

RA21 USER RESEARCH SUMMARY

*Research conducted during the RA21 project supporting the NISO Best Practice
Recommendations published May 2019*

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Last Updated: 17 June 2019

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Summary Research Findings

- Participants already *familiar* with federated access (63%), typically authenticating through their university website are successful in completing the given task, i.e., identifying the “Access Through Your Institution” button as the means for accessing the full text..
- Participants *unfamiliar* with current federated access models either took longer (11%), over 60 sec as compared to an average of 23 sec or failed (25%) to select the “Access through your institution” button. Several in this group didn’t look for the button, and their initial reaction is “I can’t access through my institution because I am not at my institution.”
- For all participants, the location of the “Access through your institution” is the most important factor for recognition.
 - When the “Access through your institution” is located above the fold and (1) on the top right of the page or (2) between the title of the article and the abstract, participants are able to easily and quickly spot it and both placements have similar effectiveness. However, below the fold is significantly less effective, and a layered approach is not preferred by participants.
- If the “PDF” link/icon is visible, participants click that first and expect to download the PDF or redirected to a paywall or login if they don’t have access.

A Case study

Access ACS Publications full text article when off-campus or off-company network

*Understanding the effectiveness of
placement, grouping
and **hierarchy**
on access options*

Key Insights

for placement, grouping and hierarchy

In the absence of :

- Placing primary access option above the fold (visible without scrolling)
- Grouping all the access options together
- Presenting choices in hierarchical order

The A/B testing revealed:

- Participants were much more likely to fail (4x) when access options are equivalent and compete with each other.
 - Participants took more than 20 seconds longer when the “Access through your institution” is below the fold and separated from other access options.
 - The probability of success is enhanced by introducing a familiar keyword in the title of the access options grouping (e.g., Get PDF).
-

Research Methodology

Objective

The purpose of this study is to validate RA21 recommended practice and to better understand the impact of the (1) placement, (2) grouping and (3) hierarchy of access options on users' ability to successfully and quickly identify the correct access option when they are off-campus or off-company network.

Methodology

The study was unmoderated and conducted using an A/B testing methodology. Users were presented with one of two versions of a design. An A version where access options' placement, grouping and hierarchy were not accounted for in the design, or a B version where these three factors were accounted for in the design per RA21 recommended practice.



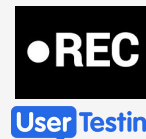
UserTesting recruited 34 total participants (12 for Version A and 11 for Version B and 11 for Version C designs) ages 20-51. Participants were 44% male : 56% female from Academic (85%), Commercial (5.9%), Research Institute (5.9%), Physician at Academic Institution (2.9%).



Participants reported conducting literature search off-campus/off-company network at least once a week (53%), once a month (29%) or daily (18%).



Participants were given a scenario where they came across an interesting article and want to get full text. They know that their school/company pays for it but they are off-campus/off-company network. They were asked where on the design page would they click? Participants were told that only their first click on the image will be collected.



Participants verbalized their thoughts as they were completing the task. This was captured in recordings on UserTesting. Their answer to an explicit question on why they made the selection was also collected.



The task time for each participant from seeing the design page to their first click was recorded. A heatmap of where the participants clicked for each design was also generated. Both a feature on Chalkmark, the tool we used for testing.

Version A

(as-is) Original publisher design was preserved. Only change was the replacement of institutional access option with RA21 button.

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Bioinspired pH- and Temperature-Responsive Injectable Adhesive Hydrogels with Polyplexes Promotes Skin Wound Healing

Thai Minh Duy Le, Huu Thuy Trang Duong, Thavasyappan Thambi, V.H. Giang Phan, Ji Hoon Jeong*, and Doo Sung Lee*

Cite This: *Biomacromolecules* 2018, 19, 8, 3536-3548
Publication Date (Web): July 13, 2018 (Articles)
<https://doi.org/10.1021/acs.biomac.800619>
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Abstract

Despite great potential, the delivery of genetic materials into cells or tissues of interest remains challenging owing to their susceptibility to nuclease degradation, lack of permeability to the cell membrane, and short in vivo widespread use in therapeutics. To develop a bioinspired in situ-forming injectable adhesive hydrogel depot that could control the delivery of DNA-bearing polyplexes for versatile biomedical applications. A series of multiblock copolymer, comprised of water-soluble poly(ethylene glycol) (PEG) and pH- and temperature-responsive poly(sulfamethazine ester urethane) (PSMEU), has been synthesized as in situ-forming injectable hydrogelators. The free-flowing PEG-PSMEU copolymer sols at high pH and room temperature (pH 8.5, 23 °C) were transformed to stable gel at the body condition (pH 7.4, 37 °C). Physical and mechanical properties of hydrogels, including their degradation rate and viscosity, are elegantly controlled by varying the composition of urethane ester units. Subcutaneous administration of free-flowing PEG-PSMEU copolymer sols to the dorsal region of Sprague-Dawley rats instantly formed hydrogel depot. The degradation of the hydrogel depot was slow at the beginning and found to be bioresorbable after two months. Cationic protein or DNA-bearing polyplex-loaded PEG-PSMEU copolymer sols formed stable gel and controlled its release over 10 days in vivo. Owing to the presence of urethane linkages, the PEG-PSMEU possesses excellent adhesion strength to wide range of surfaces including glass, plastic, and fresh organs. More importantly, the hydrogels effectively adhered on human skin and peeled easily without eliciting an inflammatory response. Subcutaneous implantation of PEG-PSMEU copolymer sols effectively sealed the ruptured skin, which accelerated the wound healing process as observed by the skin appendage morphogenesis. The bioinspired in situ-forming pH- and temperature-sensitive injectable adhesive hydrogel may provide a promising platform for myriad biomedical applications as controlled delivery vehicle, adhesive, and tissue regeneration.

Wound healing

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Self-Adapting Hydrogel to Improve the Therapeutic Effect in Wound-Healing

Yongsan Li, Xing Wang, Yan-nan Fu, Yen Wei, Lingyin Zhao, and Lei Tao
Publication Date (Web): July 2018

Thiol-Ene Alginate Hydrogels as Versatile Bioinks for Bioprinting

Huay Wen Ooi, Carlos Mota, A. Tessa ten Cate, Andrea Calore, Lorenzo Moroni, and Matthew B. Baker
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Hydrogel Cross-Linked with Dynamic Covalent Bonding and Micellization for Promoting Burn Wound Healing

Ziyi Li, Fei Zhou, Zhiyong Li, Siyu Lin, Lei Chen, Lixin Liu, and Yongming Chen
Publication Date (Web): July 2018

Polyacrylamide Hydrogels Produce Hydrogen Peroxide from Osmotic Swelling in Aqueous Media

Ashray V. Parameswar, Kirsten R. Fitch, David S. Bull, Victoria R. Duke, and Andrew P. Goodwin
Publication Date (Web): July 2018

Bioinspired Self-Healing Hydrogel Based on Benzoxaborole-Catechol Dynamic Covalent Chemistry for 3D Cell Encapsulation

Yanguan Chen, Diana Diaz-Dussan, Di Wu, Wenda Wang, Yi-Yang Peng, Anika Benozir Asha, Dennis G. Hall, Kazuhiko Ishihara, and Ravin Narain
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Bioinspired pH- and Temperature-Responsive Injectable Adhesive Hydrogels with Polyplexes Promotes Skin Wound Healing

(Supporting Information for *Biomacromolecules*)

Version B

(recommendation) All access options were above the fold, grouped and organized in hierarchical order with primary access option (RA21) as a button.

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Wound healing

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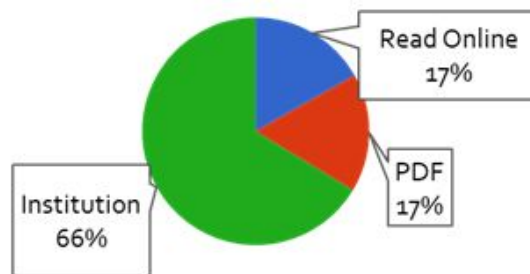
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Version A Heatmap

- 66% of the participants completed the task correctly.
- Observations/statements from the recording:
 - Few of the participants that failed did not scroll down, they focused on the elements on the top block. When they did scroll, it was quick and glossed over the RA21 access option and scrolled right back up.
 - The “your current credentials do not allow retrieval of the full text” was confusing to few participants. One thought they have to become ACS Member in order to get full text.



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Read Online

I clicked "read online" because then I would be able to see what my options were for reading off network (ex: logging in) -commercial organization participant

Quite often the online version of the article is available for a public domain. The pdf version is usually a paid one. -academic participant

PDF

It would download completely as a PDF document in my device. -research institute participant

I was trying to access the material without emailing the author of the research. -academic participant

Access through your institution

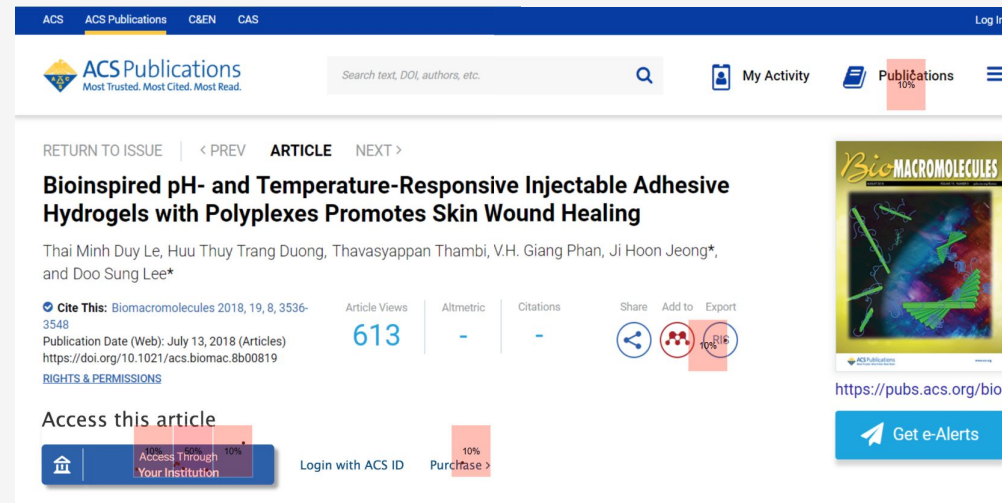
I made the selection based on the fact that I'm taking for granted that my institution is registered and recognized by the publisher of that paper. -academic participant

"I would put the login through your institution maybe on the top. If I don't even see it on the top I wouldn't scroll down and look for it. I'll just like, 'ok, I'll do it later' when I am on campus. But if I see that button on the top, maybe next to the PDF or somewhere more visible. I will do it from the beginning. It's just easier to find it and to do it." -academic participant

"I had to browse a little bit on the website, but it wasn't as hard. However, I am taking for granted that my institution is registered on the publisher's website. Which is not always true... actually, it happens very few times that I can login by using my institution. I would say that 90% of the times, I have to login first using the proxy of my university. But it would be very nice if the publisher can recognize my institutions so I can login even without using a proxy." -academic participant

Version B Heatmap

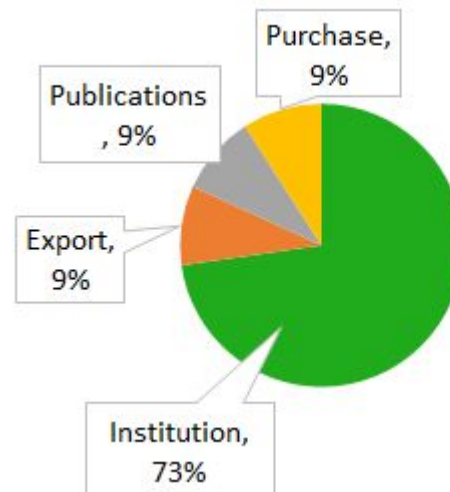
- 73% of the participants completed the task correctly.
- Observations/statements from the recording:
 - Participants relied on what is already familiar, and those that selected other options didn't seem to recognize, or are familiar with federated access.
 - "I would have to say it has to do with research habits. Once the person is used to doing that, you get into it, maybe it's bad because you are doing it subconsciously but at the same time it helps you save some time."



