

of this folder, the file or directory denoted by this abstract  
pathname element.  
[...]  
[...]  
[...]

```
<ProjectConfiguration>  
<ProjectConfiguration Include="ReleaseWin32">  
<Configuration>Release</Configuration>  
<Platform>Win32</Platform>  
</ProjectConfiguration>  
</ItemGroup>  
<PropertyGroup Label="Globals">  
    <ProjectGuid>{F1E1F1-78C7-44B8-9779-802A3A8A8E8E}</ProjectGuid>  
    <Scc></Scc>  
    <RootNamespace>Learning</RootNamespace>  
    <Platform>Win32</Platform>  
    <ProjectName>Learning</ProjectName>  
    <ProjectGuid>{F1E1F1-78C7-44B8-9779-802A3A8A8E8E}</ProjectGuid>  
    <ProjectDefaultTargets>Build</ProjectDefaultTargets>  
    <ProjectExtensions>{2222}</ProjectExtensions>  
</PropertyGroup>  
</ItemGroup>  
</Project>
```

23092

```
public class Program  
{  
    static void Main()  
    {  
        Console.WriteLine("Hello World!");  
    }  
}
```

020331

06595.134

# The Value of Social Annotation for Teaching and Learning:

## Promoting Comprehension, Collaboration and Critical Thinking With Hypothesis

000344786120

```
try  
{  
    String content = "Lorem ipsum dolor sit amet, consectetur  
adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore  
magna aliqua";  
    File.OutputStream fos = null;  
}
```

*The Value of Social Annotation for Teaching and Learning: Promoting Comprehension, Collaboration and Critical Thinking With Hypothesis* is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License (CC BY-NC-ND 4.0).

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The mission of Hypothesis is to enable a conversation over the world's knowledge. Using annotation, we enable sentence-level note taking or critique on top of classroom reading, news, blogs, scientific articles, books, terms of service, ballot initiatives, legislation and more. Everything we build is guided by our principles. In particular that it be free, open, neutral and lasting, to name a few. Our efforts are based on the annotation standards for digital documents developed by the W3C Web Annotation Working Group. We partner broadly with developers, publishers, academic institutions, researchers, and individuals to develop a platform for the next generation of read-write web applications and to advance a new paradigm of open annotation.

For more information about Hypothesis visit <https://web.hypothes.is/>.

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## A Note From Jeremy Dean

Hypothesis was founded in 2011 as a non-profit organization with the goal of building an open source, standards-based web annotation technology for use in academia, scholarly publishing and research. Since then, our digital annotation software — known as Hypothesis — has been used by over 1 million annotators, who have created 40 million annotations on nearly 2.3 million digital documents. Hypothesis is unique among learning technologies in that it is used extensively within and outside the classroom; most “edtech” typically does not have applicability outside of formal educational contexts. Our social annotation tool is used by professionals across a range of sectors as well as by everyday readers on the web. As such, it is likely that instructors using Hypothesis in class might also use the tool for their research. It is also possible that students introduced to Hypothesis in a course will find ongoing utility for note taking and collaborative discussion beyond the classroom.

This white paper describes the importance of annotation in education, summarizes key research findings about social annotation and student learning, and features testimonials from instructors representing a range of disciplines who have used Hypothesis in their courses.

Hypothesis can be used to annotate readings from inside a school’s learning management system (LMS), and our technology easily integrates with leading platforms, including Canvas, Blackboard, Moodle, Sakai, and Schoology. Our LMS app is used in over 17,000 courses. We also recently announced a partnership with VitalSource, so educators and students using VitalSource’s BookShelf reader can annotate course texts. Thanks to this development, Hypothesis is now available to an additional 16 million VitalSource users in more than 240 countries. In addition, we have announced a new partnership with ITHAKA, the non-profit provider of JSTOR, a digital library that serves more than 13,000 education institutions around the world, providing access to more than 12 million journal articles, books, images and primary sources in 75 disciplines. One of the first outcomes of our new relationship with ITHAKA will be a pilot integration that enables our users to engage with JSTOR’s vast library of scholarly content directly within the Hypothesis interface. Today, Hypothesis is used by more than 1,200 higher education and secondary institutions throughout North America and the world.

Since 2015, we have been primarily focused on designing and delivering social annotation technology to academic institutions. We have extensive experience working across a range of public schools, from two-year colleges like City College of San Francisco and Montgomery College in Maryland to large universities like University of Texas at Austin and University of Alabama to large state systems like Rutgers, the State University of New Jersey, and the Missouri University System. We are proud to have collaborated with partners at every level of these institutions — from professors hoping to increase engagement in their classes to programs redesigning curricula across multiple sections of a course to provosts’ offices attempting to improve student retention across their entire student population.

We are committed to supporting our partners with ongoing product developments. For example, when Hypothesis is used in a LMS, it meets the rigorous level of AA compliance for accessibility based on an external review conducted by the Inclusive Design Research Centre. We also recently began to host data in Canada so that our Canadian partners can comply with institutional and national data storage policies.

Our organization has been a thought leader in social annotation for many years, and we continue to demonstrate a unique investment in how Hypothesis helps schools, instructors and students. We are honored to observe that more peer reviewed research has been published about Hypothesis than any other social annotation technology on the market. We believe this is because of our technical and social commitments. Our technology is open source and interoperable; Hypothesis is easily implemented across various formal and informal learning environments, and associated data may be easily gathered and studied by researchers. From a social standpoint, our organization is guided by principles that include transparency, long-term thinking and work that directly benefits the public. In practice, our technical and social commitments have led to robust collaborations with multiple academic researchers and institutions — quite a few are described in this white paper. And during the 2020-21 academic year, Dr. Remi Kalir, from the University of Colorado Denver, served as our first Scholar in Residence and helped launch a large-scale research project through a partnership with Indiana University's Department of English. We are grateful that Dr. Kalir has authored this white paper and has continued to research and promote the use of annotation in education.

Jeremy Dean, VP Education, Hypothesis

## Executive Summary

We can all picture the basic practice of annotation: scrawling a quick thought in the margin of a paperback, adding a suggestion to an early draft, drilling down on a pundit's turn of phrase. Annotation is all of these and more: notes added to texts stretching back through history as far as writing itself.

## Social Annotation Extends Familiar Literacy Practices

Social annotation aids learning and fosters student success. Social annotation supports rich disciplinary practices useful for students throughout their academic and career journeys — like reading comprehension, close reading, textual analysis, language development and argumentation — practices that are needed now more than ever.

Students value using social annotation in their courses because it helps them feel more connected to the texts they are reading and to the peers with whom they are learning.

Educators value using social annotation in their courses to support student learning, in large part because it lets them better understand what, how and when their students are reading.

## A Short History of Annotation as Social Activity

Annotation is a note added to a text. For everyday readers, as well as for authors and scholars, annotation may be associated with private musings jotted in the margins of a book; such was the case for Edgar Allan Poe, who wrote in 1844, “In the marginalia, too, we talk only to ourselves; we therefore talk freshly — boldly — originally — with abandonnement — without conceit.”<sup>1</sup> Yet annotation does more than make visible a bold, yet private, exchange between a reader and their text. Annotation is also a social practice that for centuries has connected people and ideas across cultures and context, texts and time.

Annotation, as a scaffold for communal study and debate, has been an integral feature among print editions of the Talmud since the 1500s.<sup>2</sup> As European print culture flourished in the 1500s, and as books became more easily produced and accessible everyday objects, an increasingly literate public interacted with their texts through annotation.<sup>3</sup> By the 1600s, books were annotated for social purposes; annotations written by the more learned provided information through translation, clarification and reference for other readers.<sup>4</sup> In England, throughout the 1800s, both scholars and friends would regularly exchange their annotated books with one another as a cherished social activity.<sup>5</sup> Samuel Taylor Coleridge, who’s credited with the first use of the term *marginalia*, in 1819, coined the term as literary criticism and to spark public dialogue.<sup>6</sup>

“

In England, throughout the 1800s, both scholars and friends would regularly exchange their annotated books with one another as a cherished social activity.

