al., 2012)

Let's say you cite multiple papers with the same first author and the same year...

(Knijnenburg et al., 2012), (Knijnenburg et al., 2012a), (Knijnenburg et al. 2012b), etc.

Use of et al.

First time you cite authors: use all the names*:

(Knijnenburg, Willemsen, Gantner, Soncu & Newell, 2012)

Subsequently, use “first author et al.”:

(Knijnenburg et al., 2012)

For inline citations in the numbered citation format, always use et al.:

Knijnenburg et al. [1] argue that...

Note the correct spelling of “et al.”

Cite correctly

Don't something that is cited in another paper, cite the original work instead!

Don't use string citations:

> Example: "Multiple researchers note that privacy is an undying problem in social media [1, 6, 8, 12, 24, 46, 51, 56]."

Are you citing too many papers?

Usually symptom of not covering each work deep enough

- What does each of these works contribute?
- How is your work different from each of these works?

References

Format them correctly!

Much easier LaTeX and/or a good citation manager

Pay attention to:

- name formatting (full first name, yes/no?)
- use of venue abbreviations
- use of location of conference
- use of DOI

For journals, just make sure the DOI is correct

References

Do they count towards the page limit?

If not (yay), do they have their own page limit?