Sense-Making in the Disciplines: A Digital Tool to Support Content Area

Project READI Technical Report #12

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PROJECT READi

Citation for this Report: Lee, C. D., Goldman, S. R., Levine, S., Brown, M., & Loh, B., (2016). *Sense-making in the disciplines: A digital tool to support content area.* READI Technical Report #12. Retrieved from URL: projectreadi.org

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Project READI was supported by the *Reading for Understanding (RFU)* initiative of the Institute for Education Sciences, U. S. Department of Education through Grant R305F100007 to the University of Illinois at Chicago from July 1, 2010 – June 30, 2016. The opinions expressed are those of the authors and do not represent views of the Institute or the U. S. Department of Education.

Project READI operated as a multi-institution collaboration among the Learning Sciences Research Institute, University of Illinois at Chicago; Northern Illinois University; Northwestern University; WestEd's Strategic Literacy Initiative; and Inquirium, LLC. Project READI developed and researched interventions in collaboration with classroom teachers that were designed to improve reading comprehension through argumentation from multiple sources in literature, history, and the sciences appropriate for adolescent learners. Curriculum materials in the READI modules were developed based on enacted instruction and are intended as case examples of the READI approach to deep and meaningful disciplinary literacy and learning.

For a demonstration of the **Sense-Making in the Disciplines** tool or further information about the tool contact Matt Brown (matt@inquirium.net).

It is now widely recognized that reading instruction needs to continue throughout schooling and that the focus of such instruction should be decreasingly the mechanics of reading and increasingly the language, discourse, and argumentation structures of the disciplines in which the reading is located (Carnegie Council on Advancing Adolescent Literacy, 2010; Goldman, 2012; Lee & Spratley, 2009; Snow & Moje, 2010). These emphases are reflected in the Common Core State Standards in English Language Arts, History, and Science and Technical Subjects (National Governors Association, 2010) and in the Next Generation Science Standards (National Research Council, 2014; NGSS Lead States, 2013). These standards require students to be able to comprehend and interrogate increasingly complex texts and to construct arguments around increasingly complex disciplinary inquiry tasks.

Research on the teaching of reading comprehension beyond the primary grades stresses the importance of strategy instruction (National Reading Panel, 2000) and the role of prior knowledge (Jetton & Alexander, 2004; Kintsch, 1994; McNamara & Kintsch, 1996). However, a primary focus of this prior research has been on generic strategies, including processes for self-monitoring, and generic sources of prior knowledge (e.g. academic vocabulary, generic text structures such as cause-effect). While such foci are important, there are additional strategies and forms of prior knowledge that are specific to comprehension of disciplinary texts (Lee & Spratley, 2009). For example, the elements of narrative that characterize literary works do not have the same structures as one would find in informational genres that characterize history and science. Literary comprehension calls for drawing inferences about structure and rhetorical choices by authors, for drawing inferences based on knowledge of character types, genres, the historical context and the epistemological orientation to interrogate the author based on prior beliefs and commitments of the reader (Hillocks & Ludlow, 1984; Lee, 2007, 2011). Comprehension of historical texts entails examining potential sources of bias, contextualizing the production of the text, and corroborating information in the text against the historical record, and the epistemic orientation that the reconstruction of historical explanations are open to debate (Perfetti, Britt, Rouet, Georgia, & Mason, 1994; VanSledright, 2002; Wineburg, 2002). Comprehension of texts in science entails examining and evaluating data about observed phenomenon in the natural world and evaluating how such data reflect principles of scientific reasoning, understanding technical vocabulary in the field, and examining models represented textually and graphically (Goldman & Bisanz, 2002; Lemke, 1998; Moje et al., 2004). The range of genres (important for using knowledge of text structures to make predictions and anticipate the organization of ideas in the text) in these disciplines differs greatly. Reading in history and science includes not only verbal texts, but also graphics and data displays (Levin & Mayer, 1993; Mayer, 1989). In addition, the generative inquiry tasks in each discipline differ substantively: examining theme and structural generalizations in literature (Hillocks & Ludlow, 1984), issues of causation and explanatory models in history (Perfetti et al., 1994) and theoretical models and scientific justifications in science (Driver, Newton, & Osborne, 2000).