”

<sup>1</sup> Poe, E. A. (1844). Marginalia. *United States Magazine and Democratic Review*, 15, 484, <https://www.eapoe.org/works/misc/mar1144.htm>

<sup>2</sup> See chapter 21, “The Earliest Printings of the Talmud,” in: Heller, M. J. (2013). *Further studies in the making of the early Hebrew book*. Leiden, Netherlands: Brill.

<sup>3</sup> Sherman, W. H. (2008). *Used books: Marking readers in renaissance England*. Philadelphia, PA: University of Pennsylvania Press.

<sup>4</sup> Brayman Hackel, H. (2005). *Reading material in early modern England: Print, gender, and literacy*. Cambridge, UK: Cambridge University Press, 138.

<sup>5</sup> Jackson, H. J. (2001). *Marginalia: Readers writing in books*. New Haven, CT: Yale University Press.

<sup>6</sup> Coleridge, S. T. (1819). Character of Sir Thomas Brown as a writer. *Blackwood’s Magazine* 6(32), 197.

This white paper primarily concerns the social annotation of digital texts read and marked up online as part of classroom activities, with a specific focus on Hypothesis as a vanguard social annotation technology. Nonetheless, we recognize a literary lineage in which social annotation predates our digital age by centuries. We understand that annotation is social when written for other readers. We consider annotation a social practice because notes accompanying texts have long been shared, discussed and debated.<sup>7</sup> Throughout this white paper, we acknowledge a robust historical precedent whereby annotation has enabled social connection and conversation among groups of readers over time. As you read on, we hope you recognize not only what new possibilities digital texts offer when shared across the web, but also how such texts are connected to annotation — one of our oldest teaching, learning and literary practices.

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<sup>7</sup> Among various books foundational to the study of historical annotation, see: Barney, S. A. (1991). *Annotation and its texts*. Oxford, UK: Oxford University Press; Grafton, A. (1999). *The footnote: A curious history*. Cambridge, MA: Harvard University Press; and Knight, L., White, M., & Sauer, E. (2018). *Women's bookscapes in early modern Britain: Reading, ownership, circulation*. Ann Arbor, MI: University of Michigan Press.

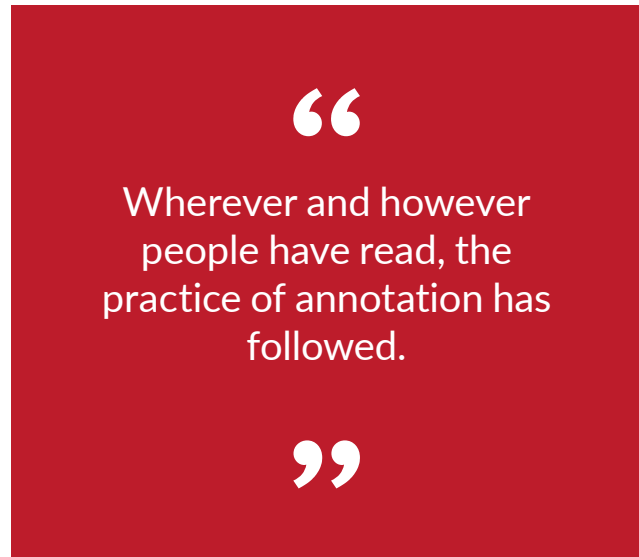


## Annotation Online

Just as social annotation stretches across centuries of reader engagement with manuscripts and books, so too does annotation of — and on — the web have remarkable precedence. In 1945, as World War II ended, scientist Vannevar Bush wrote a hopeful essay about the future of scientific discovery, information accessibility and the production of new knowledge. His essay envisions a fictitious memory extension tool, called the “memex,” that would help individuals build customizable and annotation-powered “associative trails” through everything one read across their lifetime.<sup>8</sup>

More recently, the computer scientist Tim Berners-Lee — credited as the inventor of the web — proposed in 1989 a “global hypertext system” that included a notable feature: “One must also be able to annotate links, as well as nodes, privately.”<sup>9</sup> The world’s first web browser, Mosaic, was released just a few years later, in 1993. It included a group annotation feature that allowed readers of the nascent web to share their written notes with one another.<sup>10</sup> Wherever and however people have read, the practice of annotation has followed.

Today, music fans can use the website Genius to annotate and discuss rap lyrics. Medium, the popular blogging platform, encourages readers to add in-line highlights and share selected passages from posts. Various annotation tools and projects — MIT’s Annotation Studio,<sup>11</sup> NowComment, Newsela and Perusall, among many others — have supported educators and their students in adding digital notes to online texts and other course resources.



<sup>8</sup> Bush, V. (1945, July). As we may think. *The Atlantic Monthly*, [www.theatlantic.com/magazine/archive/1945/07/as-we-may-think/303881/](http://www.theatlantic.com/magazine/archive/1945/07/as-we-may-think/303881/).

<sup>9</sup> Berners-Lee, T. (1989). *Information management: A proposal*. Geneva, Switzerland: CERN. <https://www.w3.org/History/1989/proposal.html>

<sup>10</sup> Carpenter, T. (2013, April 30). iAnnotate—Whatever happened to the Web as an annotation system? *The Scholarly Kitchen*, <https://scholarlykitchen.sspnet.org/2013/04/30/iannotate-whatever-happened-to-the-web-as-an-annotation-system/>

<sup>11</sup> Paradis, J., & Fendt, K. (2016). *Annotation Studio: Digital annotation as an educational approach in the humanities and arts*. Cambridge, MA: Massachusetts Institute of Technology. [https://web.mit.edu/hyperstudio/ans/NEHWhitePaper2016\\_AnnotationStudio.pdf](https://web.mit.edu/hyperstudio/ans/NEHWhitePaper2016_AnnotationStudio.pdf)

From blog posts to datasets, social media to scholarly manuscripts, annotation thrives online thanks to robust technical developments, institutional investments, and people's desire to read and write the web.<sup>12</sup> The prevalence of annotation online is a reminder that the web is an information fabric woven together by linked resources. Annotation increases the thread count of that fabric. By annotating the web, communities of readers interact with content in powerful ways, focusing their collective attention, writing, and discussion on specific passages within and across online documents.

Online annotation has many advantages. Annotation on the web connects readers to texts, communities and ideas across space and time. Annotation content can be multimodal, embedded with links and resources, and easily shared with others. And online annotation encourages groups to collaborate and, as we will discuss, productively learn together.

Then again, the ongoing growth of annotation technologies has resulted in some product-specific technical limitations. For example, a reader who adds an annotation using a particular tool to something read online cannot always and easily reference, share or make ongoing use of that specific annotation in other digital spaces, with other texts, or with other annotation technologies. In response to this and related concerns, the World Wide Web Consortium collaborated with Hypothesis and others to establish, in 2017, an open standard for web annotation. It is now possible for companies, publishers and technology developers to create standards-based annotation tools that are interoperable and more supportive of readers' online annotation practices wherever and however they occur. As Dan Whaley, CEO of Hypothesis, wrote when announcing the standard, it is now technically possible for web annotation to "allow users to form communities freely, and those communities can extend across any internet-connected document, whether in HTML, PDF, EPUB or other formats."<sup>13</sup>



<sup>12</sup> Kalir, J. (2020). Remarking on annotation: An annotated reading list about and with annotation. *Commonplace*, <https://doi.org/10.21428/6ffd8432.8b15fafc>

<sup>13</sup> Whaley, D. (2017, Feb 24). Annotation Is Now a Web standard. *Hypothesis*, <https://web.hypothes.is/blog/annotation-is-now-a-web-standard/>

Online annotation enables communities of readers to interpret music lyrics, assess the scientific credibility of journalism,<sup>14</sup> analyze case law,<sup>15</sup> and speculate about the future of text in a networked knowledge era.<sup>16</sup> We now turn our attention to the field of education and review the many ways in which social annotation supports teaching, learning and student success.