Export: I usually would try to share it to my google drive or email, but since this is an article, and probably with multiple pages, I will want to export. It makes more sense that way. –academic participant from US

Publications: She does not explain why she chose what she did but did say that she will first go to "Publications". –academic participant from Saudi Arabia

Purchase: Because I'm off campus and I can't have access to the book by logging in through my institution website. And it looked like it was the only place it was relevant.. –academic participant from France



Usually there's a link that says "full text" I don't see that link but I do see that I can access the article through my institution, so I would click that. –academic participant

"I don't know that you could make it even more obvious to click. It's in a good spot and it's conspicuously marked. There's nothing more you could do to improve that." –academic participant

Version C Heatmap

- 91% of the participants completed the task correctly.
- Observations/statements from the recording:
 - The participant that clicked on the article title said, “but I am already off so I wouldn’t do that” with regards to the Access through your institution button. But very interestingly followed the hierarchy of access options and concluded that he can only buy a subscription or buy the article.
 - One participant said she would typically select “Share” and send to her email, or if she had the credentials to login with her institution, then she would click on the “Access through your institution”.



“This button you provided is extremely intuitive. For some reason, I wanted to look for it on the right hand side of the screen, maybe on the top right corner. But where you placed it was still within my immediate view when I open the window and it's a large button that was differently colored so that was well designed. So good job on that.” -academic participant

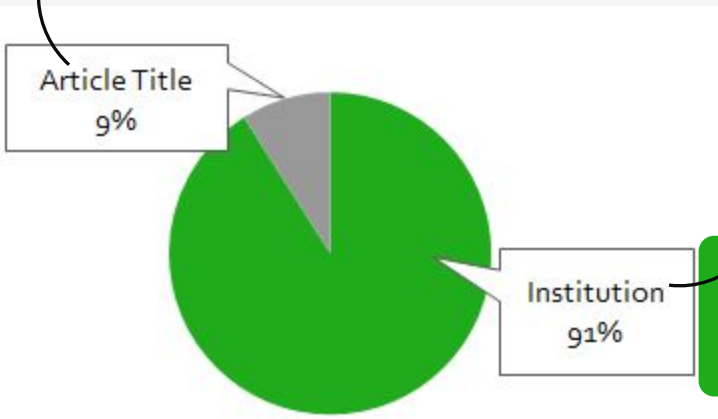
It was right next to text talking about access, and it mentioned my institution, which has a subscription to get me the full text. -academic participant

This button highly resembles the button/panel that many research sites (such as NIH) have that link the user to a destination where they can get a free version of the article through their institution. -academic participant

It seems that the button redirects you to where you could enter a network and emulate Institutional Access. -academic participant

“it was a very quick task... very very clear. It was the first thing that I saw so it was very easy, very straightforward.” –academic participant

After scanning the page, that is the link that looks the most promising to see the article because I am on my own network. I do not have a personal subscription. -commercial organization participant



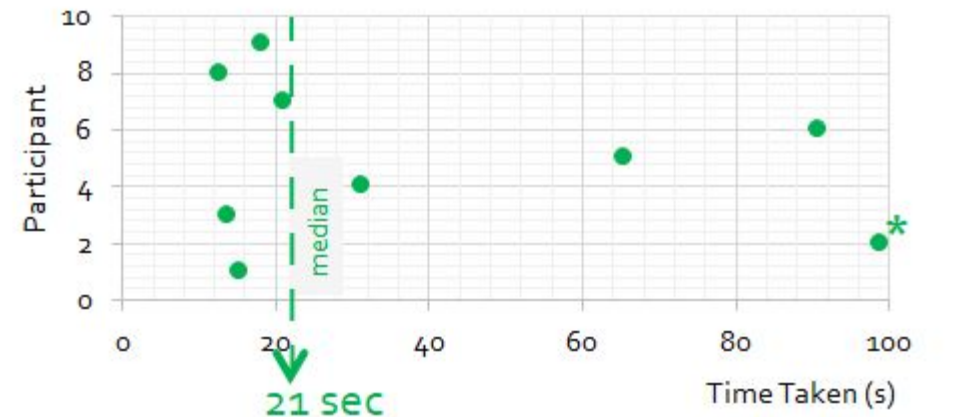
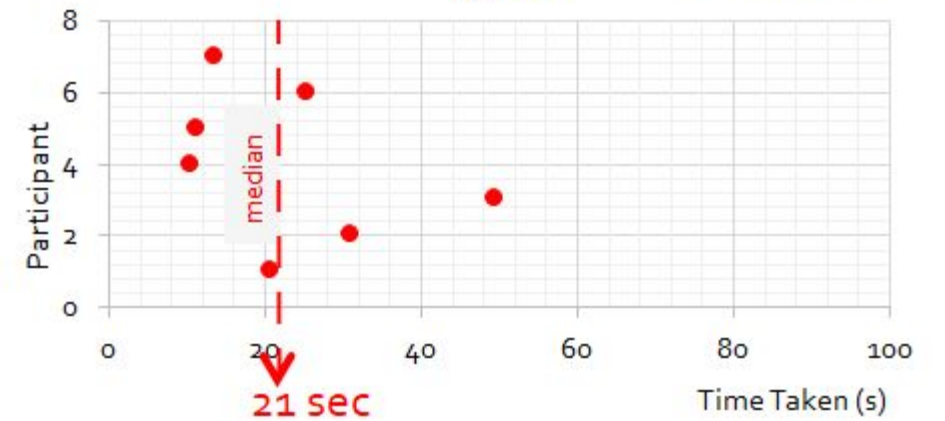
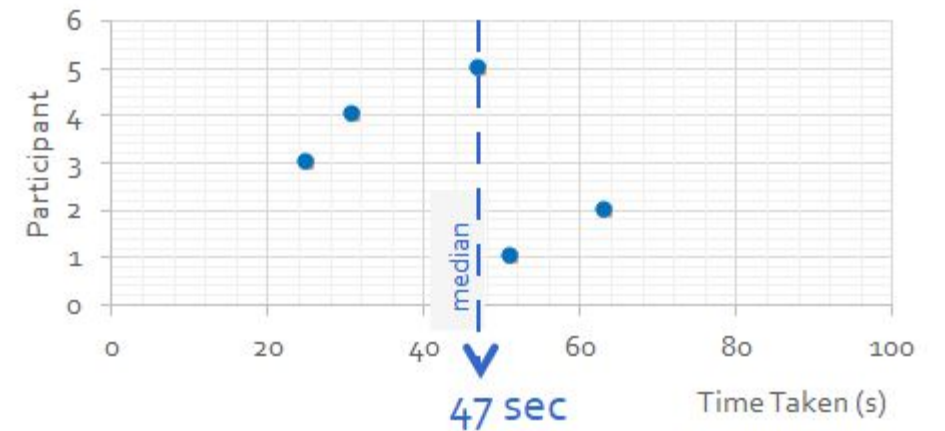
Task Time

- The median time taken to complete this task successfully was **more than 20 seconds longer** for Version A relative to Versions B and C.
- The extra time it took for users to verbalize their thoughts were accounted for by comparing their relative values.
 - A Version A participant that quickly makes the connection, (i.e., I am off-campus therefore access through my institution) and successfully completes the task while verbalizing their thoughts took **25 seconds**.
 - A Version C participant that quickly makes the connection and successfully completes the task while verbalizing their thoughts took **11 seconds**.
 - A Version C participant that quickly makes the connection and successfully completes the task while verbalizing their thoughts took **13 seconds**.

Version A (as-is)
Original publisher design was preserved. Only change was the replacement of institutional access option with RA21 button.

Version B (recommendation)
All access options were above the fold, grouped and organized in hierarchical order with primary access option (RA21) as a button.

Version C (recommendation)
Like Version B, except "Access this article" is replaced with "Get PDF"



* Participant methodically assessed the task and meticulously explained his rationale before he clicked on the RA21 access option.

Quotes

There is a need for easy off-campus access to scholarly information.

“We have monthly study groups and they are off campus”
[need access options like RA21] –academic participant

“Very applicable to me [off-network access option] and very glad that people are continuing to work on providing these features.” –academic participant

“This is always a tricky thing to do, to be able to get access to online journals when you are off campus which I commonly do. I am not sure I clicked the right spot to there but I wouldn't know the login information for that particular journal or through that database, so I would hope that through the link that I clicked through that I could be able to select my institution and then they could look and see and verify that I have access. The other option is through VPN.” –academic participant

Users do not trust the current federated access options and default to what works.

“What I would do personally, I would copy/paste the title and the author and I would go to my university's library portal and get access to the VPN there in order to access the article. But I know that I've tried clicking on that page before, on similar websites, that part that says 'log in via your institution. Most of the time I do not believe that link will work for me since it will allow me to login via something like Athens or Shibboleth, but those are not subscriptions that my university uses.” – academic participant

“A number of times in my personal experience, when I click on the institutional logins, there are a number of options, I think Shibboleth is one where not every institutions is listed there. So although that is the most intuitive button on a website typically when I click on it I find that my institution is not listed among those with that option. Typically the best option for me is login through my institution externally and then go back to the article link and just click PDF. But I thought given the scenario there that was the button [Access through your institution] that made the most sense.” –academic participant

Users are unaware of current federated access options and default to what works.

“Okay, I am not at my institution so I can't access it from that [Access Through Your Institution button]. ”

Conclusion

The rate at which users find “Access Through Your Institution” option when the access option is placed above the fold, grouped and placed in hierarchical order is 20 seconds faster than if it was below the fold and equivalent.

The probability of success is enhanced by using a familiar keyword in the title of the access options grouping (e.g., Get PDF).

The chances of clicking on the wrong access option (when they are not grouped and placed in hierarchical order, and not above the fold) could be much higher than the study result suggests because:

- (1) the participants in this study are focused on the task of identifying the right link for the given scenario.
- (2) They were also deliberate and mindful during the task because they are told that we are only collecting their first click; therefore, majority of them carefully evaluated all the options before they clicked.
- (3) The task explicitly told the participants that their school or company pays for the article; therefore, it was clearer to those that understood and succeeded in the task to click on the “Access Through Your Institution” button.

In real life, the mindset of a researcher is to identify relevant scholarly information resources for their research, not thinking about which is the right access option to click. Below are participant statements that support this conclusion:

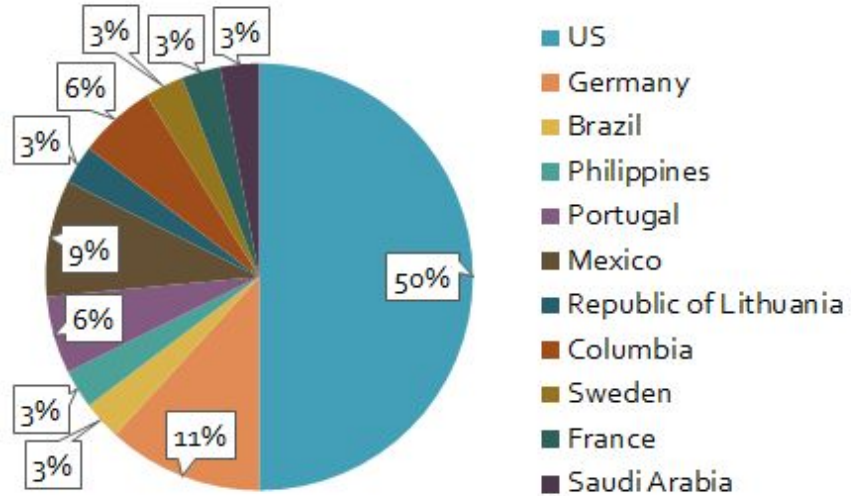
“Maybe the PDF and I could print it, or I’ll just read it online.” [then they remembered and re-read their task and does not click on “PDF”].

“Normally I’ll want to read online or take the PDF but I know I am not on campus today...” [scrolls down to see what else].

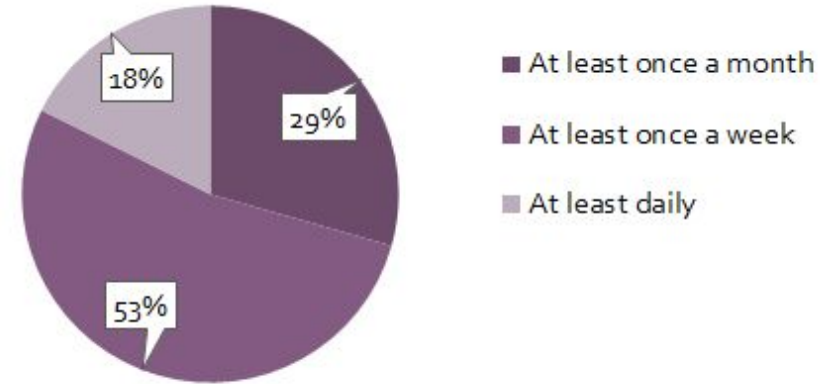
“Because I had the information that my institution could pay for it, it was clear that pressing that button [Access through your institution] would get them to pay for it.”

“Possibly, it is because of the power of habit. There could be other ways to do it, but it is the one I am used to following.”