Sense-Making in the Disciplines (SMD) is the prototype of a digital tool developed in Project READI to support students, especially struggling readers, to learn to engage in close critical reading in disciplines and to extrapolate data from disciplinary texts to be organized to support argumentation around generative questions. The prototype developed focuses on reading and argumentation primarily in literature and secondarily in history. In future work we plan to expand features of the system and to incorporate science. SMD has two major components. One

is used by students as readers. The second is an authoring component that can be used by teachers and curriculum designers. We describe here the underlying architecture of the tool and provide examples of its structure and use. SMD is not a curriculum per se. It allows teachers and/or curriculum designers to select texts and to select which reading and argumentation support features are most relevant for the goals of instruction.

For students as readers, SMD provides tools for annotating, what we call heuristic graphic organizers, structures for teachers or curriculum designers to input key questions for strategically chunked sections of a text, and culminating questions that ask students to draw from the accumulated evidence and observations made from their close reading of the text in question to address a consequential question structuring evidence with textual evidence and backing and warrants to support that evidence.

Annotation is a well established strategy to encourage and support students to be metacognitive about what and how they are thinking as they read (Chun & Plass, 1996; Johnson, Archibald, & Tenenbaum, 2010). Annotation tools in SMD include the ability to digitally highlight text and create a note card that captures the student's reflections. Note cards are then given tags. Tags may be student generated or students may choose one of the pre-set codes established by the teacher or curriculum designer. Note cards then may be retrieved by tags. This provides an easy opportunity for the student to retrieve all the insights he or she has accumulated around a particular issue and to easily link that observation back to the actual text that stimulated the response. Pre-set tags capture the categories of problems that the text, the target of learning, and the discipline require. For example, in literature tags include names of characters, particular rhetorical features (e.g. repetition, pattern, exaggeration, understatement, etc.) or particular interpretive problems (e.g. symbolic, ironic, etc.) The purpose of the pre-set tags is to focus students' attention on particular kinds of problems that they are likely to meet in the text.

Heuristic graphic organizers are structured to focus students' attention on noticing salient details that embody the target interpretive problem. In literature this may be noticing that which may be symbolic or evidence of unreliable narration. In history this may be noticing evidence of the contexts under which the text was produced or language signaling a particular construct. These also include heuristic organizers for constructing arguments where students can articulate claims, provide evidence, explain reasoning behind the evidence etc. The purpose of these organizers is to structure how students think about approaching a particular problem of interpretation.

Key questions for strategically chunked texts are created by the teacher or curriculum designer. Each text is strategically chunked into sections, where each section offers an opportunity to at least tentatively consolidate a major proposition or big idea. The idea here is to help students build up emergent understandings of big ideas as they are reading, rather than waiting until they have finished reading the whole text. The logic is also that the key questions in each section are intended to prepare the student to begin to accumulate thinking and evidence as preparation for the big consequential task they will address after completing reading of the entire text. The system is organized such that students cannot go on to the next section of the text until

they have completed key questions for the section before. The goal here is to encourage some relative consolidation of the student's thinking before moving on.

For each text there is a culminating question. In literature the culminating question is either what Hillocks calls an author's generalization (e.g., a question about theme) or a structural generalization (e.g. a question about how the structure of the text including uses of language influence meaning). In history, the culminating question may be about potential sources of bias or point of view or establishing how the text defines a set of causal claims. Students have available to them accumulated data in the form of tagged notes and annotations, data in heuristic organizers, and responses to key section questions from which they can draw in articulating claims and having easily available textual data and prior reasoning to incorporate into an extended argument.

SMD is not intended as a stand-alone tool. It is expected that students will work with individual texts or sections of a text – depending on the length of the text – first in the digital tool and then take up ideas that emerge from that individual work in group interactions and discussions in the classroom. The final consequential question is answered outside of the tool, but the accumulated evidence is available from within the tool. Teachers are able to view students' work in the tool daily in order to think about what to take up in class discussion and group work outside of the tool.