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<sup>14</sup> As with Climate Feedback, <https://climatefeedback.org/>

<sup>15</sup> As with the Harvard Law School Library's H2O project: <https://opencasebook.org/>

<sup>16</sup> See, for example: Forte, T. (2020). Future of text. In F. A. Hegland, *The future of text*. Future Text Publishing (pp. 386-387).

# Research About Social Annotation and Student Learning

This brief review concerns social annotation and student learning. Almost everyone has a different — and often very strong — opinion about whether people can or should write inside books. Not surprisingly, this debate about annotation has persisted for centuries.<sup>17</sup> We find favor with Mortimer J. Adler’s stance, from 1940, that “marking up a book is not an act of mutilation but of love.”<sup>18</sup> Setting opinion aside, the scholarly record indicates that marking up a text while reading it is deeply connected to thinking and learning — especially when that annotation is social.<sup>19</sup> We now turn from books to the web to focus on what students learn and accomplish when they read digital texts and annotate online.<sup>20</sup>

“

Marking up a book is not an act of mutilation but of love.

”

## What Is Social Annotation?

Within the peer reviewed research, *social annotation* has been defined as a genre of learning technology that “enables the annotation of digital resources for information sharing, social interaction and knowledge production.”<sup>21</sup> Social annotation can occur both synchronously and asynchronously, in formal and interest-driven learning environments, and across a range of digital texts, including literature and poetry, primary sources, news articles, blog posts, original research, books, and legislation, among many other online resources.

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<sup>17</sup> See the concluding chapter in Jackson’s *Marginalia: Readers writing in books*.

<sup>18</sup> Adler, M. (1940, July 6). How to mark a book. *Saturday Review*, 11.

<sup>19</sup> Kalir, R., & Garcia, A. (2021). *Annotation*. Cambridge, MA: MIT Press.

<sup>20</sup> As a complement to this white paper’s review of the literature, see the “Bibliography of Social Annotation” resource curated by Hypothesis at <https://web.hypothes.is/education/annotated/bibliography/>

<sup>21</sup> Kalir, J., Morales, E., Flerackers, A., & Alperin, J. (2020). “When I saw my peers annotating:” Student perceptions of social annotation for learning in multiple courses. *Information and Learning Sciences*, 121(3/4), 208; see also Novak, E., Razzouk, R., & Johnson, T. E. (2012). The educational use of social annotation tools in higher education: A literature review. *The Internet and Higher Education*, 15(1), 39-49.

The growth of social annotation technologies, particularly over the past two decades,<sup>22</sup> has afforded learners — of all ages, in many disciplines and around the world — ample opportunity to easily access resources, share their thoughts and questions, and participate in robust activities that are connected and meaningful.<sup>23</sup> Social annotation emerges from, and also extends, learners’ everyday literacy practices — including reading, writing and communication activities — across multimodal digital texts and online learning contexts.

Here, we consider key insights from research about social annotation, notwithstanding a few important caveats. First, students’ handwritten annotations inside their textbooks and atop course materials are indicators of cognition and active reading,<sup>24</sup> and have been shown to productively complement both science and literacy education.<sup>25</sup> In this white paper, we specifically focus on students’ social annotation of digital texts. Second, students of all ages annotate. There is promising research about children annotating to aid their acquisition of another language,<sup>26</sup> and about K-12 students benefiting from the use of annotation strategies to aid their learning of literacy and literature.<sup>27</sup>

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- <sup>22</sup> Useful summaries of recent annotation projects and possibilities are featured in: Ghadirian, H., Salehi, K., & Ayub, A. F. M. (2018). Social annotation tools in higher education: A preliminary systematic review. *International Journal of Learning Technology*, 13(2), 130-162; Jones, J. B. (2015). There are no new directions in annotations. In J. Dougherty & T. O’Donnell (Eds.), *Web Writing* (pp. 247–258). Ann Arbor, MI: University of Michigan Press. <https://doi.org/10.2307/j.ctv65sxxgk.26>; and Unsworth, J. (2000). Scholarly primitives: What methods do humanities researchers have in common, and how might our tools reflect this? *Humanities computing: Formal methods, experimental practice*, King’s College London, <http://www3.isrl.illinois.edu/unsworth/Kings.5-00/primitives.html>
- <sup>23</sup> Farber: <https://www.edutopia.org/article/social-annotation-digital-age> ; CITE LESS FORMAL ACADEMIC STUFF
- <sup>24</sup> Marshall, C. (1997). Annotation: From paper books to the digital library. In *Proceedings of the Second ACM International Conference on Digital Libraries—DL ’97* (pp. 131-140).
- <sup>25</sup> For example: Zucker, L. (2016). Under discussion: Teaching speaking and listening. *English Journal*, 105(5), 92-94; and Zywicki, J., & Gomez, K. (2008). Annotating to support learning in the content areas: Teaching and learning science. *Journal of Adolescent & Adult Literacy*, 52(2), 155-165.
- <sup>26</sup> For example: Chen, C. M., Wang, J. Y., & Chen, Y. C. (2014). Facilitating English-language reading performance by a digital reading annotation system with self-regulated learning mechanisms. *Journal of Educational Technology & Society*, 17(1), 102-114.
- <sup>27</sup> For example: Brown, M. D. (2007). I’ll have mine annotated, please: Helping students make connections with texts. *English Journal*, 73-78; and Castek, J., Beach, R., Cotanch, H., & Scott, J. (2014). Examining middle-school students’ uses of Diigo annotations to engage in collaborative argumentative writing. In R. Anderson & C. Mims (Eds.), *Handbook of research on digital tools for writing instruction in K-12 settings* (pp. 80-101). IGI Global.

Here, we summarize peer reviewed research specific to higher education and the social annotation activities of undergraduate and graduate students (we do, however, briefly showcase K-12 educators' and students' social annotation in the section of this white paper titled "Social Annotation in K-12 Teaching and Learning"). Third, we recognize that annotation is often coupled with other course activities. Annotation may precede essay writing,<sup>28</sup> accompany pre-reading and exam preparation in "flipped" courses,<sup>29</sup> or even prompt reflective discussion about the educational value of annotation.<sup>30</sup> Social annotation is frequently used to scaffold other learning activities and objectives.<sup>31</sup> The research we discuss here — about students' social annotation of digital texts in higher education contexts, and often in support of broader educational aims — is unambiguous: Social annotation can aid learning and productively support student success.

“

Social annotation can aid learning and productively support student success.

”

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<sup>28</sup> Wolfe, J. (2002). Marginal pedagogy: How annotated texts affect a writing-from-sources task. *Written Communication*, 19(2), 297-333.

<sup>29</sup> See: Miller, K., Lukoff, B., King, G., & Mazur, E. (2018). Use of a social annotation platform for pre-class reading assignments in a flipped introductory physics class. *Frontiers in Education*, 3, <https://doi.org/10.3389/feduc.2018.00008>; and Suhre, C., Winnips, K., De Boer, V., Valdivia, P., & Beldhuis, H. (2019, May). Students' experiences with the use of a social annotation tool to improve learning in flipped classrooms. In *5th International Conference on Higher Education Advances* (pp. 955-962). Universitat Politecnica de Valencia.

<sup>30</sup> Allred, J., Hochstetler, S., & Goering, C. (2020). "I love this insight, Mary Kate!": Social annotation across two ELA methods classes. *Contemporary Issues in Technology and Teacher Education*, 20(2), <https://citejournal.org/volume-20/issue-2-20/english-language-arts/i-love-this-insight-mary-kate-social-annotation-across-two-ela-methods-classes>

<sup>31</sup> Zhu, X., Shui, H., & Chen, B. (2020). A scaffolding framework for social annotation in online classes, <https://doi.org/10.35542/osf.io/zk4vj>

# Educational Affordances of Social Annotation

To date, two comprehensive reviews of the literature have carefully assessed the relationship between social annotation and student learning. Novak and colleagues' literature review, published in 2012, focused exclusively on empirical studies from higher education and found that students held generally favorable views of their experiences using social annotation technology, that social annotation practices supported reading comprehension and critical thinking, and that student metacognition and motivation were productively associated with social annotation use.<sup>32</sup> More recently, Zhu and colleagues' 2020 literature review (which primarily concerned higher education) identified five evidence-based ways in which social annotation can enable learning:

- Social annotation helps students process domain-specific knowledge.
- Social annotation supports argumentation, inquiry and knowledge construction.
- Social annotation improves literacy skills.
- Social annotation supports instructor and peer assessment.
- Social annotation connects online learning spaces.<sup>33</sup>

Some recent research has found no correlation between students' positive perceptions of social annotation use and their participation in collaborative learning.<sup>34</sup> Alternatively, other studies indicate that social annotation improves student attention to textual details, encourages shared perspective-taking,<sup>35</sup> and is an active form of online reading that helps students to identify claims, evidence and reasoning.<sup>36</sup>

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<sup>32</sup> Novak et al. (2012).