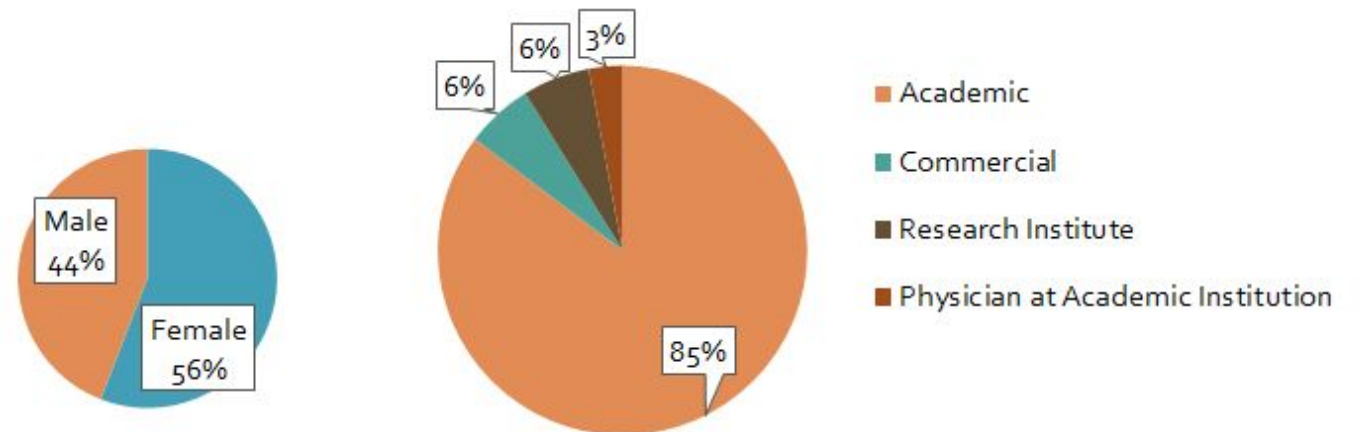
Participant Segmentation



How often do you conduct literature search when you are off-campus or off-company network?



Which of the following best describes you?



A Case study

Access Mary Ann Liebert full text article when off-campus or off-company network

*Understanding the effectiveness of
layer placement
on access options*

Key Insights

for layer placement

- Majority of the participants preferred the direct, no layer approach to access.
 - *Time savings* is the common reason for choosing either the direct or layer approach to access.
 - While the layer approach could be an appropriate design because it meets users' expectation (i.e., they click on familiar cues like "PDF", "Download", or "Full Text", and if they don't have access then a prompt will ask them to log in), users struggled in identifying the correct call-to-action because the wording is inconsistent across different publishers (e.g., "PDF", "Download", "View Article", "Check Access").
 - While the success is high (88%), the median total task time is 48 sec (33 sec for identifying the initial call-to action and 16 sec for selecting "Access Through Your Institution"). This is *25 seconds longer* than the average task time for no layer approach.
-

Research Methodology

Objective

The purpose of this study is to validate RA21 recommended practice and to better understand the impact of a layered placement of access options on users' ability to successfully and quickly identify the correct access option when they are off-campus or off-company network.

Methodology

The study was unmoderated. Users were presented with a design where the access options' placement was one click away from the abstract page.



UserTesting recruited 17 total participants ages 21-37. Participants were 59% male : 41% female from Academic (88%), Commercial (5.9%), Research Institute (5.9%).



Participants reported conducting literature search off-campus/off-company network at least once a week (59%), once a month (24%), daily (12%) or at least once a year (5.9%).



Participants were given a scenario where they came across an interesting article and want to get full text. They know that their school/company pays for it but they are off-campus/off-company network. They were asked where on the design page would they click? Participants were told that only their first click on the image will be collected.



UserTesting

Participants verbalized their thoughts as they were completing the task. This was captured in recordings on UserTesting. Their answer to an explicit question on why they made the selection was also collected.



Chalkmark

The task time for each participant from seeing the design page to their first click was recorded. A heatmap of where the participants clicked for each design was also generated. Both a feature on Chalkmark, the tool we used for testing.

Abstract Page

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3D Printing and Additive Manufacturing, Vol. 5, No. 2 | Original Articles

3D-Printed Reusable Cell Culture Chamber with Integrated Electrodes for Electrical Stimulation and Parallel Microscopic Evaluation

Dominik Schneiderei, Jessica Tschernich, Oliver Friedrich, Marina Scharin-Mehlmann, and Daniel F. Gilbert

Published Online: 1 Jun 2018 | <https://doi.org/10.1089/3dp.2017.0103>

[View Article](#) [Tools](#) [Share](#)

Abstract

Electrical stimulation of mammalian cells *in vitro*, including stem or neuronal cells and myocytes, has been a widely established method for assessing physiological or pathophysiological mechanisms in a variety of fields of research. Conventional infrastructure used in *in vitro* electrical stimulation experiments is typically proprietary, noncustomizable, costly, and requires a high level of skill to use and maintain. The emergence of rapid prototyping technology makes it possible to quickly engineer alternatives to conventional stimulation infrastructure that are open source, customizable, low cost, and user friendly. In this study, we describe the rapid prototype of a three-dimensional (3D)-printed reusable growth chamber with integrated electrodes for electrical stimulation and parallel microscopic evaluation of cultured cells that can easily be reconstructed within a few hours using 3D desktop printing and off-the-shelf components. The chamber is light weight (~8 g), small (76 × 26 × 6 mm), and extremely low cost (<EUR 1). We demonstrate the applicability of the printed device for maintenance of *in vitro* cultures as well as for electrical and chemical stimulation using the conditionally immortal dorsal root ganglia cell line MED17.11 as a model system. The applicability for microscopic evaluation was demonstrated by time-resolved high-content imaging of the intracellular calcium concentration as a measure of stimulation-induced membrane depolarization. We provide a comprehensive parts list, 3D design files, a wiring diagram, and software code for rebuilding the cost-effective infrastructure for electrical and/or chemical stimulation and parallel high-content microscopy of cells *in vitro*. While this work focuses on electrical stimulation of mammalian cells, the presented technology could also be adapted for use with other biological specimens and provides a general example of rapidly prototyped low-cost biotechnology for application in life sciences and education.

Keywords

- 3D desktop printing
- conductive filament
- PLA
- electrical stimulation
- Fluo-4 AM
- MED17.11 dorsal root ganglia cell line
- Arduino
- LabVIEW

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Layer Page

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3D Printing and Additive Manufacturing, VOL. 5, NO. 2 | Original Articles

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Dominik Schneiderei, Jessica Tschernich, Oliver Friedrich, Marina Scharin-Mehlmann, and Daniel F. Gilbert

Published Online: 1 Jun 2018

Access content

To read the fulltext, please use one of the options below to sign in or purchase access.

- Access Through Your Institution**
- Personal Login
- Purchase** 3D Printing and Additive Manufacturing PPV \$51.00
- Claim

Restore content access
This functionality works only for purchases made as a guest

Original publisher design was preserved for the Abstract Page. Only change was made on the Layer page with the replacement of institutional access option with RA21 button.

Authors and Affiliations

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b. 2Erlangen Graduate School in Advanced Optical

Results

Abstract Page

- 88% of the participants clicked “View Article”.
- 5.9% of the participant clicked “Share”.
- 5.9% of the participants clicked on the person icon (this was the correct choice).
- A common observation from the recordings: Participants paused at the Abstract page because it didn’t quite make sense given the scenario that they don’t have access to click on “View Article” but they tried it anyway.

Layer Page

- 100% of the participants clicked “Access Through Your Institution”.

Task Time

- Median total task time is 48 sec (33 sec for Article Page and 16 sec for Layer Page)

The screenshot shows the article page for "3D-Printed Reusable Cell Culture Chamber with Integrated Electrodes for Electrical Stimulation and Parallel Microscopic Evaluation" in the journal "3D Printing and Additive Manufacturing". The page features a dark red header with the publisher's name and navigation links. The article title is prominently displayed, followed by the authors' names and the publication date. Below the title, there are three buttons: "View Article" (with a downward arrow icon), "Tools", and "Share". A yellow callout box highlights the "View Article" button with "88%". Another yellow callout box highlights the "Share" button with "5.9%". A third yellow callout box in the top right corner highlights the person icon in the navigation bar with "5.9%". The abstract text is visible below the buttons. On the right side, there is a thumbnail of the journal cover and a sidebar with "Information" and "To cite this article:" sections.

Share:

I was looking for a way to send it to myself via email so I could open it at work later.
–government organization participant (at least once a year)

Person icon:

I assumed I would have to log in to view the paper. This is because I am off-campus.
–academic participant (at least once a month)

View Article:

- There were no other obvious choice.
- From experience, the full text option is usually somewhere at the top of the page, below the title or on the side.
- A lot of journals allow them to view the article for free without having to login through their institution or buy them.
- It will redirect them to a login page if a login was necessary.
- The arrow pointing downward signaled “Download”.

Majority of the participants preferred the direct, no layer approach to access

A common reasoning for choosing either the direct or layer approach is *time savings*.

- The few that chose the layer approach indicated that it's too time consuming if everything was on the article page, it would be too busy and distracting and users have to search around.
- A misconception for one participant that chose the layer approach is that the "Access Through Your Institution" option would be available even though they have access to full text thus causing them to unnecessarily add their credentials.

8/10 participants preferred the "Access Through Your Institution" button directly on the article page and not one click away.

"It cuts out a step and it tells me that I automatically have to be logged into my school account or have an offline account so that I don't waste time trying to view the article when it only gives me the abstract."

"It will be quicker because that's what I look for anyway. Saves me a click."

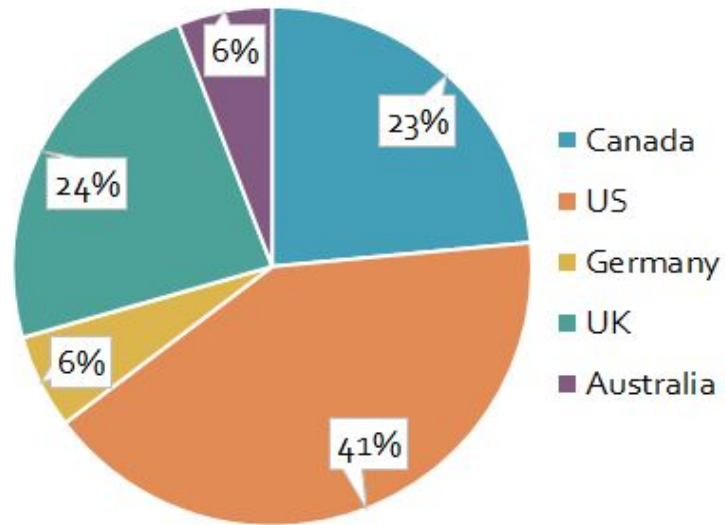
"I typically look for this and sometimes pages have this straight away, however a tab or button would be useful and efficient as they can often be tricky to find."

"Many people access these papers via their institutions, and would prefer a more straightforward way to do so that could save a couple clicks."

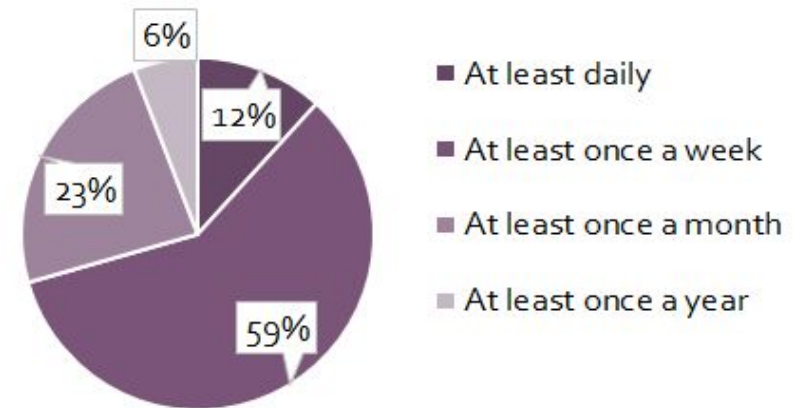
"Say you are a new student and you didn't know that you could login through your institution on that website. It will help them recognize that they have that option to access full text, oh I can do that!"

"It encourages you to know you can access the article as you have an institution to log in to. Also some people will be looking for that option immediately and it makes it easier to find."