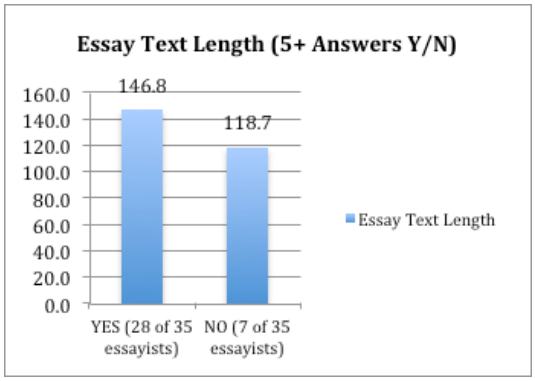
The authoring tool allows teachers and/or curriculum designers to decide on texts and targets of learning. We make available a document to guide teachers and curriculum designers around principles of text selection, text chunking, identifying sources of complexity that students will meet in texts, and in identifying prototypical categories of consequential tasks and consequential tags for note cards.

Development and Implementation of SMD

The primary goal for the Sense-Making in the Discipline tool during Project READI was to develop a prototype and to test its functionality in real classrooms. Toward that end, the first two years were devoted to developing the tool through several iterations. In 2012-13 an initial trial usage of an early version of SMD was tested. Implementation took place in 2013-14 and 2014-15 academic terms. A total of 28 texts and texts set were prepared for use with SMD. To support instructional units in literature, three texts were selected to be input into the SMD tool in 8 junior and 10 senior level English Language Arts classrooms and two text sets in history/social studies in 5 sophomore classes and 4 senior classes. The literature texts were prepared by project staff. The text sets in history/social studies were in one instance developed by a teacher and in the second instance by the project's instructional coach in history.

While still rudimentary, SMD in its current form has a bulk research tool screen that allows us "at-a-glance" views of students' work in each of the core practices of the SMD tool: section questions, note cards, annotations, heuristic organizers. On the whole, students focused more on answering section questions than the other supports in the tool and secondarily on note cards. We think there are several reasons for this. The tool did not have an easy way for teachers

to see at a glance what features students were using in the system. They could access views of the work of individual students, but for a high school teacher teaching well over a hundred students, it is not feasible to examine daily each students' work in the system. These observations also suggest that greater up front modeling of the heuristic organizers would have been useful and needed to have been better integrated in regular instruction. However, on the whole we found that students with higher GPAs and higher ACT scores tended to answer more section questions and created more notecards. Using data from the Spring 2014 EBAIMS post test in literature, students who answered five or more section questions in the *Damballah* story in SMD wrote longer essays in the post test:



Considering that essay lengths for this assessment ranged from 23 words up to 322 words, this distinction is important. When we examined features of essay quality comparing students who entered more note cards and students who answered more section questions, the results were mixed and not definitive. We offer these observations simply to say that in future iterations of this work, we anticipate that more fully developing the searchable tools that teachers can access to monitor student work will influence fidelity of implementation and as a consequence provide better opportunities to examine relationships between what students do in the system, what they do in class outside of using the tool, and measures of disciplinary reasoning. Toward this end, we have submitted a proposal to the Reading and Writing Panel of IES to continue development of the SMD tool in literature, expand its use in history, and to expand the teacher authoring, teacher access to student work, and research tools of the system. If funded, after that development work, we would plan to go to NSF to seek funding to develop the supports for use in science.

Sense Making in the Disciplines: Functionalities

Here we provide a technical description of the functionalities of the tool. Specifically, here we offer an explanation of the technical affordances of this digital medium. This description is intended to provide specific illustrations of the affordances of the tool and how these affordances are addressed from a digital design perspective. The illustrations are from literature which served as the primary focus of this initial design work. Several small adaptations were made for history, but our hope is to secure future funding to expand formally the affordances into history and eventually into science.

Supports reading across a wide range of devices

The Sense-Making in the Disciplines Tool (SMD) is envisioned as a tool that is used by students and teachers on computers and tablets throughout the school day and at home. It supports the work of individuals, small groups, and the whole class on a projected screen. The tool is designed to facilitate the following:

Provide a consistent reading experience across a wide variety of devices

Screen sizes and ratios vary across devices: wide on laptops, narrow and tall on phones, etc. We designed the Sense-Making tool to provide a consistent look across these different devices, with an emphasis on readability informed by sound book design practices. In particular, long lines of text can be difficult to read, so SMD is designed to limit the width of text rather than simply expand to fill the available space as many digital devices do. In addition, font sizes can be scaled up or down to make the text easier on devices with varying resolutions.