<sup>33</sup> Zhu, X., Chen, B., Avadhanam, R. M., Shui, H., & Zhang, R. Z. (2020). Reading and connecting: Using social annotation in online classes. *Information and Learning Sciences*, 121(5/6), 261–271.

<sup>34</sup> Chan, J. W. W., & Pow, J. W. C. (2020). The role of social annotation in facilitating collaborative inquiry-based learning. *Computers & Education*, 147, 103787.

<sup>35</sup> Clapp, J., DeCoursey, M., Lee, S. W. S., & Li, K. (2021). "Something fruitful for all of us": Social annotation as a signature pedagogy for literature education. *Arts and Humanities in Higher Education*, 20(3), 295–319.

<sup>36</sup> For example: Wood, J., East, M., & Williard, H. (2021). Collaborative annotation to support students' online reading skills. In E. Hrastinski (Ed.), *Designing Courses with Digital Technologies* (pp. 66-71). New York, NY: Routledge; and Bjorn, G. A., Quaynor, L., & Burgasser, A. J. (2022). Reading research for writing: Co-constructing core skills using primary literature. *Impacting Education: Journal on Transforming Professional Practice*, 7(1), 47–58.

In the natural sciences, for example, multiple studies have recently shown that social annotation helps undergraduate biology students read, inquire about and understand primary scientific literature.<sup>37</sup> In the humanities, social annotation has been described as a “signature pedagogy” for literary studies,<sup>38</sup> with one recent review documenting the emerging technologies and collaborative practices that make annotation an effective aspect of writing studies and composition courses.<sup>39</sup> Ultimately, the peer reviewed research literature — evaluated as a whole — is both encouraging and conclusive. Social annotation supports rich disciplinary practices that are useful for students throughout their academic and career journeys.

Students’ participation in social annotation activities can, in some cases, also improve or indicate individual learning outcomes. One study of computer science students, for example, found a positive correlation between the quantity of a student’s shared annotations and measures of their individual achievement: “When the quantity of shared annotations increases, the learning achievement also increases.”<sup>40</sup> In a separate study, a control experiment among students in a health education course demonstrated that those who participated in social annotation contributed to more complex knowledge construction activities, and “that the treatment group gained a deeper understanding of the learning material after online social interaction compared to the control group.”<sup>41</sup>

“  
When the quantity of  
shared annotations  
increases, the learning  
achievement also increases.  
”

<sup>37</sup> See Cafferty, P. W. (2022). “I Really enjoy these annotations:” Examining primary biological literature using collaborative annotation. *CourseSource*, <https://doi.org/10.24918/cs.2021.40>; Goller, C. C., Vandegrift, M., Cross, W., & Smyth, D. S. (2021). Sharing notes Is encouraged: Annotating and cocreating with [Hypothes.is](https://www.hypothes.is) and Google Docs. *Journal of microbiology & biology education*, 22(1), ev22i1-2135; and Kararo, M., & McCartney, M. (2019). Annotated primary scientific literature: A pedagogical tool for undergraduate courses. *PLOS Biology*, 17(1), e3000103.

<sup>38</sup> Clapp et al. (2021).

<sup>39</sup> Hodgson, J., Kalir, J., & Andrews, C. (2022). Annotation as writing: Promising technologies and practices in writing studies. *EdArXiv*, <https://doi.org/10.35542/osf.io/fr56e>

<sup>40</sup> Zarzour, H., & Sellami, M. (2017). A linked data-based collaborative annotation system for increasing learning achievements. *Educational Technology Research and Development*, 65(2), 393.

<sup>41</sup> Eryilmaz, E., van der Pol, J., Ryan, T., Clark, P. M., & Mary, J. (2013). Enhancing student knowledge acquisition from online learning conversations. *International Journal of Computer-Supported Collaborative Learning*, 8(1), 134.



Undergraduate physics students at Harvard University who used social annotation for pre-reading activities improved their individual exam scores by 5-10% as compared to a similar cohort of students who annotated course texts without social interaction. While the authors of that study cautioned there is not a causal relationship between social annotation and student exam performance, social annotation was found to be an effective means of “delivering content to students outside class and for building an online learning community in which students can discuss course content and develop understanding.”<sup>42</sup> Furthermore, an exploratory study about programming students’ use of predefined annotation tags on a single course reading found a correlation between students who authored a greater number of notes tagged “Help” or “Confusing” and lower quiz performance.<sup>43</sup>

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<sup>42</sup> Miller et al. (2018).

<sup>43</sup> Singh, S. (2019). Exploring the potential of social annotations for predictive and descriptive analytics. In *Proceedings of the 2019 ACM Conference on Innovation and Technology in Computer Science Education* (pp. 247-248).

## Social Annotation With Hypothesis

Notably, Hypothesis is the most extensively studied and robustly discussed social annotation technology in the scholarly record.<sup>44</sup> To date, there are at least 30 peer reviewed empirical studies that provide evidence about the various ways in which Hypothesis supports both student and educator learning in the natural sciences, social sciences, and the humanities. Moreover, at least 20 additional peer reviewed publications more broadly address the educational features and affordances of Hypothesis. For example, Hypothesis is frequently featured in scholarship about open educational resources and practices<sup>45</sup> because the technology encourages “student-centric, process-focused” practices “with a pedagogical purpose to promote deep, critical reading.”<sup>46</sup> One recent evaluation of the educational effectiveness of multiple social annotation technologies rated Hypothesis as “excellent” across various criteria. Specifically, the evaluation found that, when used to annotate various types of digital texts, Hypothesis is flexible and efficient, intuitive and easy to navigate, and interactive with and encouraging of various social activities like collaboration and commentary; Hypothesis “provides a solution for including variable online content in critical, close reading exercises, thereby enriching and diversifying foundational pedagogical strategies.”<sup>47</sup>

“  
When used to annotate various types of digital texts, Hypothesis is flexible and efficient, intuitive and easy to navigate, and interactive with and encouraging of various social activities like collaboration and commentary.  
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<sup>44</sup> Peer reviewed literature that makes use of and/or mentions Hypothesis has been curated in a bibliography titled “Scholarship About Hypothesis,” <https://web.hypothes.is/education/annotated/scholarship-about-hypothesis/>. In addition to the educational research noted in this white paper, at least another 20 peer reviewed publications discuss the prominence of Hypothesis in other scholarly endeavors, including publishing and science communication, scientific inquiry, and research methodology.

<sup>45</sup> For example: DeRosa, R., & Robison, S. (2017). From OER to open pedagogy: Harnessing the power of open. In R. Jhangiani & R. Biswas-Diener (Eds.), *Open: The philosophy and practices that are revolutionizing education and science* (pp. 115–124). London, UK: Ubiquity Press; and Robbins, T. (2017). Case study: Expanding the Open Anthology of Earlier American Literature. In E. Mays (Ed.), *A guide to making open textbooks with students*. The Rebus Community for Open Textbook Creation.