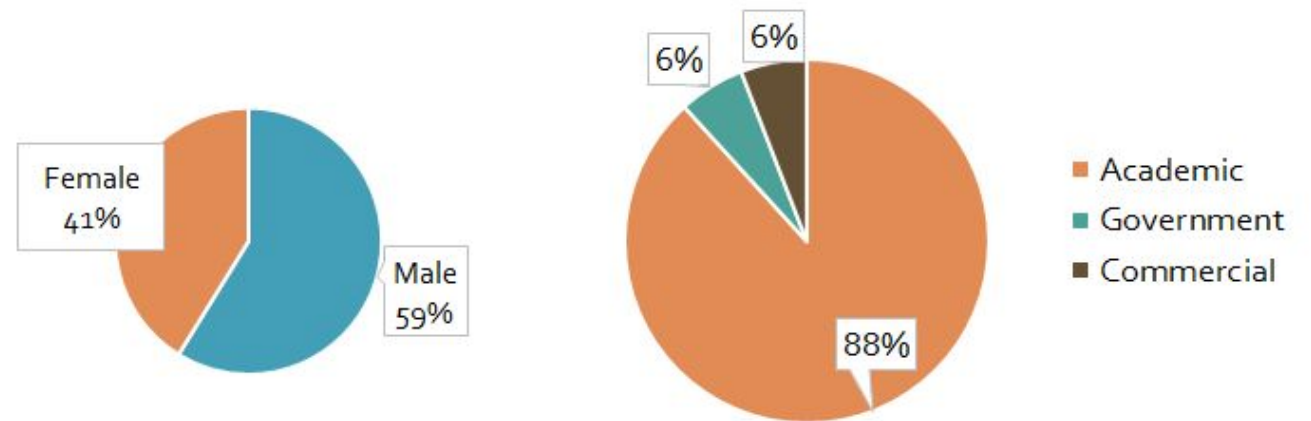
Participant Segmentation



How often do you conduct literature search when you are off-campus or off-company network?



Which of the following best describes you?



A Case study

Access Mary Ann Liebert full text article when off-campus or off-company network

*How **color** affects users'
understanding on
RA21 calls to action*

Key Insights

for button color

Versions A: button is maroon, matching the color scheme of the abstract page.

Version B: button is blue, a color that people are use to for links and it stands out.

The A/B testing revealed that **the color of the button does *not* have a significant impact on success.**

- Task time for both Versions A and Version B are similar, 26 sec and 28 sec respectively.
- Participants that selected access options other than “Access Through Your Institution” were either unfamiliar with using their institutional credentials to gain access to full text when they are outside of their institutional network (federated access), or relied on what they are familiar doing and did not explore other possible options. *The color of the button was not stated as a factor in the incorrect selection.*



Research Methodology

Objective

The purpose of this study is to validate RA21 recommended practice and to better understand the impact of color of access options on users' ability to successfully and quickly identify the correct access option when they are off-campus or off-company network.

Methodology

The study was unmoderated and conducted using an A/B testing methodology. Users were presented with one of two versions of a design. An A version where access option matches the color scheme of the design, or a B version where the access option is blue, a color that creates a feeling of trust in N. American culture and a color people are used to for links when WWW first came to be.



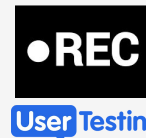
UserTesting recruited 21 total participants (10 for Version A design and 11 for Version B design) ages 20-51. Participants were 43% male : 52% female (5% no response) from Academic (67%), Research Institute (10%), Government (5%), No response (19%).



Participants reported conducting literature search off-campus/off-company network at least once a week (48%), once a month (24%), daily (19%), at least once a year (5%) or never/rarely (5%).



Participants were given a scenario where they came across an interesting article and want to get full text. They know that their school/company pays for it but they are off-campus/off-company network. They were asked where on the design page would they click? Participants were told that only their first click on the image will be collected.



Participants verbalized their thoughts as they were completing the task. This was captured in recordings on UserTesting. Their answer to an explicit question on why they made the selection was also collected.



The task time for each participant from seeing the design page to their first click was recorded. A heatmap of where the participants clicked for each design was also generated. Both a feature on Chalkmark, the tool we used for testing.

Version A

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3D Printing and Additive Manufacturing, VOL. 5, NO. 2 | Original Articles

3D-Printed Reusable Cell Culture Chamber with Integrated Electrodes for Electrical Stimulation and Parallel Microscopic Evaluation

Dominik Schneiderreit, Jessica Tschernich, Oliver Friedrich, Marina Scharin-Mehlmann, and Daniel F. Gilbert

Published Online: 1 Jun 2018 | <https://doi.org/10.1089/3dp.2017.0103>

Tools Share

Abstract

Electrical stimulation of mammalian cells *in vitro*, including stem or neuronal cells and myocytes, has been a widely established method for assessing physiological or pathophysiological mechanisms in a variety of fields of research. Conventional infrastructure used in *in vitro* electrical stimulation experiments is typically proprietary, noncustomizable, costly, and requires a high level of skill to use and maintain. The emergence of rapid prototyping technology makes it possible to quickly engineer alternatives to conventional stimulation infrastructure that are open source, customizable, low cost, and user friendly. In this study, we describe the rapid prototype of a three-dimensional (3D)-printed reusable growth chamber with integrated electrodes for electrical stimulation and parallel microscopic evaluation of cultured cells that can easily be reconstructed within a few hours using 3D desktop printing and off-the-shelf components. The chamber is light weight (~8 g), small (76 × 26 × 6 mm), and extremely low cost (<EUR 1). We demonstrate the applicability of the printed device for maintenance of *in vitro* cultures as well as for electrical and chemical stimulation using the conditionally immortal dorsal root ganglia cell line MED17.11 as a model system. The applicability for microscopic evaluation was demonstrated by time-resolved high-content imaging of the intracellular calcium concentration as a measure of stimulation-induced membrane depolarization. We provide a comprehensive parts list, 3D design files, a wiring diagram, and software code for rebuilding the cost-effective infrastructure for electrical and/or chemical stimulation and parallel high-content microscopy of cells *in vitro*. While this work focuses on electrical stimulation of mammalian cells, the presented technology could also be adapted for use with other biological specimens and provides a general example of rapidly prototyped low-cost biotechnology for application in life sciences and education.

Access Content

Access Through Your Institution

Personal Login Save For Later More Options

Figures References Related Details

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JUN 2018

Information
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Keywords

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LabVIEW

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Oliver Scharin-Mehlmann Marina Gilbert Daniel F.

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Original publisher layer design was removed.

All access options available on the Abstract page, above the fold, grouped and organized in hierarchical order with primary access option (RA21) in maroon, matching the color scheme of the page (Version A) or in blue, a color that people are use to for links and it stands out (Version B).

Version B

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3D Printing and Additive Manufacturing, VOL. 5, NO. 2 | Original Articles

3D-Printed Reusable Cell Culture Chamber with Integrated Electrodes for Electrical Stimulation and Parallel Microscopic Evaluation

Dominik Schneiderreit, Jessica Tschernich, Oliver Friedrich, Marina Scharin-Mehlmann, and Daniel F. Gilbert

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Electrical stimulation of mammalian cells *in vitro*, including stem or neuronal cells and myocytes, has been a widely established method for assessing physiological or pathophysiological mechanisms in a variety of fields of research. Conventional infrastructure used in *in vitro* electrical stimulation experiments is typically proprietary, noncustomizable, costly, and requires a high level of skill to use and maintain. The emergence of rapid prototyping technology makes it possible to quickly engineer alternatives to conventional stimulation infrastructure that are open source, customizable, low cost, and user friendly. In this study, we describe the rapid prototype of a three-dimensional (3D)-printed reusable growth chamber with integrated electrodes for electrical stimulation and parallel microscopic evaluation of cultured cells that can easily be reconstructed within a few hours using 3D desktop printing and off-the-shelf components. The chamber is light weight (~8 g), small (76 × 26 × 6 mm), and extremely low cost (<EUR 1). We demonstrate the applicability of the printed device for maintenance of *in vitro* cultures as well as for electrical and chemical stimulation using the conditionally immortal dorsal root ganglia cell line MED17.11 as a model system. The applicability for microscopic evaluation was demonstrated by time-resolved high-content imaging of the intracellular calcium concentration as a measure of stimulation-induced membrane depolarization. We provide a comprehensive parts list, 3D design files, a wiring diagram, and software code for rebuilding the cost-effective infrastructure for electrical and/or chemical stimulation and parallel high-content microscopy of cells *in vitro*. While this work focuses on electrical stimulation of mammalian cells, the presented technology could also be adapted for use with other biological specimens and provides a general example of rapidly prototyped low-cost biotechnology for application in life sciences and education.

Access Content

Access Through Your Institution

Personal Login Save For Later More Options

Figures References Related Details

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b. ²Erlangen Graduate School in Advanced Optical

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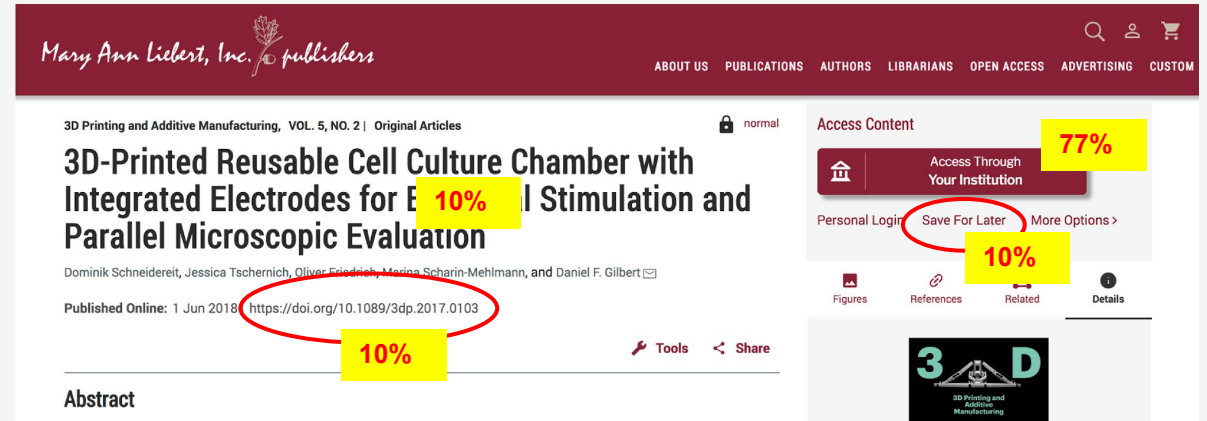
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Version A Heatmap

- 70% of the participants completed the task correctly.
- Observations/statements from the recording:
 - Participants that selected other access options were unfamiliar with using their institutional credentials to gain access to full text when they are outside of their institutional network (federated access).
 - One participant did state that he did not see the button: "I didn't see that button, that means it wasn't so obvious. Something to take care of there, guys."



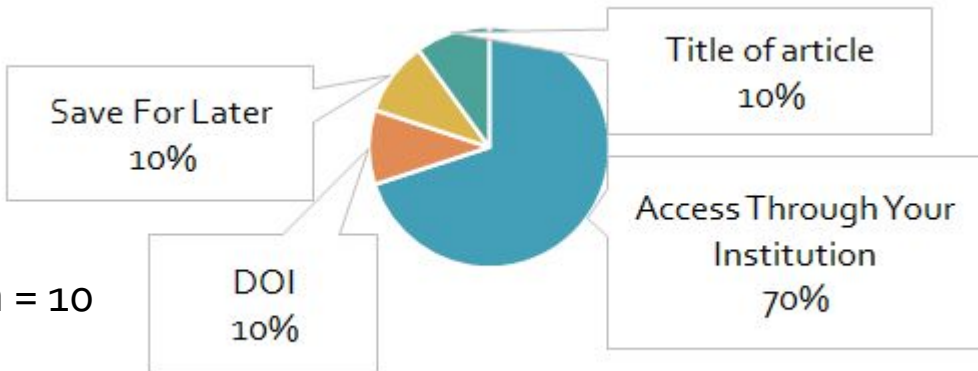
Title of article: my preference for the initial task where I pressed the header, is because I believe I can get more information from the search engines like google. The instructions were not really clear and I could not make out the purpose of this test. If I could initially understand the purpose, I would have understood it better and thus provide better and relevant feedback. –academic participant from Kenya (daily)

DOI: I clicked the DOI, sometimes in some pages, it redirects you to the PDF download or does it automatically –research institute participant from Venezuela (daily)

Save For Later: Because I was off-campus, I knew I wouldn't be able to access the paper, so I clicked "Save for Later" so I could go back to it once I was back on campus. –academic participant from US (Never/Rarely)

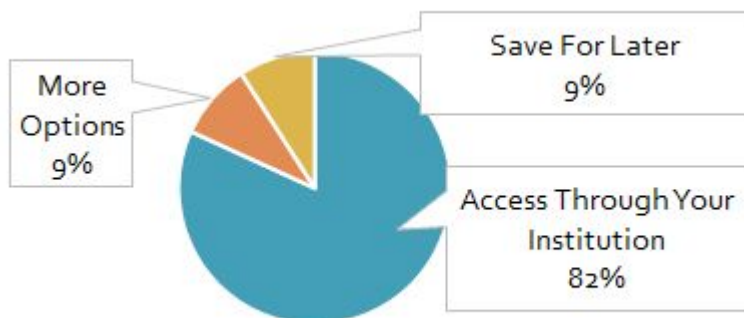
Access Through Your Institution:

- For all the journal website normally the login section is at the top right portion of the website. If I don't have personal account I would look for the institutional login. That's why I directly went to that portion and clicked on the institutional login.
- It was the first link I saw due to it being close to the top of the screen, and encapsulated in a large coloured box. The text was large and along with the icon next to it, the link was eye catching. The text itself clearly listed the link as a means to get access to the article via my institution (which I had been told had paid for the journal).
- Anyone who is familiar with researching through the institution probably already knows that they have an account from the school that they can use to access the text outside of school. I guess that's a good button to put in there.