Simplify navigation

Another key aspect of readability, especially for a digital document, is navigation across pages. Some digital books attempt to maintain the analog notion of pages and one is left navigating left and right and up and down around single rectangular "pages" of text in order to read everything on a page, only to then have to use another mechanism to turn the page. SMD in contrast, uses a web browser continuous single scrolling document approach. This makes navigation simple: up and down scrolls you through the whole text.

Support touch devices

Because some students and teachers are using SMD on a tablet, SMD needs to also support finger actions, which requires a much larger target for actions relative to a button designed for a mouse, which can be quite precise. "Hovering" a mouse over an interactive element in order to trigger functions such as help is also not supported on touch devices, so we needed to design SMD to be primarily click-driven.

Support discussion of text in classroom context

One other aspect of the design for devices and classroom contexts is worth noting: traditional texts designed for literature often provide line numbers so that teachers and students have a common referent when discussing a text, e.g. "On line 32, the author states…". With a digital text displayed on different devices (being displayed with different line widths and word wrapping) line numbers will vary greatly across device, and even within a single device if its configuration changes. In order to better support teachers and students in a classroom context, we have added sentence numbering in the margins of the text so that teachers and students can refer to points in the text via sentence number. Sentence numbers remain consistent across devices, screen orientation, and screen resolution.

THE MARIGOLDS

by Eugenia W. Collier

Section 1

When I think of the hometown of my youth, all that I seem to remember is dust -- the brown, crumbly dust of late summer -- arid, sterile dust that gets into the eyes and makes them water, gets into the throat and between the toes of bare brown feet. I don't know why I should remember only the dust. Surely there must have been lush green lawns and paved streets under leafy shade trees somewhere in town; but memory is an abstract painting -- it does not present things as they are, but rather as they *feel*. And so, when I think of that time and that place, I remember only the dry September of the dirt roads and grassless yards of the shantytown where I lived. And one other thing I remember, another incongruency of memory -- a brilliant splash of sunny yellow against the dust -- Miss Lottie's marigolds.

Whenever the memory of those marigolds flashes across my mind, a strange nostalgia comes with it and

Supports self-directed reading

One of the primary use models of SMD is to enable students to do self-directed reading at their own pace. Rather than relying on the teacher to structure student reading and provide help with interpreting the text, students should be able to dive into the text on their own, supported by the tool. The affordances of the tool replicate the heuristics taught in the READI instructional practices, aligned with Cultural Modeling practices in literature for this first iteration. The underlying architecture of the tool is sufficiently adaptable for differing heuristics across disciplines, although we have argued that the fundamental heuristic tasks conceptually don't change (e.g. annotations, categories of comprehension questions, heuristic organizers, etc.) across disciplines. Rather, the specific instantiation of a particular heuristic shifts. So while SMD supports self-directed reading, it provides a space where students can apply those heuristics at their own pace, working independently in the SMD tool.

Guide careful reading through section prompts and questions

Many texts, especially longer texts, benefit from a clear demarcation of new ideas, themes, settings, events that may not be immediately obvious to a novice reader. Readers need to be primed to focus on particular aspects of a story or text before they begin reading. And after they read portions of the text, they benefit from prompts that focus their attention on key aspects of what they just read. We designed **section prompts** and **section questions** for this purpose. Section prompts guide students at the beginning of each section to focus on a particular feature. Section questions at the end of each section provide prompts for reflection on what was just read. The prompts can be designed to help students notice and make connections between parts of the

text. This is consistent with the conception of reading comprehension as a dual process of top-down and bottom-up constructive processes, including the need to make connections within and across sections of a text. These processes hold true regardless of the discipline in which the text is situated.