<sup>46</sup> Bali, M., Cronin, C., & Jhangiani, R. S. (2020). Framing open educational practices from a social justice perspective. *Journal of Interactive Media in Education*, 2020(1), 10, <https://doi.org/10.5334/jime.565>

<sup>47</sup> Seatter, L. (2019). Towards open annotation: Examples and experiments. *KULA: Knowledge Creation, Dissemination, and Preservation Studies*, 3(1), 12. <https://doi.org/10.5334/kula.49>

Over the past few years, Hypothesis has also been prominently featured in research about multiple education projects, as with: Science in the Classroom, a collection of open-access and annotated research papers from the Science family of journals;<sup>48</sup> the Marginal Syllabus, a literacy learning initiative that supported educators' equity-oriented professional development;<sup>49</sup> and Annotation for Transparent Inquiry, a project that has facilitated innovative workflows for greater transparency in qualitative and mixed-methods research and publication.<sup>50</sup>

Hypothesis social annotation benefits students' close reading, peer discussion and collaborative learning. In literature and composition courses, for instance, research suggests that students' use of Hypothesis can support rhetorical and argumentative analyses.<sup>51</sup> In biology courses, students who read research articles annotated with Hypothesis have successfully acquired new vocabulary and accurately interpreted graphs.<sup>52</sup> Across disciplines and course contexts, Hypothesis social annotation has been found to enable students' knowledge construction activities, as with interpretation and elaboration, with activities like consensus building, support, and conflict emerging when peers reply to one another.<sup>53</sup> The use of Hypothesis has also been found to propel students' interest-driven reading and openly networked dialogue beyond texts first discussed within a learning management system.<sup>54</sup> Importantly, multiple studies demonstrate that students perceive Hypothesis as a valuable addition to their learning. Results from a recent study of multiple undergraduate courses at a Canadian university found a majority of students reported that Hypothesis favorably supported their learning despite differences in course subjects, activities and prevalence of social annotation use.

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<sup>48</sup> <https://scienceintheclassroom.org/>. See also: McNutt, M. (2014). More Science in the Classroom. *Science*, 346(6212), 895–895; and McCartney, M., Childers, C., Baiduc, R. R., & Barnicle, K. (2018). Annotated primary literature: A professional development opportunity in science communication for graduate students and postdocs. *Journal of Microbiology & Biology Education*, 19(1). <https://doi.org/10.1128/jmbe.v19i1.1439>

<sup>49</sup> <https://marginalsyllab.us/>. See also: Kalir, J. (2020). *Social annotation enabling collaboration for open learning*. *Distance Education*, 41(2), 245–260; and Kalir, J. (2020). "Annotation is first draft thinking": Educators' marginal notes as brave writing. *English Journal*, 110(2), 62–68.

<sup>50</sup> <https://qdr.syr.edu/ati>. See also: Kapiszewski, D., & Karcher, S. (2021). Empowering transparency: Annotation for transparent inquiry (ATI). *PS: Political Science & Politics*, 54(3), 473–478.

<sup>51</sup> For example: Sievers, J. (2021). Writing between the lines: Teaching digital reading with social annotation in an introductory literature course. *Pedagogy*, 21(3), 427–453; and Sprouse, M. L. (2018). Social annotation and layered readings in composition. *The Proceedings of the Annual Computers & Writing Conference 2018*, 39–52.

<sup>52</sup> Kararo, M., & McCartney, M. (2019). Annotated primary scientific literature: A pedagogical tool for undergraduate courses. *PLOS Biology*, 17(1), e3000103.

<sup>53</sup> Morales, E., Kalir, J. H., Fleerackers, A., & Alperin, J. P. (2022). Using social annotation to construct knowledge with others: A case study across undergraduate courses. *F1000Research*, 11(235), <https://f1000research.com/articles/11-235/v2>

<sup>54</sup> Chen, B. (2019). Designing for networked collaborative discourse: An unLMS approach. *TechTrends*, 63(2), 194–201.

Specifically, students reported that Hypothesis had contributed valuably to their comprehension of course content, confirmation of ideas and engagement with diverse perspectives.<sup>55</sup> Recently, the University of New Haven transformed their Honors Program’s “common read” — typically a book provided to incoming first-year students — into openly accessible and annotatable texts. Evaluation of this innovation over four years found that students who annotated using Hypothesis were “deeply engaged” with their peers; the researchers concluded: “True scholarship means entering into a conversation with others. Social annotation of public domain texts using Hypothesis has helped us achieve those goals.”<sup>56</sup>

“

True scholarship means entering into a conversation with others. Social annotation of public domain texts using Hypothesis has helped us achieve those goals.

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<sup>55</sup> Kalir, J. H., Morales, E., Fleerackers, A., & Alperin, J. P. (2020). “When I saw my peers annotating”: Student perceptions of social annotation for learning in multiple courses. *Information and Learning Sciences*, 121(3/4), 207–230. Student perceptions about Hypothesis are also reported in: Porter, G. W. (2022). Collaborative online annotation: Pedagogy, assessment and platform comparisons. *Frontiers in Education*, 7, <https://www.frontiersin.org/articles/10.3389/educ.2022.852849>; and Sievers (2021).

<sup>56</sup> Wranovix, M., & Isbell, M. (2020). The digital common read: Creating a space for authentic engagement with social annotation. *Journal of the European Honors Council*, 4(1), 1–10.

Social annotation with Hypothesis can also be employed as an effective means of supporting educators' professional development. The use of Hypothesis has been found to benefit educators' discipline-specific communication skills<sup>57</sup> and their acquisition of new content knowledge<sup>58</sup> — as well, it can make visible and valuable “new ideas revealed in others' comments.”<sup>59</sup> Educator learning enabled by Hypothesis can also strengthen commitments to more equitable instructional practices.<sup>60</sup> Professional learning via Hypothesis social annotation advances “non-traditional approaches to online collaborative reading of texts ...

[to] promote transformative learning as dialogue,”<sup>61</sup> while also helping “to imagine a different paradigm for conducting, consuming, and responding to research.”<sup>62</sup> Other researchers have suggested that Hypothesis enacts a participatory form of public discourse that exemplifies the “social scholarship of teaching,” whereby educators share their knowledge and produce new meaning about teaching through the annotation of academic literature.<sup>63</sup>

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Educator learning enabled by Hypothesis can also strengthen commitments to more equitable instructional practices.

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<sup>57</sup> McCartney et al. (2018).

<sup>58</sup> Vasinda, S. (2020). Discussion before the discussion in virtual study groups: Social reading and open annotation. In R. Karchmer-Klein & K. Pytash (Eds.), *Effective practices in online teacher preparation for literacy educators* (pp. 216–238). IGI Global.

<sup>59</sup> Allred et al. (2020).

<sup>60</sup> Kalir, R., Cantrill, C., Dillon, J., McBride, C., & King, M. (2021). Social annotation, critical literacy, and justice-directed educator learning. In E. Langran & L. Archambault (Eds.), *Proceedings of the 2021 Society for Information Technology & Teacher Education International Conference* (pp. 1069-1075). Waynesville, NC: AACE.

<sup>61</sup> Bali, M., & Caines, A. (2018). A call for promoting ownership, equity, and agency in faculty development via connected learning. *International Journal of Educational Technology in Higher Education*, 15(1), 46.

<sup>62</sup> Mirra, N. (2018). Pursuing a commitment to public scholarship through the practice of annotation. *The Assembly: A Journal for Public Scholarship on Education*, 1, 29-36.

<sup>63</sup> Greenhow, C., Gleason, B., & Willet, K. B. S. (2019). Social scholarship revisited: Changing scholarly practices in the age of social media. *British Journal of Educational Technology*, 50(3), 987–1004. <https://doi.org/https://doi.org/10.1111/bjet.12772>

## Social Annotation and Science Education

Among the promising uses of social annotation in science education is an American Academy for the Advancement of Science initiative called Science in the Classroom (SitC). Funded by the National Science Foundation, SitC supports graduate students and early career scientists in annotating open-access articles from the journal *Science* so as to demystify the nature of science, promote scientific communication, and support STEM education efforts.<sup>64</sup> Research around SitC has found that undergraduates who read this expert-annotated primary source literature improve their scientific literacy — for example, their interpretation of graphs<sup>65</sup> — and that researchers who annotate the *Science* articles improve their science communication skills.<sup>66</sup>

Social annotation has also been effectively incorporated into undergraduate students' microbiology coursework and research.<sup>67</sup> More broadly, Hypothesis has been used to help teach courses in: astronomy, biochemistry, environmental science, organic chemistry, evolutionary biology, molecular biology and physics.