Version B Heatmap

- 82% of the participants completed the task correctly.
- Observations/statements from the recording:
 - Similar to Version A, Participants that selected other access options were unfamiliar with federated access and relied on what they are familiar doing. Did not explore other possible options.
 - One participant did call out the blue box stating that it seems to be universally used.



More Options: If you are off the company or institution network, it often times won't allow you to view a full articles. Sometime it only allow you to view a very small portion or description of it. So most times if you are able to click on 'More Options' it may give you some off-network options, or even attempting to click on 'Share' and attempt to email it to yourself. Sometimes that will work depending on the particular article or particular site that houses the article.. –participant from US (at least once a month)

Save For Later: I thought that access through institution wouldn't work since I wasn't there. –academic participant from Brazil (at least once a month)

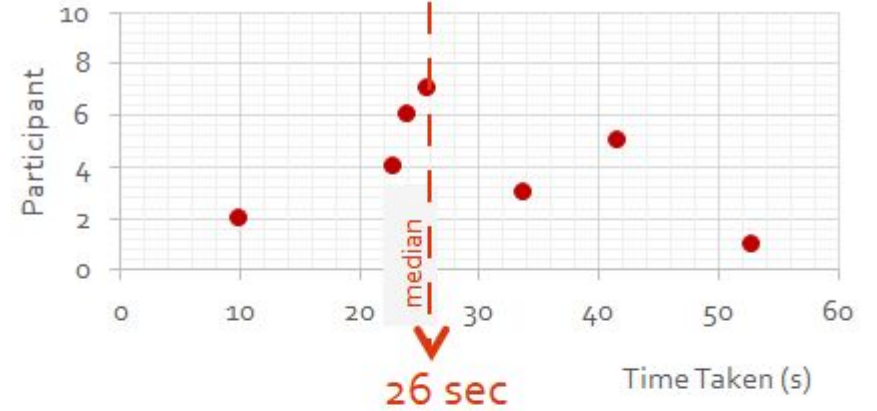
Access Through Your Institution:

- It clearly said access via university subscription so with that in mind it was easy and I knew where to go!
- because I belong to a school, I would think that this would be how I get the free access.
- I have seen similar articles where I have to use my university credentials to get access to the full article.
- For two reasons. First I knew I did not have a account so I would need to access through another institution (my university). Second due to the academia sort of symbol that gave it away. An extra point out may be the blue box which seems to be universally used.

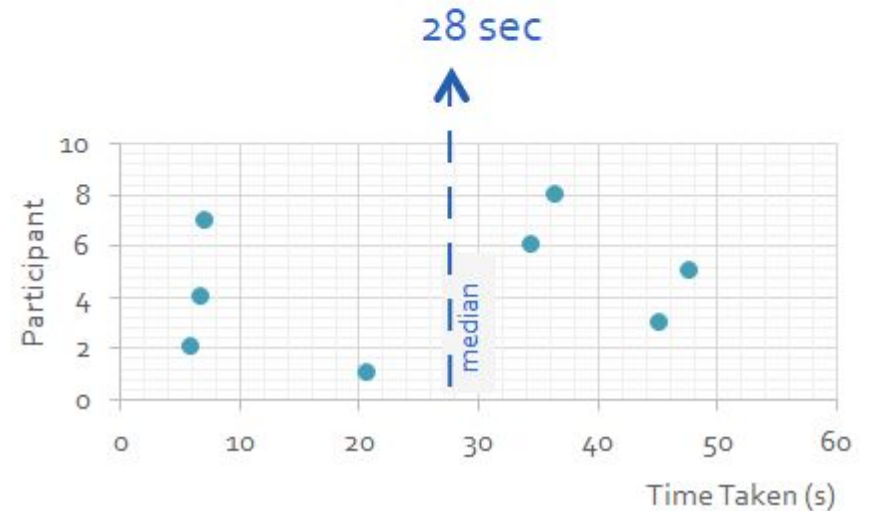
Task Time

- The median time taken to complete this task was *similar* for both Version A and Version B which suggests the color of the button does *not* have a significant impact on recognition.
- Methodology
 - Since the goal for comparing task time is to determine whether or not the color of the button has an impact, the calculation for median only included participants that (1) correctly selected the “Access Through Your Institution” button and (2) are familiar with federated access.
 - The extra time it took for users to verbalize their thoughts were accounted for by comparing their relative values.

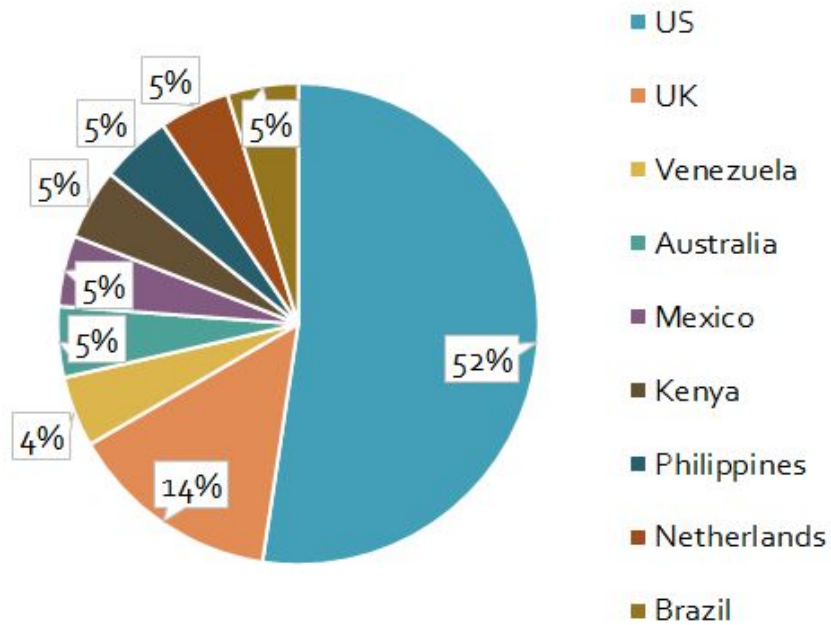
Version A maroon button, matching the color scheme of the page.



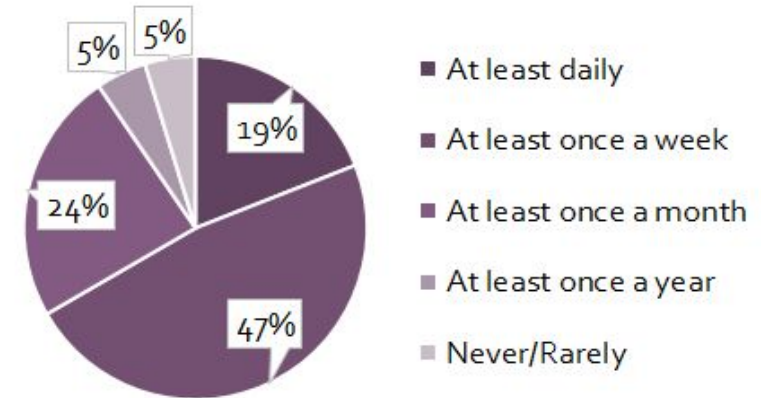
Version B blue button, a color that people are used to for links and it stands out



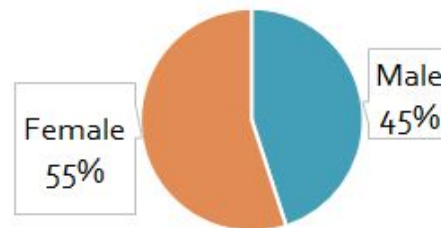
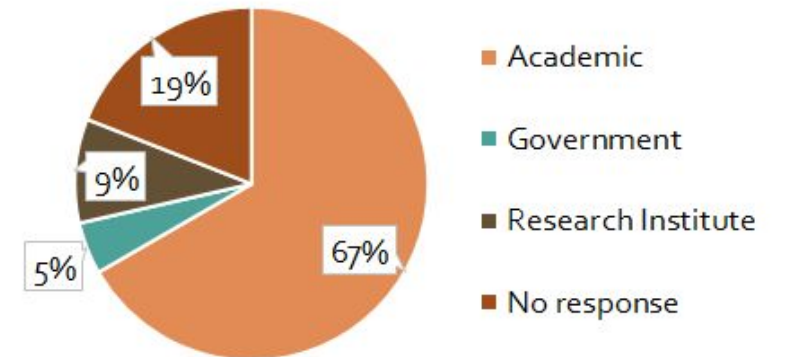
Participant Segmentation



How often do you conduct literature search when you are off-campus or off-company network?



Which of the following best describes you?



A Case study

Access to scholarly information resources: ACS Publications, Wiley, Springer/Nature, Elsevier

*How color affects users'
understanding on RA21 calls to
action across different
publishers*

Key Insights

for button color
across different publishers

- The color of the button didn't matter when participants didn't know what they were looking for.
- None of the participants mentioned the color of the button explicitly when evaluating the different articles pages.
- None of the participants have a strong feeling about the color of the button. They have stronger feelings about the location of the button and their ability to get access
- All participants did not have trouble recognizing the "Access through your institution" as the same functionality when they are different colors.
 - The consistency of the words, icon and button was enough threshold for recognition.
 - Some participants felt it made sense that the color of the button matched the design of the page.
 - Some of the participants stated that they are not sure color would mean anything but it is easier to find the button with different colors.
- Majority of the participants had trouble finding the call to action when it's a white background and blue text (similar to a link).
- The actions taken by the participants revealed that the location of the "Access through your institution" was more important, and that they relied on where the button was from the previous task when looking for it in the subsequent task.

Research Methodology

Objective

The purpose of this study is to validate RA21 recommended practice and to better understand the impact of color of access options across different publishers on users' ability to successfully and quickly identify the correct access option when they are off-campus or off-company network.

Methodology

The study was both moderated and unmoderated. Part 1 of the test users were presented with a static prototype starting with a Google search result that included four different publishers: ACS Publications, Elsevier, Springer/Nature and Wiley. The "Access through your institution" button for each of the publishers was a different color that matched the design of the abstract page. The order of the four publishers were randomized for each participants. Part 2 of the test users see all four different abstract pages side-by-side for comparison.



14 participants were recruited for the study, 8 unmoderated and 6 moderated. Participants were 79% male : 21% female from Academic (79%), Commercial (21%). Geographic distribution: 50% U.S., 22% U.K., 7.0% India, 7.0% Lithuania, 7.0% Germany, 7.0% Spain.



Participants were given a scenario where they imagine they are a researcher at the University of Minnesota. They are off campus and start their search on Google about biopolymers. They got four interesting results where they want to get the full text. They were asked where on the design page would they click and what they expect to happen. After completing all four publisher pages, participants were asked explicitly (1) what they thought about "Access through your institution" being different colors? (2) If they recognize them as the same functionality if they are different colors across different articles? And (3) what they thought about the button being all the same color as they moved from one journal page to the next?



User Testing



Participants verbalized their thoughts as they were completing the task. This was captured in recordings on UserTesting (unmoderated) and BlueJeans (moderated).

Color test across different publisher journal pages

visible on screen

ACS Publications

The screenshot shows the ACS Publications website for the journal *BioMacromolecules*. The article title is "Environmentally Sustainable Fibers from Regenerated Protein". The "Access this article" section at the bottom left features a red circle around the "Access Through Your Institution" button. The "Login with ACS ID" section is also visible.

Elsevier

The screenshot shows the Elsevier ScienceDirect website for the journal *Composites Science and Technology*. The article title is "Fully biodegradable natural fiber composites from renewable resources: All-plant fiber composites". The "Access Through Your Institution" button in the top navigation bar is circled in red. The abstract and keywords are visible below the article title.