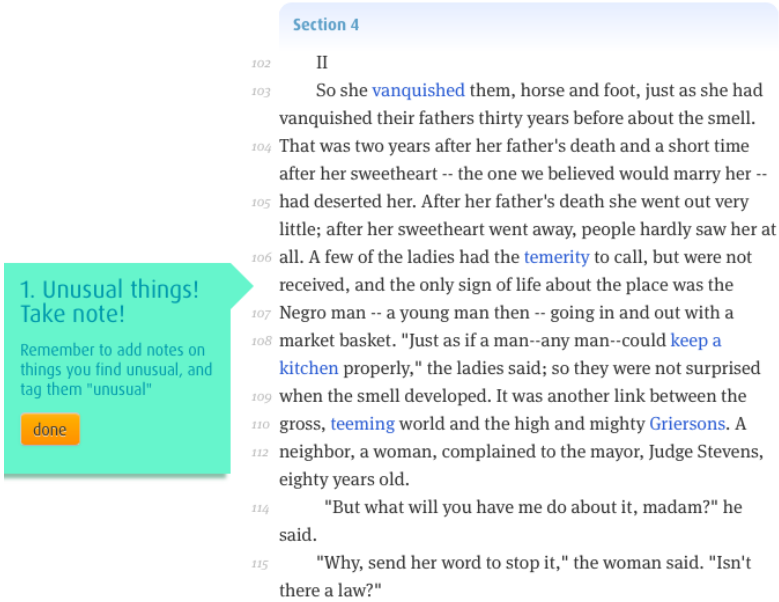
Provide general task guidance across reading and reflection with activity prompts

Careful reading of a text, especially using a tool like SMD, does not simply involve reading or even answering a few section questions here and there. Rather, students should be engaged in other expert habits of mind around reading: noting interesting or surprising aspects of text, annotating those thoughts, writing notes about their observations, making connections between different pieces of the text and ideas. We designed **activity prompts** to do just that.

Activity prompts guide students across the different careful reading tasks supported by SMD Activity prompts function first as a list of suggested actions that the students should take displayed in the upper left corner of the screen. Each prompt consists of a short label (e.g. "Rules of Notice: Repetitions" followed by a more descriptive guidance:

> "'The one' is repeated twice in this paragraph. When an author repeats something, it could be important to understanding meaning. The New Testament, Revelations 1:8, God says 'I am the one who is, who always was, and who is still to come -- the Almighty One.' Think about possible connections to what Orion says here about the boy. Go to the Repetitions organizer and write about this."

Clicking on the prompt will trigger an animation that points the user to where they can either find the text, or find the Graphic Organizer (described below) for taking action. The prompts themselves usually appear next to the object student attention is being directed toward.

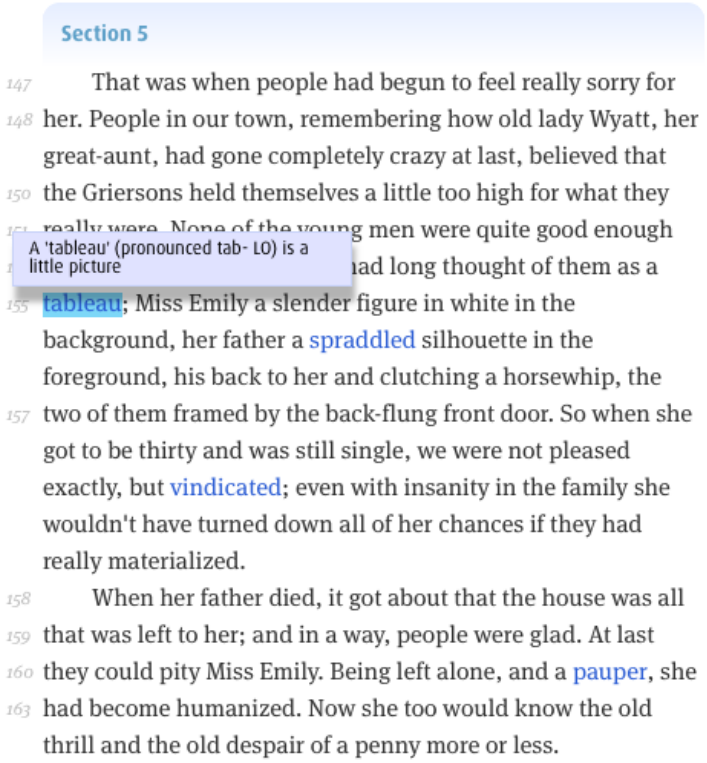


Careful reading places a heavy cognitive load on students. As they read or work on taking notes or answering section questions, they can easily get lost in the details of one aspect of the work, yet need to keep track of all the other sense making they are engaged in. The always present activity prompt serves as a reminder of their current immediate goal.