“

I honestly feel like ... social annotation has been the closest thing to a magic bullet that I've ever encountered in teaching; the change in student behavior has been very dramatic and deepened the course experience.

”

Dr. Emily Ragan  
Associate Professor, Department  
of Chemistry and Biochemistry  
Metropolitan State University of Denver

<sup>64</sup> <https://scienceintheclassroom.org/>

<sup>65</sup> Kararo, M., & McCartney, M. (2019). Annotated primary scientific literature: A pedagogical tool for undergraduate courses. *PLoS Biology*, 17(1), e3000103.

<sup>66</sup> McCartney, M., Childers, C., Baiduc, R. R., & Barnicle, K. (2018). Annotated Primary Literature: A Professional Development Opportunity in Science Communication for Graduate Students and Postdocs. *Journal of Microbiology & Biology Education*, 19(1).

<sup>67</sup> Goller, C. C., Vandegrift, M., Cross, W., & Smyth, D. S. (2021). Sharing Notes Is Encouraged: Annotating and Cocreating with [Hypothes.is](https://web.hypothes.is) and Google Docs. *Journal of microbiology & biology education*, 22(1), ev22i1-2135. See also: <https://delftia.wordpress.ncsu.edu/delftia-and-e-waste-literature-findings/>

## Social Annotation and Mathematics Education

There is great benefit in teaching students how to read about mathematics. It is not uncommon for students in mathematics courses to quickly consult their textbooks when completing a problem set or searching for a formula. Yet it is also advantageous for students to engage more substantively with primary mathematics sources through both reading and writing activities like social annotation — especially when encountering a complex concept for the first time, or when explaining how they solved a problem.

Social annotation is also a productive complement to mathematics courses given the prevalence of open educational resources (OER) in mathematics education, as Hypothesis easily integrates with leading open-textbook publishing platforms such as Pressbooks, OpenStax and LibreTexts.

## Annotating in the Social Sciences

Across social science disciplines, it is common for students to encounter, have to make sense of and discuss primary sources. Annotating primary sources can help students to contextualize information, define unfamiliar terminology, identify discipline-specific techniques, examine bias and evaluate the reliability of a source.

Social annotation is an effective practice for students to learn about a range of topics and texts, from political science to criminal justice. As Jessica Dauterive — a PhD candidate in history at George Mason University — has observed, “Hypothesis provides a user-friendly way for you and your students to have conversations about primary and secondary sources through digital annotation.”

“

A lot of my students have given me the feedback that they’re not just skimming the text anymore. They’re not just looking for the main findings or the points to summarize. They’re actually considering each part of the text. And as they’re considering each part of the text, they’re using this tool to communicate to me their interpretations of the readings. And also the ways it connects back to their own experiences. I found it to be quite invaluable for that kind of engagement.

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Margaret Schmuhl  
Assistant Professor, Criminal Justice  
SUNY Oswego



## Reading History With Social Annotation

It is valuable for students to annotate the historical record as they examine primary source documents, as in correspondences, legislation, journal entries, poetry and literature, and images. Social annotation can help students in history courses to engage with peer analysis of primary sources, and it can also productively inform low-stakes writing assignments like reading response papers. A sample of history courses that have incorporated Hypothesis social annotation into learning activities include: Introduction to History, Cultural History, History of the Future, Women in America, Modern European History and United States History to 1877.

“

I've found social annotation to be one of the most effective tools for engaging students in course readings — actually doing the readings, asking questions and starting conversations with each other. I've used it for both primary and secondary historical sources and found it to be really helpful in getting students to hone their skills in analysis. I also love the fact that I can have conversations with students about the reading in the margins.

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Mary Klann  
Lecturer, Department of History  
UC San Diego

## Annotating to Read English Literature

Given the rich history of readers annotating literature, it is not surprising that social annotation is an intuitive and productive complement to English courses. Students' reading of literature, their textual analysis and discussion activities become collaborative processes when annotating together. Research shows that when using social annotation in English courses, students can read using multiple rhetorical and critical lenses, identify genre-specific conventions and argumentative strategies, and develop more complex reading comprehension competencies. In describing the large-scale use of Hypothesis in English Department courses at Indiana University Bloomington, Associate Professor of English Justin Hodgson has noted: "We turned to Hypothesis because it offered the ability for us to not only maintain critical reading and analysis components, but to actively enhance that experience through the affordances of networked technologies — anchoring student conversations and discussions in course texts."

“

No matter what I teach — poems, essays, fiction — I want students to learn the profits and pleasures of careful, engaged reading. Hypothesis finally delivers on the promise of digital annotation.

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Lawrence Hanley  
English Professor  
San Francisco State University

## Social Annotation in Composition Courses

Research about annotation in composition indicates that students who write annotations can consequently improve other academic writing skills and products. In composition courses, annotations are often written as a response to a text, with students replying to peers, asking questions, challenging arguments and constructing shared insight.

Writing activities can also guide students to use their annotations in peer review; as students read and reply to peer writing, they may provide feedback, motivate revision and assist as a collaborator. Student composition through annotation can also be multimodal, with writing that includes various forms of media and resources, and is one strategy for supporting the development of digital literacy skills. Finally, there is emerging evidence that students who annotate course readings are successful in identifying textual evidence which is subsequently used to support their original argumentation in essay writing activities.

## Learning World Languages With Social Annotation

Annotation is a common practice when students learn another language. Recent experimental studies have demonstrated statistically significant gains for undergraduate students who use social annotation when learning English. Annotation activities have been shown to improve students' academic performance compared to peers who do not annotate course texts.<sup>68</sup>

Social annotation enables students to identify new vocabulary, develop grammar skills, and translate texts using their first language, as well as to read and write in a second language. Annotation activities can be used to encourage cultural engagement with and immersion in a new language of study. Hypothesis social annotation has been used by instructors to support students learning to read, speak and communicate in multiple languages, including: Arabic, English, Finnish, Italian, Japanese, Russian, Slavic, Spanish, and German.

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<sup>68</sup> Benitez, C., Quinones, A., Gonzalez, P., Ochoa, C., & Vargas, A. (2020). The Impact of Online Annotation Tools on Students' Academic Performance in a Distance University Program. *Turkish Online Journal of Distance Education*, 21(2), 167-177.

## First-Year Seminar and Social Annotation

First-year seminars provide students with a range of academic and social experiences as they begin their post-secondary studies. Typically, these courses help students to develop familiarity with their college or university, join a robust learning community, and connect with peers and faculty. This instructional context frequently spans disciplines and is highly interactive, whether face-to-face or online. Social annotation can help students engage deeply with new ideas, as well as with their reading and writing, while they encounter diverse perspectives and build foundational academic skills.

Starting in 2016, the Honors Program Common Read at the University of New Haven embarked on a new initiative to “reimagine the common read as an interactive experience” using Hypothesis social annotation.<sup>69</sup> Over the course of four years, faculty found that social annotation “encouraged students to read carefully, to establish a space for students to learn from each other, and to help students realize that true scholarship means entering into a conversation with others. Social annotation of public domain texts using Hypothesis has helped us achieve those goals and has encouraged us to refine them.”

“

I do have students annotate the syllabus. In this post-ish pandemic world, with so many students being shunted into online learning unwillingly, students don't really know how to be students in the college setting. A lot of times high schools don't provide syllabi for their students, so they don't know how to read [them]. And that document can be pretty daunting, especially as institutions require us to put more and more policies and resources and statements in our syllabi. All of which are very good and necessary, but students will just skim over it and get to looking at ‘What do I have to do for tomorrow's class?’ So annotating the syllabus is a great way for students to share some of what they're worried about or curious about in the course.

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Sheryl Sawin  
Associate Director and Associate  
Professor, Intellectual Heritage Program  
Temple University

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<sup>69</sup> Wranovix, M., & Isbell, M. (2020). The digital common read: Creating a space for authentic engagement with social annotation. *Journal of the European Honors Council*, 4(1), 1–10.