Springer/Nature

The screenshot shows the Springer/Nature website for the journal *Polymer Journal*. The article title is "Poly(amino acids)/polypeptides as potential functional and structural materials". The "Access Through Your Institution" button in the "Access options" section is circled in red. The abstract and keywords are visible below the article title.

Wiley

The screenshot shows the Wiley Online Library website for the journal *Angewandte Chemie*. The article title is "Cellulose: Fascinating Biopolymer and Sustainable Raw Material". The "Access Through Your Institution" button in the "Access" section is circled in red. The abstract and keywords are visible below the article title.

Specific findings about each publisher's journal page

ACS Publications

Majority of the participants struggled (some 5 and some 10 minutes) with this layout. They tried one of the multiple PDF options to the right side of the page first, then scrolls to the bottom of the abstract to try the other PDF options. When that also didn't work, they usually scroll back up and sees the "Your current credentials do not allow retrieval of the full text." and stops feeling stranded or tries to click on the "i" icon.

Participants that knew what to look for also had trouble because they see the PDF options on the top right of the page and assumed they have access.

"this one was a bit more difficult for me. Habit tells me to come over here and just click on PDF right away. That took a bit of my time. Having the button at the bottom of the page too, there's a lot that takes up half the page, you have to scroll a bit. Not impossible to find, took a bit of time."

The number of actual calls to action was overwhelming for users especially for those unfamiliar with federated access.

"I will try to access this if I am in my institution, if not then I need to either join ACS or login with my credentials if I do have one."

Elsevier

Participants that evaluated this page first had trouble finding the call to action when it's white background and blue text (a link). They expressed the following reasons: (1) location is very different from all the others, (2) not a good contrast, too subtle, and (3) no box to indicate it's button.

Participants that evaluated other journal pages knew what they were looking for but still had a very difficult time finding the call to action.

"It's kind of a weird place as you can see, it takes a lot of place here sticking this in."

"it blends into the rest of the page."

Participants familiar with Elsevier journals spotted the call to action right away because they recalled where the PDF is located when they do have access.

Springer/Nature

All the participants looked around above the fold first, but since there weren't access options available, they scrolled to the bottom of the page to find the call to action.

One Participants felt that it made sense to have the calls to action later on in the article vs. at the very top like Elsevier.

Majority of the participants like the contrast of the button when asked about the colors of the button. It made the words very easy to read.

Wiley

Majority of the participants tried the "PDF" option first.

Majority of the participants disliked how much advertising was on the page.

"this one looks less professional, lots of advertising."

"that took a bit longer to find. I was looking up top, where the log in/register was located. There was just more junk on this page, bunch of ads up top, the log in is sort of tucked away. The layout is more foreign to me."

Majority of the participants were misled by the login fields.

"this is confusing, it's not clear which login credential it's asking for. It could be phishing. For ACS Publications, it clearly says ACS ID so that is okay."

Quotes

The color of the button didn't matter when participants didn't know what they were looking for.

"Yes [I recognize the call to action as the same functionality if they are different colors]. The initial access was difficult, but after going through it the first time I knew what I was looking for and the experience were all the same."

I think it was more difficult at first because I didn't know exactly what I was looking for. As I got further into the task, I had a better understand of what to look for and where to find it. Also, the different colors made it easier to find [vs. Elsevier, white background, not a button].

All participants did not have trouble recognizing the "Access through your institution" as the same functionality when they are different colors.

"I was looking for 'Access through your institution' so the color doesn't matter but it does help you locate it. What would be ideal is to have the link at the top like Elsevier, but that was hard to see, if it was a colored box, e.g., blue, then it'll be easy to find."

"I actually read what the words say I am not too concerned about the color. I would say if it was a consistent color, it would make no difference to me across journals because I think I would still read what the button is telling me to do."

"Yes. because they all use the same logo and they all use the same word you know what to expect when you see it, you know what it's going to let you do."

None of the participants had a strong feeling about the color of the button. They have stronger feelings about the location of the button and their ability to get access.

'Probably slightly better actually [that each color is matching the color scheme for each site] or just make it fits on the page better and probably make the experience slightly better that it matches the general design of the page.'

I think it's completely fine [that the call to action is different colors]. I think it makes it stand out and it goes with each of the web pages. Elsevier was really hard to find, even putting a box around it would make it easier. But I think having the color makes it blend with the page better.

"I do like something that helps it stand out, doesn't matter if it's the same or different colors or if there are even colors. The words help, the icon helps, color helps but what it comes down to its just the ability to access it through the university subscription."

"About the color, it's more about the place it is, the color fits the theme."

"Since it's designed like the articles pages, I am not quite sure that the colors would mean anything but it is easier to find those buttons with different colors from the page than it is in Elsevier page, it is very hard because it just blends in. In other pages it is quite easy to catch and easy to see."

Quotes

When access options are equivalent, users look for access option with the words: “PDF” or “Download”.

“If I have access then clicking on PDF will get me full text. If I don’t have access, clicking on PDF will take me to the login page.”

“It [ACS Publications and Wiley] was confusing since it showed PDF link even though I didn’t have access yet. The last two templates [Nature and Elsevier] were more intuitive because the links didn’t appear until I was signed in.”

“You should have ‘Access through your institution’ first before the ‘PDF’. Or just have the PDF icon and add a pop up telling you what to do. If you have that, it’s not important to have the different colors, different locations. If there’s no PDF option, I don’t know how to download it.”

participant starts to look for the word “Download” and reveals all the inconsistencies across publishers and the numerous terminology and options available for access options.

Placement of the primary access option very important.

“In most cases it was the placement of this on the page that drove a lot of the behavior. Like this one over here [ACS Publications] it was off screen, I had to scroll a little to find it. You don’t see it off the top whereas with some of these other articles the link that I needed to click was on screen immediately when it open so it was much more deliberate to find. But the different colors doesn’t bother me at all.”


“Something that’s not being mentioned is placement. The ACS Publications page I would move that up to the top right of the page, so instead of having article options which I am not sure they allow you full access to the article, I would put the access there. Because that’s the main reason why people are going to click on these links because they want to open the full article. Same for Springer/Nature, put on top right because I think placement is just as important as color and text.”

Other User Research



*Understanding how people
navigate to full text / context*

Key Findings (consistent with other studies)

- Too many options for accessing article can be overwhelming
 - Differences between access options are not always clear
 - Purchase PDF, Export, Download has ambiguity (free? paid?)
 - Options spread out on the page make the task harder
 - Ability to get an article for free is a key factor in decision making for the users
 - Secondary options (Download - related articles) with the same presentation as primary option (Download - main article) can lead to mistakes
 - User don't always scroll down to see access options
 - Users notice consistency of call to action
 - Most users understood and explained what would happen when they click institutional access control
 - Article access options grouped together, hierarchically arranged, and visible provide better experience
- 

Research Methodology

Objective

The purpose of this study is to test effectiveness of cue text and different layouts

Methodology

The study was unmoderated and conducted using an A/B testing methodology. Users were presented with one of three versions of cue text. Cue text was repeated for three providers



UserTesting recruited 18 total participants (6 for Version A and 6 for Version B and 6 for Version C designs). All users have experience doing literature research.



Participants were given a scenario where they came across an interesting article and want to get full text. They were asked where on the design page would they click. Participants had to repeat this task for three different providers (ProQuest, ACS, Elsevier).



Participants verbalized their thoughts as they were completing the task. This was captured in recordings on UserTesting. Their answer to an explicit question on why they made the selection was also collected.

Participants were asked to rank ease of use of each task and explain their ranking.

Participants verbalized their thoughts as they were completing the task. This was captured in recordings on UserTesting. Their answer to an explicit question on why they made the selection was also collected.



UserTesting

Quotes

Too many access option are confusing

"I didn't like the fact that there were actually 4 different purchase/export places that I could go to get the article; it felt unnecessary that there were so many options, and so many purchase buttons; it was a little overwhelming."

"Now articles option, here i would just click on PDF to see if I can just download it that way. The confusing part is there is also Log in through your institution if there I can just get with with PDF "

Free access is a key factor in decision making

"I'll scroll through to see what's available, I would "Log in through..." then I would look at clicking Export, then if I don't have access through institution I would click purchase..."

" see that I can purchase it, but I wouldn't want to do that if I didn't have to, so I would either click export or see if I could log in through my institution. "

Purchase, PDF, Export, Download has ambiguity of free or paid

"Notice Log in... also there are view... options. I don't know why there is purchasing if there is a pdf. Also there are options on the right. I would click pdf or pdf with links. Not sure what Log in section is for if I can read anything I want. A little confusing because there is no payment information by "view...."

"Again, there is a "purchase" link, but there are also PDF, HTML, etc, links above it that don't indicate any price. So I'm not sure what the purchase feature is for if it seems I can download the PDF for free. "

Quotes (1 of 2)

Too many access option are confusing

"I didn't like the fact that there were actually 4 different purchase/export places that I could go to get the article; it felt unnecessary that there were so many options, and so many purchase buttons; it was a little overwhelming."

"Now articles option, here i would just click on PDF to see if I can just download it that way. The confusing part is there is also Log in through your institution if there I can just get with with PDF "

Article access options grouped together, hierarchically arranged, and visible provide better experience

"All the available options to avail the pdf copy of the article were very clear to me. Immediately is says "Access through.. it gives me a clear way how to get the entire article. If I am at the Uni I would click here. Expect that it would take me to the page where I need to login, I don't need to open a separate tab and login. Otherwise I would use other options"

"The button to purchase the article was clearly located on the right hand side and the steps were clearly mentioned that I'd need to follow in order to gain access to this article. "

"I didn't have any issues at all with this, as there is only really one main option to download the article (by clicking the big blue 'log in through your institution' button). Also I liked the fact that this button was located towards the top of the page, compared to the first article where the button was at the bottom of the page...."



Quotes *(2 of 2)*

Users notices consistency of cue to access articles

"Icon looks similar to the previous task so I assume it would be the same. "

"Since the same thing is on this site as well, I can now assume that the log in through your institution is the correct way to get this document."

Free access is a key factor in decision making

I'll scroll through to see what's available, I would "Log in through..." then I would look at clicking Export, then if I don't have access through institution I would click purchase..."

" see that I can purchase it, but I wouldn't want to do that if I didn't have to, so I would either click export or see if I could log in through my institution. "

Purchase, PDF, Export, Download has ambiguity of free or paid

"Notice Log in... aslo there are view... options. I don't know why there is purchasing if there is a pdf. Also there are options on the right. I would click pdf or pdf with links. Not sure what Log in section is for if I can read anything I want. A little confusing because there is no payment information by "view...."

"Again, there is a "purchase" link, but there are also PDF, HTML, etc, links above it that don't indicate any price. So I'm not sure what the purchase feature is for if it seems I can download the PDF for free. "


Conclusion

Number of different access options, their hierarchy, and location have bigger significance on user success than specific button text. That said, users very quickly start looking for the same access option across different providers. Based on this study, we would recommend:


- Use visual hierarchy to present different access options and have a single call to action to access the article, so users quickly tell what to follow.
 - Place the main option to access the article above the fold, so users don't have to scroll
 - Use consistent button text, so users can learn the pattern and quickly recognize it on another providers' sites
-

*Evaluate overall experience,
institutional access cue,
discovery / search page,
remembered institution*

Key Findings (academic users)

- Overall experience is successful; majority of academia participants are ranking experience easy or very easy.
 - People understand the process and have expectation to get to the full text in the same manner when working with different articles.
 - Preview page with minimum access options and institutional cue (button with icon) visible above the fold provides smoother experience than other options with more choices.
 - People start to look for institutional cue after the 1st try.
 - Access through institution text works; some people read 1,2,3 steps under it.
 - People understand to search for institution; there is no hesitation what to search for. When searching for institution people associate more with institution than with email. People search for full institution name, abbreviation or keyword.
 - People found remembered institution beneficial
 - Footer information might not be needed; people don't hesitate when searching for institution and understand the process.
 - Consistency beyond access would improve experience. Once people authenticate there are inconsistencies in the paths to get to full text. It creates challenges for faculty to create instructions.
 - Open Athens, Shibboleth - not everyone knows terminology, institution can provide potential benefit because people know it.
- 

Key Findings (corporate users)

- People are very used to current workflows. They are preconditioned to what to expect, what to click or not to click. Some don't click Access Through option assuming that the option indicates no access. When seeing a Purchase option, one user made an assumption there is no other option but to go through standard ordering procedure (Elsevier "Purchase PDF").
 - Some users know what their institutions subscribes to and would not follow the path to the article from provider their institution doesn't subscribe to.
 - Most people want to see full text without extra steps. In a lot of cases that is what they are used to.
 - People have very specific procedures for doing comprehensive literature search. Google Scholar used sometimes for quick and dirty search only. Google Scholar is used less than by academia.
 - Just like with academic users, PDF and download links draws users attention first; most would try PDF first and if it doesn't work try other options.
 - Just like with academic users, Access Through option with clear secondary options (purchase, login) displayed above the fold is more effective
 - When asked to authenticate, people assume that have to use computer credentials.
 - Some have security concerns about unfamiliar process and authentication.
- 

Research Methodology

Objective

The purpose of this study is to test effectiveness of the overall experience

Methodology

The study included moderated sessions (in person interviews, online interviews) and unmoderated sessions (usertesting.com).