Students can at any time close the current prompt and view it in the context of all the other activity prompts so they have an idea of where they are in the process and what they still need to do. They can also use it as a convenient mechanism for navigating the text and tools.

Provide background knowledge and vocabulary definitions in context

Another difficulty that students have with challenging texts is understanding the vocabulary or having enough background knowledge to interpret the text. We designed SMD to provide **vocabulary definitions** and multimedia **background information** for students in the context of their reading. They can view a definition or read up on background without ever losing the context of their reading.



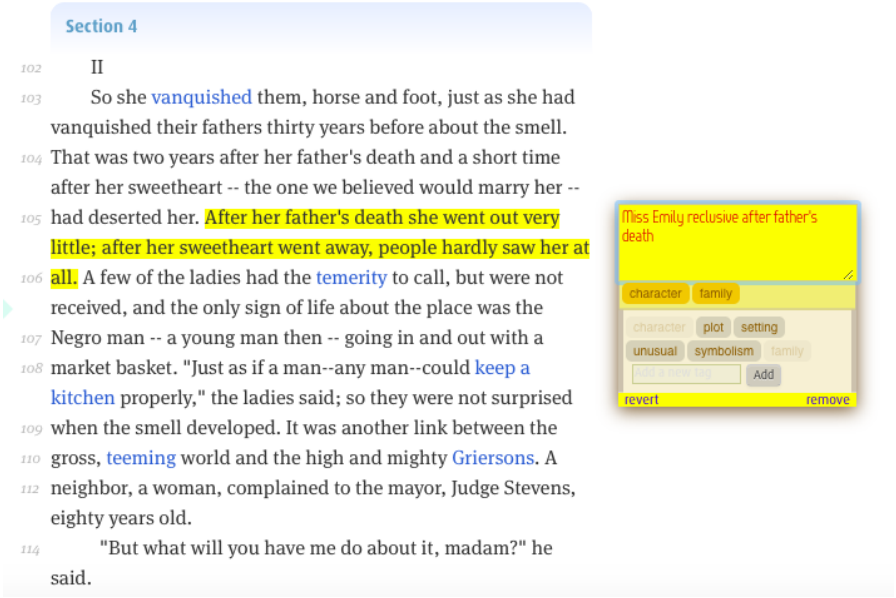
Supports self-directed reflection and annotation

Reflection and annotation are key components of careful reading. SMD promotes reflection from two angles: helping students engage in their own self-directed reflection and prompting and structuring student reflection.