## Social Annotation in K-12 Teaching and Learning

Across disciplines, annotation is a routine and standards-based instructional practice in many K-12 schools. Research demonstrates that, when paired with thoughtful instruction and mentor texts, annotation benefits students' active reading skills, reading comprehension of both literature and nonfiction texts, and the acquisition of another language. Students who annotate texts individually can improve their recall and retention of information, and students who annotate texts together can create shared meaning through collaboration. Many of the literacy skills encouraged by annotation — such as textual analysis, written communication and metacognition — are broadly considered to be critical when preparing high school students for post-secondary success.

Research about annotation in K-12 science education indicates that this cognitive reading strategy helps students engage in scientific argumentation and develop conceptual understanding.<sup>70</sup> Annotation has also been effectively used to guide K-12 science educators in planning more equitable instruction and assessment,<sup>71</sup> as well as in using open educational resources available in the National Science Digital Library.<sup>72</sup>

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<sup>70</sup> Zywica, J., & Gomez, K. (2008). Annotating to support learning in the content areas: Teaching and learning science. *Journal of Adolescent & Adult Literacy*, 52(2), 155-165.

<sup>71</sup> Task Annotation Project in Science <https://www.achieve.org/our-initiatives/equip/tools-subject/science/task-annotation-project-science>

<sup>72</sup> Mimi Recker et al., "Teacher Design Using Online Learning Resources: A Comparative Case Study of Science and Mathematics Teachers," *Education Research International* (2013): 1–11. NSDL: <https://nsdl.oercommons.org/>

## Promoting Digital Literacy With Social Annotation

The term *digital literacy* refers to people's multimodal use of technology to engage with, respond to and also create new media, messages, and meaning. Hypothesis social annotation supports a range of digital literacy practices, as students and instructors produce multimodal commentary, link to media resources across information contexts, and visualize thinking with peers and other learning communities.<sup>73</sup> As Dr. Amanda Licastro — an Emerging and Digital Literacy Designer at the University of Pennsylvania Libraries — has observed: “In the changing landscape of higher education, we need to give students a flexible, collaborative space to research and debate texts. From teaching the history of media, I have learned to value the longstanding social function of annotations, and therefore have come to privilege this function of marginalia.”<sup>74</sup>

“

Annotation supports deep and close reading of digital materials, facilitating conversation between students, flipping the expert/novice paradigm, and finding low-stakes incentives for students to engage in course content.

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Dr. Amanda Licastro  
Emerging and Digital Literacy Designer  
University of Pennsylvania

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<sup>73</sup> Kalir, J. (2019). Open web annotation as collaborative learning. *First Monday*, 24(6).

<sup>74</sup> Licastro, 2019, p. 88. | Licastro, A. (2019). The past, present, and future of social annotation. In M. Lamb & J. Parrott (Eds.), *Digital reading and writing in composition studies* (pp. 87-104). Routledge.

## Conclusion

This white paper has described the value of annotation for student learning and success. It has summarized recent research about the benefits of social annotation in higher education coursework, for classes taught across modalities, and when learners annotate course content from the natural sciences, social sciences and the humanities. Distinctively, this white paper has featured a range of cross-disciplinary instructor testimonials about the productive use of Hypothesis — a leading social annotation technology — for students’ reading, writing and collaborative learning. All testimonials are available on [page 33](#).

It is important to acknowledge that some of this white paper’s cited research and practitioner perspectives reflect the use of social annotation prior to the COVID-19 pandemic. Alternatively, some studies and anecdotes respond directly to instructional challenges that have arisen since March of 2020. Educational institutions, students and educators have all struggled with shifts to emergency remote instruction, hybrid course formats, and the need for new learning technologies and flexible practices amidst ongoing disruption and loss. Yet despite the difficulty and unknowns of the past few years, instructors have adopted innovative solutions that have helped students to engage deeply with course content and collaborate with one another — and social annotation was one of those useful approaches. Despite countless changes to typical academic routines, students embraced opportunities for social reading and peer-to-peer learning. Again, social annotation has been a meaningful course activity during this era of pandemic education.

Social annotation will continue to be a promising feature of digital teaching and learning, especially in higher education. Evidence presented in this white paper — gathered from both the scholarly record and educator practice — strongly suggests that easy-to-implement educational technologies like Hypothesis enable students’ high-quality interaction with course readings, their peers and instructors, both on campus and online. In short, social annotation is a productive form of digital dialogue among people, content and learning communities.

Social annotation makes learners’ thinking visible to one another, aids group cognition, and affords the social production of new knowledge. Through social annotation, students can readily share their confusion with peers, offer novel interpretations, elaborate on ideas, connect to resources and work through disagreement toward shared understanding. Social annotation is an exemplar of peer-to-peer learning and an evidence-based way for learners to closely read and analyze texts across academic disciplines.

For social annotation to further impact the future of digital education, it will be important for institutions to carefully consider how specific learning technologies integrate with existing resources and infrastructure. There is a compelling argument that open and interoperable technologies like Hypothesis are advantageous for fostering the broad use of social annotation across diverse forms of educational content, institutional platforms and course modalities. Moreover, there is an ongoing need for strong alignment between technical investments and professional development. Establishing social annotation as integral to digital education will require complementary investment in educators' capacity to leverage innovative instructional practices in service of student learning and success.



## Faculty Testimonials

“I honestly feel like ... social annotation has been the closest thing to a magic bullet that I’ve ever encountered in teaching; the change in student behavior has been very dramatic and deepened the course experience.”

**Emily Ragan**

*Associate Professor, Department of Chemistry and Biochemistry*  
Metropolitan State University of Denver

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“[Social annotation] allows students to read a paper with a high level of criticality. You can ensure students are coming to class prepared, and they can learn from their peers.”

**Naima Starkloff**

*Postdoctoral Fellow in the Civitello Lab*  
Emory University

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“In mathematics, we don’t often require reading of the textbook as a way to gain insight in the content and problems that we complete in class. This is unfortunate, because allowing students to hear and read can help accelerate their understanding. Students should have assistance with learning to read technical writing because it is a different skill than reading through a novel, opinion article, non-science textbooks, or other typical college-level writing. Making the reading visible is important to support our students. Also, setting up the social annotation in the LMS as an additional assignment is too easy NOT to use!”

**Ashley McHale**

*Professor, Mathematics Department*  
Las Positas College

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“One of the prompts I’ll sometimes give students is, ‘Point out a formula somewhere in the text, and try and put into words what that formula actually means, why somebody should care about that,’ or ‘If you had to explain this to somebody who’s not currently taking our math class, what would that explanation look like?’”

**Matt Salomone**

*Associate Professor, Mathematics*  
Bridgewater State University

“A lot of my students have given me the feedback that they’re not just skimming the text anymore. They’re not just looking for the main findings or the points to summarize. They’re actually considering each part of the text. And as they’re considering each part of the text, they’re using this tool to communicate to me their interpretations of the readings. And also the ways it connects back to their own experiences. I found it to be quite invaluable for that kind of engagement.”

**Margaret Schmuhl**

*Assistant Professor, Criminal Justice*  
SUNY Oswego

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“I’ve had a lot of student feedback that they like seeing what their classmates are writing about, because it’s given them insight into their perspectives on the reading and how it connects to their lives and their experiences. And I think it allows for an engagement in an online platform that I typically tend to enjoy in a physical face-to-face classroom.”

**Margaret Schmuhl**

*Assistant Professor, Criminal Justice*  
SUNY Oswego

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“I’ve found social annotation to be one of the most effective tools for engaging students in course readings — actually doing the readings, asking questions and starting conversations with each other. I’ve used it for both primary and secondary historical sources and found it to be really helpful in getting students to hone their skills in analysis. I also love the fact that I can have conversations with students about the reading in the margins.”