Participants were asked to think out loud during the task, and are asked to talk about their experiences afterwards.



25 Academic participants (19 students, 6 researchers and librarians). Participants were from Germany, U.S., Mexico, Philippines, UK, and China



Participants were asked to think out loud during the task, and are asked to talk about their experiences afterwards.

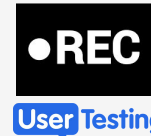
Sessions included moderated sessions (in person interviews, online interviews) and unmoderated sessions (usertesting.com).

Each session took about 30 minutes.



Participants were asked to retrieve the full text to three (2 for corporate users) articles (ProQuest, Elsevier, and ACS) starting from Google Scholar.

Participants verbalized their thoughts as they were completing the task. This was captured in recordings on UserTesting. Their answer to an explicit question on why they made the selection was also collected.



Participants verbalized their thoughts as they were completing the task.

Prototype (1 of 2)

Biodegradable composites based on lignocellulosic fibers—An overview

KG Satyanarayana, GGC Arizaga, F Wypych - Progress in polymer science, 2009 - Elsevier

The development of commercially viable "green products" based on natural resources for both matrices and reinforcements for a wide range of applications is.

☆ 🔗 Cited by 719 Related articles All 5 versions 🔗

Engineering Biodegradable Flame Retardant Wood-Plastic Composites

L Zhang - 2013 - search.proquest.com

... As **sustainability** has become one of the most desirable features of novel ... V. Biodegradation of aliphatic-aromatic copolyesters: evaluation of the final **biodegradability** and ecotoxicological ... Ma, Biaobing Wang, Mechanical properties and morphology of **biodegradable** poly(lactic ...

☆ 🔗 Related articles All 3 versions

Active release of nitric oxide-releasing dendrimers from electrospun polyurethane fibers

BV Worley, RJ Soto, PC Kinsley... - ACS Biomaterials ... , 2016 - ACS Publications

... ACS Biomater. ... were doped into polyurethane solutions prior to electrospinning of the polymer to yield well-defined dendrimer-doped composite polyurethane **fibers**. The **fiber** mats were semiporous (≥30% porosity) and exhibited high water uptake (>100% relative to **fiber** mass ...

☆ 🔗 Cited by 5 Related articles All 2 versions 🔗

Document Preview

Engineering Biodegradable Flame Retardant Wood-Plastic Composites

Zhang, Lini. State University of New York at Stony Brook, ProQuest Dissertations Publishing. 2013. 1540254.

Access this article

[Access Through Your Institution](#)

To get document (PDF, etc.)

1. Find your institution
2. Log in at your institution site
3. Get this document

Other Options

[Log in with ProQuest account](#)

[Purchase PDF](#)

Engineering Biodegradable Flame Retardant Wood-Plastic Composites

A Thesis Presented

by

Progress in Polymer Science

Volume 34, Issue 9, September 2009, Pages 982-1021

Biodegradable composites based on lignocellulosic fibers—An overview

Kestur G. Satyanarayana, G.G.C. Arizaga, Fernando Wypych

[Show more](#)

<https://doi.org/10.1016/j.progpolymer.2008.12.002>

Get rights and content

Abstract

The development of commercially viable "green products" based on natural resources for both matrices and reinforcements for a wide range of applications is on the rise. This effort includes new pathways to produce natural polymers with better mechanical properties and thermal stability using nanotechnology and use of natural polymers to make biodegradable plastics and their composites with lignocellulosic fibers. This paper presents an overview of the developments made in the area of biodegradable composites, in terms of market processing methods, matrix-reinforcement systems, morphology, properties and product development. Some critical issues and suggestions for future work are discussed, underscoring the roles of materials scientists and textile engineers for the future of these new "green" materials through value addition to enhance their use.

Keywords

Lignocellulosic fibers; Biopolymers; Mechanical properties; Biodegradability; Composite processing; Societal applications

Recommended articles

A review of the recent developments in biocompos...
Composites Part A: Applied Science and Manufacturh...
[Download PDF](#) [View details](#)

Lignocellulosic fibre mediated rubber composites: ...
Composites Part B: Engineering, Volume 76, 2015, pp...
[Download PDF](#) [View details](#)

A Jatropha biomass as renewable materials for bi...
Renewable and Sustainable Energy Reviews, Volume ...
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Citing articles (484)

Access this article

[Access Through Your Institution](#)

To get document (PDF, etc.)

1. Find your institution
2. Log in at your institution site
3. Get this document

Other Options

[Purchase](#)

[Log in with ACS account](#)

Access this article

[Access Through Your Institution](#)

To get document (PDF, etc.)

1. Find your institution
2. Log in at your institution site
3. Get this document

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Review

Environmentally Sustainable Fibers from Regenerated Protein

Andrew J. Poole¹, Jeffrey S. Church and Mickey G. Huson
CSIRO Materials Science and Engineering, P.O. Box 21, Belmont, Victoria, 3216, Australia

Biomacromolecules, 2008, 10 (1), pp 1–8
DOI: 10.1021/bm801094h
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Copyright Published 2008 by the American Chemical Society

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View: ACS ActiveView PDF | PDF | PDF w/ Links | Full Text HTML

Access this article

[Access Through Your Institution](#)

To get document (PDF, etc.)

1. Find your institution
2. Log in at your institution site
3. Get this document

Other Options

[Purchase](#)

[Log in with ACS account](#)

Search Citation Subject [Advanced Search](#)

Enter search text / DOI Anywhere Search

[Biomacromolecules](#) [All PublicationsWebsites](#)

Next Article > Table of Contents

Article Options

[PDF](#) (210 kb) [Abstract](#)

[PDF w/ Links](#) (247 kb) [Figures](#)

[References](#)

Article Views: 1,426 Times

Received 17 June 2016
Date accepted 29 August 2016
Published online 29 August 2016
Published in print 21 September 2016

[Learn more about these metrics](#)

[More Article Metrics](#)

Prototype (2 of 2)

Get access to **ACS Publications**

Find Your Institution

Your university, organization or company

Examples: Science Institute, xxx@YourInstitution.edu, UCLA

HOW IT WORKS

- 1. Find your institution**
Search by institution name, email to find your institution.
- 2. Log-in**
Use your institutional credentials to log in as you normally do.
- 3. Enjoy**
Access the content and features provided by your institution.
- 4. Explore**
Continue to work seamlessly with your institutional access.

Get access to **ProQuest**

Choose Your Institution

Institutions you used previously

UCLA University of California, Los Angeles

Choose another

Quotes (1 of 2)

Access this article widget is effective for academic users

"Clear where to go and login process is really good, worked right away"

"I understand how to click through everything since I did the first task."

"It's an easy click, and a striking button to press"

"It was pretty easy to see the blue access w/ institution button--it wasn't hidden at the way bottom of the page or anything--it was intuitive and obvious."

"I know to search for the Access...."

Access this article widget for corporate users is questionable

"I know what we subscribe to and what we don't subscribe to. We don't subscribe to ProQuest. I know I will not be able to get it. We are preconditioned how to work. I didn't expect this button to work"

" I want the article immediately on my screen, I don't want any noise."

"It (authentication) should happen automatically."

"I do not recognize this icon, so I would not follow it."

Access button location matters

"I wish that button was at the top"

"I didn't even notice that on the screen. You scroll down and then Ok you can login into something. For the 1st one (ProQuest), it's very obvious, but for this one you have to scroll down."

"I thought it was easy and straightforward, but a little harder to notice since you had to scroll down..."

Other full text options on the page can distract

"Export made it look like it was exportable without having to log in"

"I see that there is PDF so I would just click pdf and see if it would download"

Quotes (2 of 2)

Remembered institution across providers is beneficial

"I didn't like the fact that there were actually 4 different purchase/export places that I could go to get the article; it felt unnecessary that there were so many options, and so many purchase buttons; it was a little overwhelming."

"Now articles option, here i would just click on PDF to see if I can just download it that way. The confusing part is there is also Log in through your institution if there I can just get with with PDF "

Authentication for corporate users

"I am a picky with compliance about access. I am not sure I would be doing it, not sure I would be putting my company credentials for my company."

Open Athens, Shibboleth - not everyone knows terminology, institution can provide potential benefit because people know it

"I teach a lot of distance student and all of the materials are online so much of my job is to get students access, they find it some confusing where to go, which kind logon is needed (Athens, Open Athens, Shibboleth)..."

We use online reading list, they would click on initial link and then a long path, doi for some, for some clicking on article name. It's inconsistent, hard to give instructions, lots of clicks. Have to click on everything before you find it. It's supposed to be quicker....

There is no one way to do it, hard to provide instructions... They would send us screenshots to show how far they get...."

Conclusion

When Access through institution is placed in a intuitively organized preview page (discussed below) it can be very effective for **academic** users.

Intuitively organized preview page

- Articles access options are located together in hierarchical manner
- Access options are visible above the fold
- Access through institution option is consistent across providers (the same text and icon)

Further testing is needed to evaluate usability of the solution for the **corporate** users. Preliminary results show that corporate users are pre-conditioned to use existing workflows. They may hesitate to click Access through institution button because it may indicate No Access to them. Some may also have security concerns about clicking something unfamiliar. Corporate training might be needed to establish trust for this solution.

*Evaluate user preference for
checking access: Institution Name
vs. Institution Email*

Key Insights

Corporate users

- 33% preferred institution name
- 18% neutral
- 49% preferred institution email
- Institution Email
 - Privacy concerns around using email address that will need to be managed
 - Perceived individual information is collected
- Institution Name
 - Confusion around variety of names for institution. Which of the various names from my company should I use?

Academic users

- 25 out of 26 participants thought entering institution name made sense when searching for their institution.
-

Research Methodology

Objective

The purpose of this study is to evaluate users' preference for checking access: search by institution name or by institution email.

Methodology

The study was both unmoderated and moderated. Unmoderated sessions were conducted via Chalkmark or UserTesting.com. Moderated sessions were conducted at the Spring 2018 ACS National Meeting in New Orleans. Users were presented with the discovery page and were asked which method they prefer for checking access.



45 PDR members participated in the Chalkmark test (Sept 2017): 40% Roche, 29% BASF, 14% abbvie, 11% Novartis, 7% gsk.

26 academic researchers participated in both unmoderated test via UserTesting.com and moderated test (19) at the ACS National Meeting (7).



PDR members were asked explicitly: which method would you prefer for checking access and were giving a scale of 1-5 where 1 is strongly prefer Institution name and 5 is strongly prefer institution email.

Academic researchers were not asked explicitly but were watched as they navigate through the prototype, both moderated and unmoderated. They were asked afterwards why they entered institution name or email.