Support self-directed marking up text with annotations

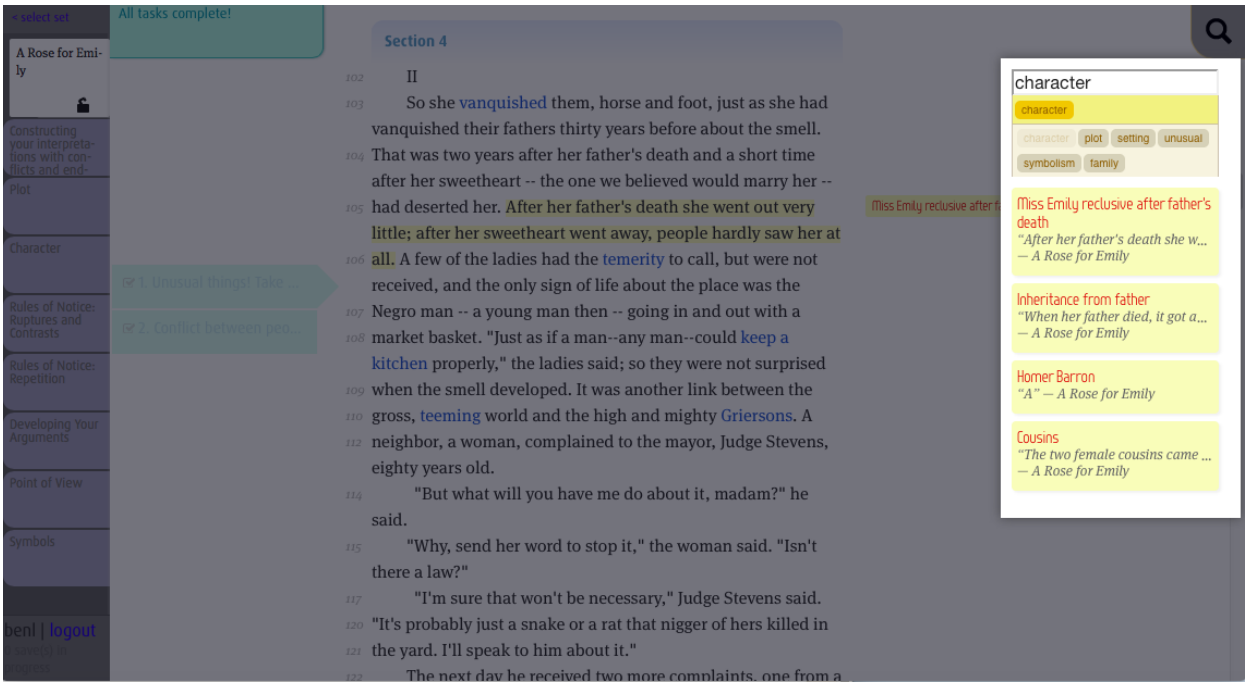
With physical books, students (at least in college) are encouraged to write margin notes, highlight key passages, and otherwise annotate a text as they read it. The process of annotation can trigger reflection, and serve as flags for revisiting and interpreting the text later. Sophisticated readers record questions they might have about the text, insights they have while they're reading, etc.

Digital books inhibit this behavior when they do not provide any tools for markup. We designed SMD with basic **markup tools** to address this need. Students can highlight any word or sentence with a yellow highlighter, add a **note card** that explains the highlight, and tag the note with **keywords** to facilitate sorting and searching later. The tagging keywords can also be tied to habits of mind for reading to help students make the connection between the text and key concepts, e.g. in literature, by encouraging students to highlight and tag text with the "character" keyword, we encourage them to pay attention to how characters are being developed. Tags in other disciplines will differ, but the fundamental functionality of support for being metacognitive about the significance of the reader's reflections (e.g. what I have noticed is an instance of x construct).



Students can use pre-defined keywords (defined by the curriculum author) or they can define their own custom keywords that are then available for use on future notes.

Two other affordances of note cards that are worth mentioning. First, note cards and tags are **searchable**, giving students an easy and quick way to review their notes. For example, a student might search for all notes that they had tagged "character" or even a character name. We deliberately designed notecards so that they are always attached to the right margin of the text. This gives students a consistent place to always look for their notes and allows them to be easily reviewed as you scroll through the text.



Second, note cards can be used to **annotate images** as well. Students can highlight a part of an image by dragging a rectangular box on the image, and then attach a note card. In this way, SMD can be used for both reflection and annotation of text-based and image-based primary sources that are more prevalent in science and social sciences.

Support structured reflection and annotation

Note cards, tags and other forms of annotation can encourage students to engage with and reflect on the 'visible text', but developing readers also require help engaging in the heuristics and pattern-finding that allow them to engage in the interpretive problems of the 'invisible text.' For this, SMD provides a number of **heuristic graphic organizers** that help developing readers find patterns, explore relationships, and build alternate representations of the text. These representations help make explicit the sorts of domain thinking in which expert readers in the domain often engage implicitly.