**Mary Klann**

*Lecturer, Department of History*  
UC San Diego

“Annotation allows History students to practice analysis skills and to receive quick feedback from their peers and me. For my introductory surveys, I help guide their annotations by pre-annotating with questions they can answer. In their answers, they are essentially analyzing the text. By asking follow-up questions to students, I hope to drive their analysis further so they are thinking critically about how an author presents a particular argument and uses a source.”

**Mary Klann**

*Lecturer, Department of History*  
UC San Diego

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“I am kind of frustrated when I am the only audience for students’ response papers. [Social annotation] allowed them to practice writing to an audience of their peers. I found it to be hugely motivating for students who would want to see how other students had reacted. I thought that it allowed them to process some of the information of reading through conversation. And also the way that they could make it more multimodal, so the fact that I was getting YouTube links, YouTube videos, Wikipedia links, pictures in the margins — [it] just allowed students to bring that material to life in ways that they were not always feeling welcome to do in response papers.”

**Alicia Maggard**

*Assistant Professor*  
Auburn University

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“Class discussions are crucial to helping students understand the meaning of these texts, but it is often hard to tell where, exactly, students have become confused in the text. This is true even in physical, face-to-face classes. In an online course, the typical discussion boards were not cutting it. Social annotation allows us to ask students questions within the body of the text, questions that can help them understand the text better in the moment of reading. And their annotations reveal not only what they are confused about but why, because I can see the exact part of the text that has been misread.”

**Alexandra Penn**

*Online Instructional Designer, eLearning Design & Services*  
Indiana University

“No matter what I teach — poems, essays, fiction — I want students to learn the profits and pleasures of careful, engaged reading. Hypothesis finally delivers on the promise of digital annotation.”

**Lawrence Hanley**

*English Professor*

San Francisco State University

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“Most homework or assignments that take place outside of class aren’t social by design. Yet social annotation creates a real digital space for interaction. However brief, these pings between students – or from teacher to student – in annotations double or triple the number of interactions a student has with someone else who is interested in course material. Teachers have believed in the power of discourse communities for decades, but social annotation creates them in a real sense.”

**Ben Storey**

*Assistant Director, Writing Studies | Lecturer, English*

Indiana University Bloomington

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“When I landed in the writing classroom, I would say things like, ‘Writing is a social activity,’ and ‘It’s a myth that the writer operates in isolation.’ But there’s a difference between being able to say that and being able to show it. And even though I would do group work in the writing classroom, I felt that social annotation was a tool to take it back several steps: It allows students to realize that reading [is] key, but thinking and having conversations about what one is reading is really what pushes one forward in the writing process.”

**Dr. Noel Holton Brathwaite**

*Assistant Professor of English*

Farmingdale State College SUNY

“What we really want to do in our courses is stress critical reasoning, critical thinking, and taking an original viewpoint and adding something to the discussion. What Hypothesis helped me to do was really develop a pedagogy that would be organized around re-centering reading in the classroom and thinking of it as a kind of sequential process [where] they could practice different skills, varying from simpler to more complex, but really trying to help them think about what are other strategies available to you other than quoting and directly summarizing and paraphrasing.”

**Mary Traester**

*Associate Professor (Teaching) of Writing*  
University of Southern California

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“The ability to highlight and comment on particular passages provides a low threshold for students who might be more reserved in in-class discussions.”

**Rob Michaelski**

*Senior Lecturer/Director of Core Writing, English Department*  
Santa Clara University

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“Many students that I have, I know have great thoughts. And I think that’s what the annotations help bring out; that they can put their thoughts down in writing. And then I’m telling them, ‘This is a great thought, can you explain more to the class?’ And so it’s starting out as a positive, instead of, ‘I don’t know how good my thought is. Do I want to really share that?’ And I say, ‘No, I know that it’s good. So now you can speak with the class.’ I think that’s what’s been helpful for me.”

**Cory Duclos**

*Director of the Keck Center for Language Study*  
Colgate University

“I used it for an academic article which they don’t have a lot of experience reading in Spanish. Probably 80% of the students in our upper division Spanish classes are Spanish speakers with a high level of proficiency. So I thought this is a good way to challenge them with this kind of language because they’re not going to voluntarily read an academic article. It turned out to be a really beneficial tool for the students and for me because it was satisfying to see that they were working with the reading, grappling with the difficult concepts, and doing it on their own.”

**Georgia Seminet**

*Associate Professor of Spanish*  
St. Edward’s University

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“When they discovered Hypothesis they were — at the beginning — a little bit surprised. Then they loved, mainly during the pandemic, all the sharing that this made possible. And at the end [of the course], some of them told me that they wanted other professors to use this kind of tool.”

**Rosario Rogel-Salazar**

*Professor at the Political and Social Sciences Faculty*  
Universidad Autónoma del Estado de México

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“I do have students annotate the syllabus. In this post-ish pandemic world, with so many students being shunted into online learning unwillingly, students don’t really know how to be students in the college setting. A lot of times high schools don’t provide syllabi for their students, so they don’t know how to read [them]. And that document can be pretty daunting, especially as institutions require us to put more and more policies and resources and statements in our syllabi. All of which are very good and necessary, but students will just skim over it and get to looking at ‘What do I have to do for tomorrow’s class?’ So annotating the syllabus is a great way for students to share some of what they’re worried about or curious about in the course.”

**Sheryl Sawin**

*Associate Director and Associate Professor, Intellectual Heritage Program*  
Temple University

“One of the things that I really like about Hypothesis is the idea that when we’re dealing with one of these challenging texts it gives students a way to participate that feels comfortable. It gives students a way to have a much better conversation than we could have just by talking in the classroom, because they want to choose their words very carefully in dealing with a topic as challenging as discussing race and racism. So I really value the way that they prepare for difficult discussions by annotating in advance.”

**Heather Walder**

*Assistant Teaching Professor, Archaeology & Anthropology*  
University of Wisconsin–La Crosse

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“If we annotate collaboratively, I might see something from a different worldview than I’m familiar with. Students touched on this idea of deepening or expanding ideas, ‘Maybe I post an idea and someone builds on it.’ And then this other idea of feedback, ‘I might gain feedback by seeing what other people have to say in real time.’ And so we work together to construct what social annotation looks like in our classroom.”

**Courtney Kleffman**

*English Teacher*  
Otay Ranch High School, Sweetwater Union High School District, CA

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“The biggest part for me using social annotations is the egalitarian aspect that it provides to my classroom. This allows students to focus on their thoughts when they’re writing, to really take the time to understand and listen to what other students are saying. Social annotation requires that they’re rooting their conversation and their comment in the text itself. And that really helps to focus their reader response back to the actual text and what the author was saying. This allows them to read what other people have read [and] written, and to think about it. And to go back and have this back-and-forth that doesn’t really exist — or is not really allotted for — in a classroom discussion where you only have a set amount of time.”

**Morgan Jackson**

*English Teacher*  
Bishop Gorman High School, NV

“I like to push back on the notion of what we expect an English class to do. And I think social annotation helps with that. Meaning is socially constructed. It’s really important for me to ask students to write about lines [of a reading]. So writing happens while students are reading. And then readings — like writings — develop into drafts. And so social annotation can make visible the way a developed reading of a text started with a lot of question marks.”

**Joe Dillion**

*English Teacher/Instructional Coach*

Aurora Public Schools, CO/Denver Writing Project

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“Readings might be informed by different identities or different perspectives, particularly when students may be representing a marginal perspective, or an often unconsidered perspective. We can collaboratively construct critical lenses using social annotation.”

**Joe Dillion**

*English Teacher/Instructional Coach*

Aurora Public Schools, CO/Denver Writing Project

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“Annotation supports deep and close reading of digital materials, facilitating conversation between students, flipping the expert/novice paradigm, and finding low-stakes incentives for students to engage in course content.”

**Dr. Amanda Licastro**

*Emerging and Digital Literacy Designer*

University of Pennsylvania

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“They think it is fun and helpful. Students constantly articulate how effective they believe social annotation to be in their journals, reflection essays and evaluations.”

**Dr. Amanda Licastro**

*Emerging and Digital Literacy Designer*

University of Pennsylvania



## Endnotes

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