Corporate Participants

Check access

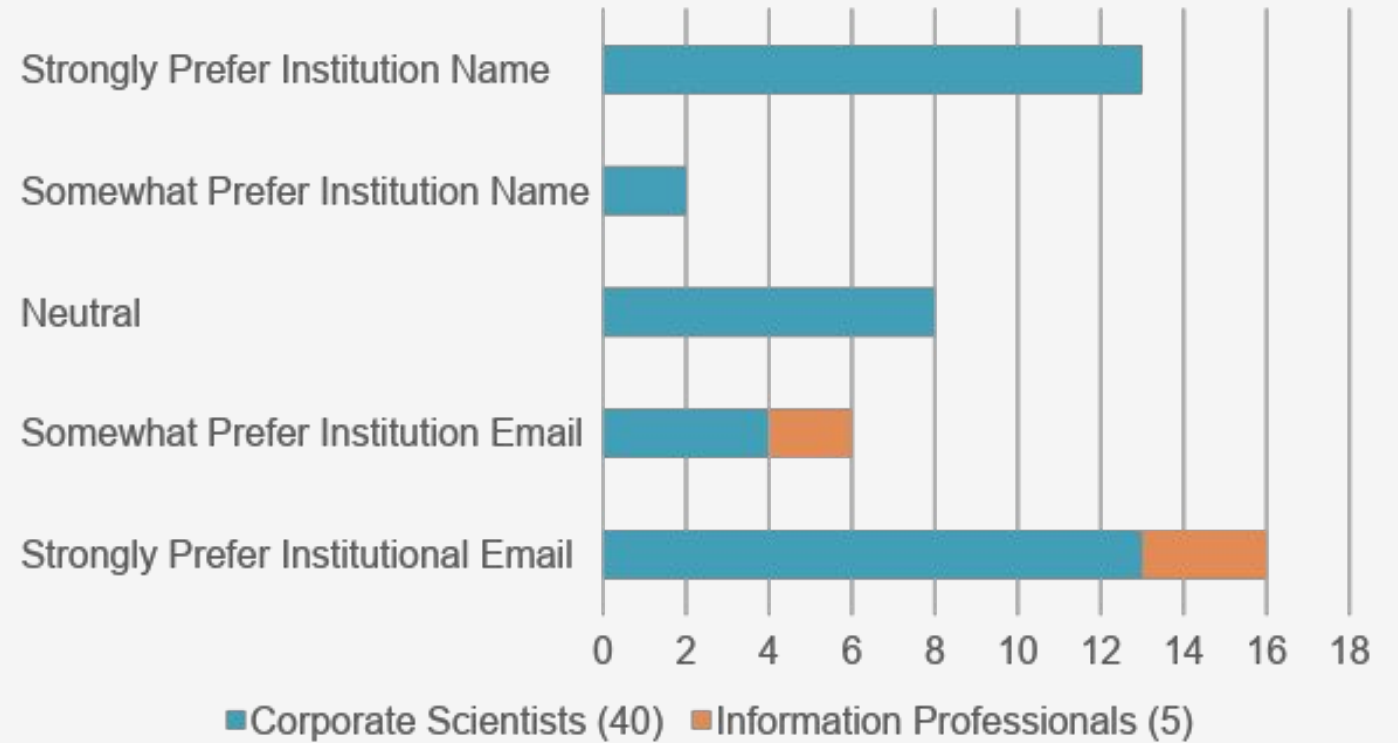
Enter institutional email or Search institution

Check access

Back

Which method would you prefer for checking access? *

- Strongly Prefer Using Institutional Email
- Somewhat Prefer Using Institutional Email
- Neutral
- Somewhat Prefer Using Institution Name
- Strongly Prefer Using Institution Name



- 33% preferred institution name
- 18% neutral
- 49% preferred institution email



Comments for Institutional Email

Users shared pros, cons and concerns of using institutional email.

Pros

- Consistent (8)
 - Email address is the same company-wide
 - Easy to remember
- More personal (3)
- Personalization (2)
 - Set up alerts, saved searches
 - Recommend personal content
- Shorter (2)
- Unique (4)

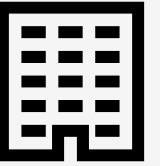
Cons

- Privacy and Confidentiality (5)
 - Problems with data privacy and protection
 - Metrics on individual level are possible
- Have to remember password (1)

Concerns

- How secure is it? (1)

“An institutional eMail is from my point of view more easy to recognize and clearly defined. Other systems (e.g. Microsoft SharePoint etc. use the same to give access to the company portal).”



Comments for Institution Name

Users shared the pros and cons of using institutional name.

Pros

- Simpler (4)
- Privacy (2)
 - More anonymous
- Shorter than email address (8)

“Using the Institution name allows you to stay more anonymous as individual user. User BASF1245 is not as easy to track back as name@basf.com combined with your profile from LinkedIn, Xing, conference reports, patent or literature publications might lead to confidentiality issues.”

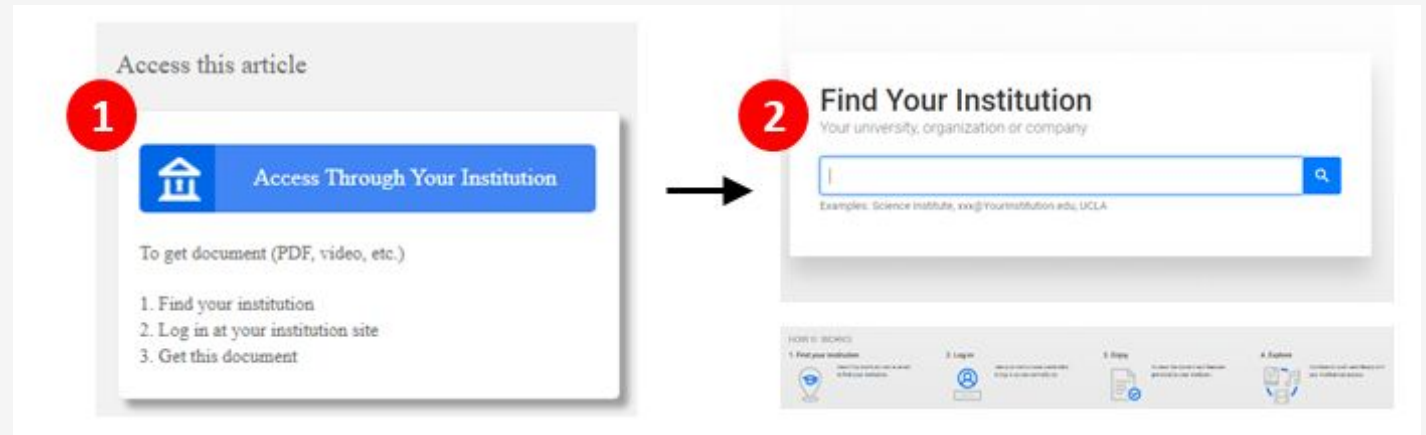
Cons

- Various names representing the same institution* (10)
 - Vary by affiliate
 - Different legal names in different countries
 - Not standardized
- Hard to remember (2)
 - Changes frequently
 - Not well-defined

“I would Not use the Institution Name. What is it? F. Hoffmann-La Roche AG / F. Hoffmann-La Roche Ltd /Genentech/ Roche Diagnostics... Would all these names be recognized?”

Academic Participants

Once the participants found the CTA from the article pages **1**, they did not spend much time on **2**, Find Your Institution (i.e., none of the participants read the “How It Works” footer or the fine print above and below the search box). All found it logical to type in their institution name first when searching for their institution, then log in with their institution email at the institution authentication page. All expects that after authentication, they will go back to where they were and now have the permission/access to download the PDF.



The following are the explanations from participants as to why they entered their institution name:

- I associate access with my institution. I don't associate myself having the access individually. The relationship is with my institution, not me as an individual.
- I have experience doing this elsewhere—I look for the institution name first, then I go to my university website to enter my email and password.
- It asked for institution first.
- If it said “Enter Your Institution Email”, then I will enter email.

Implications:

Some institutions have subsidiary names depending on the school, degree, etc. How will the users know which one is the right choice? This came up in the PDR Chalkmark survey with industry too. What is the size of this risk?

*Evaluation of the RA21
recommended user experience
(Version 2 Prototype)*

Key Insights

- **General**
 - Consistent with prior user research, poor past failed experience with access prevented participants from clicking “Access Through Your Institution”.
 - Also consistent with prior user research, participants were looking for “PDF” or “Download”. It was unclear what “Access” will give the participants.
 - Few participants pointed out, the advantage with starting their search from the library website is that in going forward, they know they will have access to all full text. Starting with RA21 doesn’t guarantee full text access.
 - **Discovery Page**
 - The assumption made by the participants when their institution appears on the Discovery Page is that their university has subscription (and that’s why it showed up) and they will have access to the full text once they authenticate.
-

Research Methodology

Objective

The purpose of this study is to validate the RA21 recommended user experience practice using a live prototype.

Methodology

The study was moderated both remotely and in person. Remote sessions were conducted via Validately. In person sessions were conducted at American University on Thursday, 23 May 2019. Users were presented with a live prototype starting with a Google search result that included three different publishers: ACS Publications, RSC, and T&F. The placement, grouping, and hierarchy of "Access through your institution" button followed the RA21 recommended practice. The order of the three publishers were randomized for each participants.

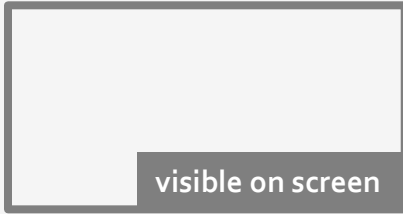


Total of 12 participants (7 remote, 5 in person). Participants were 42% male : 58% female and 50% Undergraduate students, 42% graduate students and 8% Industry transitioning to Academic Professor. The scope was limited to participants in the U.S. with home institutions participating in eduGAIN interederation.



Participants were given a scenario where they imagine they are off campus and start their search on Google about supramolecular block copolymers. They got three interesting results where they want to get the full text. We asked them to verbalize their thoughts and observed what they did next to get to the full text. After completing all three publisher pages, participants were asked explicitly about their overall experience.

Mocked-up versions of actual publisher journal pages



ACS Publications

ACS Publications | Search text, DOI, authors, etc. | My Activity | Publications

RETURN TO ISSUE | < PREV | ARTICLE | NEXT >

Supramolecular Block Copolymers under Thermodynamic Control

Beatrice Adelfizi, Antonio Aloj, Albert J. Markvoort, Huub M. M. Ten Eikelder, Ijka K. Voets, Anja R. A. Palmans* and E. W. Meijer*

Cite This: *J. Am. Chem. Soc.* 2018, 140, 23, 7168-7175

Article Views: 381 | Altmetric: 8 | Citations: 3

Access through your institution

Abstract

Supramolecular block copolymers are becoming attractive materials in nascent optoelectronic and catalytic technologies. However, their dynamic nature precludes the straightforward tuning and analysis of the polymer structure. Here we report the elucidation on the microstructure of triarylamine triamide-based supramolecular block copolymers through a comprehensive battery of spectroscopic, theoretical, and super-resolution microscopic techniques. Via spectroscopic analysis we demonstrate that the direct mixing of preassembled homopolymers and the copolymerization induced by slow cooling of monomers lead to the formation of the same copolymer's architecture. The small but pronounced deviation of the experimental spectra from the linear combination of the homopolymers' spectra hints at the formation of block copolymers. A mass balance model is introduced to further unravel the microstructure of the copolymers formed, and it confirms that stable multiblock supramolecular copolymers can be accessed from different routes. The multiblock structure of the supramolecular copolymers originates from the fine balance between favorable hydrogen-bonding interactions and a small

Royal Society of Chemistry (RSC)

Publishing | Journals | Books | Databases | Log in / register

Issue 19, 2016

From the journal: **Polymer Chemistry**

Versatile self-assembly of supramolecular block copolymers

$[W_6O_{21}]^{2-}$ as an ionic junction to link two cationic terminated polystyrene chains. These polymers exhibit versatile self-assembly behaviours not only dependent on the molecular weight but also adaptive to the concentration and temperature.

Access through your institution

Buy this article £ 42.50*

Supplementary files

Publication details

The article was received on 22 Mar 2016, accepted on 17 Apr 2016 and first published on 18 Apr 2016

Taylor & Francis (T&F)

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Journal: **Journal of Macromolecular Science, Part B: Physics**

Volume 6, 1972 - Issue 1

Structural Properties and Phase Behavior of Crosslinked Networks in Polymer Solutions

Farida Benmouna, Samira Zemmour & Mustapha Benmouna

Pages 319-329 | Received 29 Jun 2015, Accepted 25 Dec 2015, Accepted author version posted online: 02 Feb 2016, Published online: 02 Feb 2016

Abstract

Structural properties and phase behavior of crosslinked networks embedded in polymer solutions are theoretically investigated. The partial structure factor of the network is calculated using a matrix formulation of the random phase approximation and the forward scattering limit is correlated with the phase behavior. Swelling and deswelling processes are analyzed in terms of the polymer concentration, the mismatch of solvent quality with respect to polymer and network, the polymers incompatibility and their characteristic sizes. Most studies reported so far in the literature have focussed on the swelling of crosslinked networks and gels in pure solvents but the correlation of the structural properties with the phase behavior in the presence of high molecular weight polymers in solution has not been given sufficient attention. The present work is intended to fill this gap in view of the current efforts to develop novel drug encapsulating and targeted delivery devices.

Access through your institution

Discovery Page



Access to

ACS Publications

Find Your Institution

Your university, organization or company

A search input field with a blue border and a magnifying glass icon on the right side.

Examples: Science Institute, Lee@uni.edu, UCLA



RA21

Resource Access for the 21st Century [About Us](#)

Observations and Recommendations

- **Journal Page**
 - One user seemed to prefer Access button to be displayed together with abstract.
“section on the right [for RSC] looks more separated from the document” so she didn’t look into that section right away.
 - **Discovery Page**
 - One user’s eyes were drawn to the boxes on the header and footer elements (see slide 66). Eye tracking would be a better evaluation to see if this is a pattern.
 - In some cases, users type out their full institution names, not partial names or abbreviations. Therefore, search algorithm needs to account for 100% match and display results.
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