SMD's organizers take the following forms:

Prompting Questions and Answers

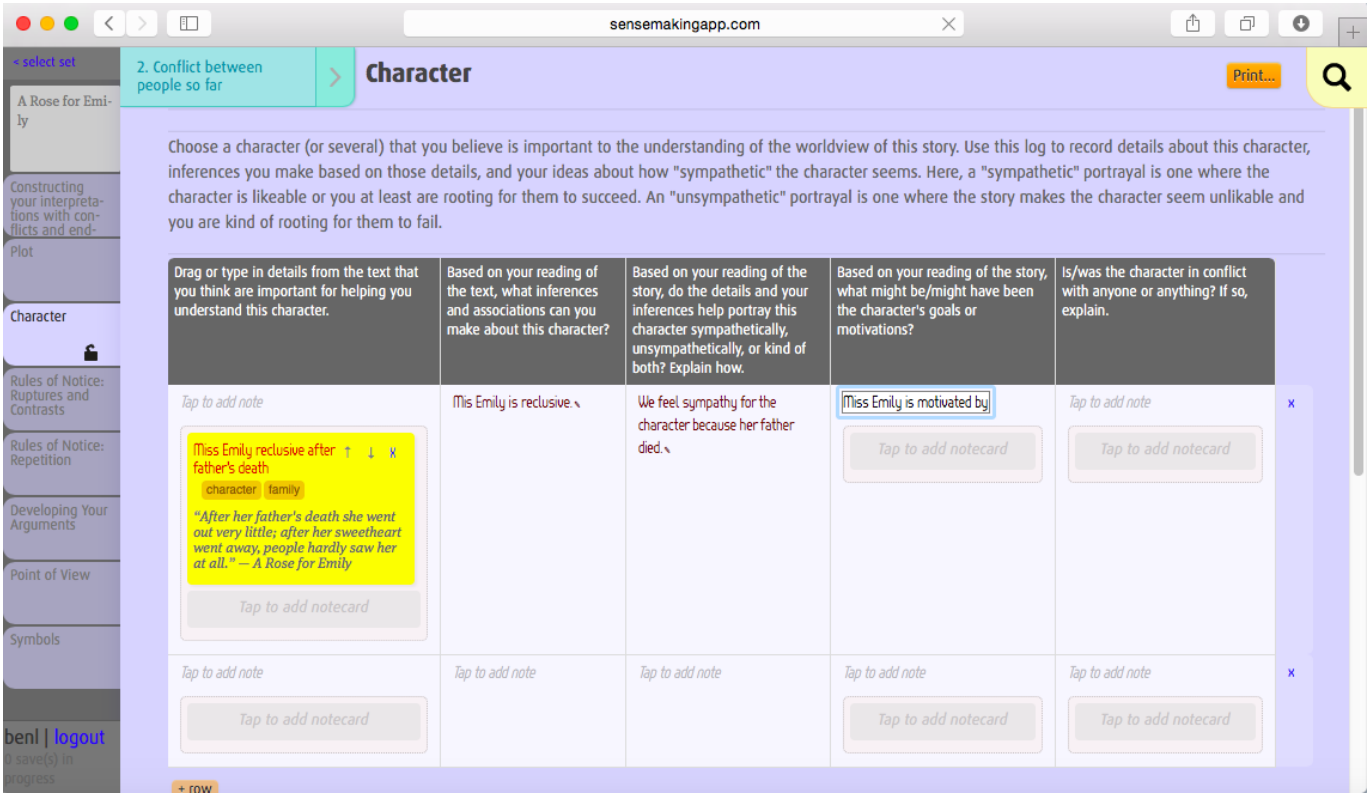
At the simplest level, an Organizer is similar to a worksheet: it needs to provide some instructive text, pose some questions, and provide room for students to answer the question. Teachers, authors, and curriculum developers can easily create a custom Organizer with any number of prompting text elements and text input fields. However, guidance on designing organizers for SMD focuses on organizers that structure student thinking around a discipline specific heuristic.

Tables

Tables provide a mechanism for comparing and contrasting elements. In SMD, teachers and curriculum authors can create table organizers that encourage students to think about a common set of questions for each highlighted text passage. For example, for a given note about character, a teacher might ask:

1. Based on your reading of the text, what inferences and associations can you make about this character?
2. Based on your reading of the story, do the details and your inferences help portray Orion sympathetically, unsympathetically, or both? Explain how.
3. Based on your reading of the story, what might be/might have been the character's goals or motivations?
4. Is/was the character in conflict with anyone or anything? If so, explain.

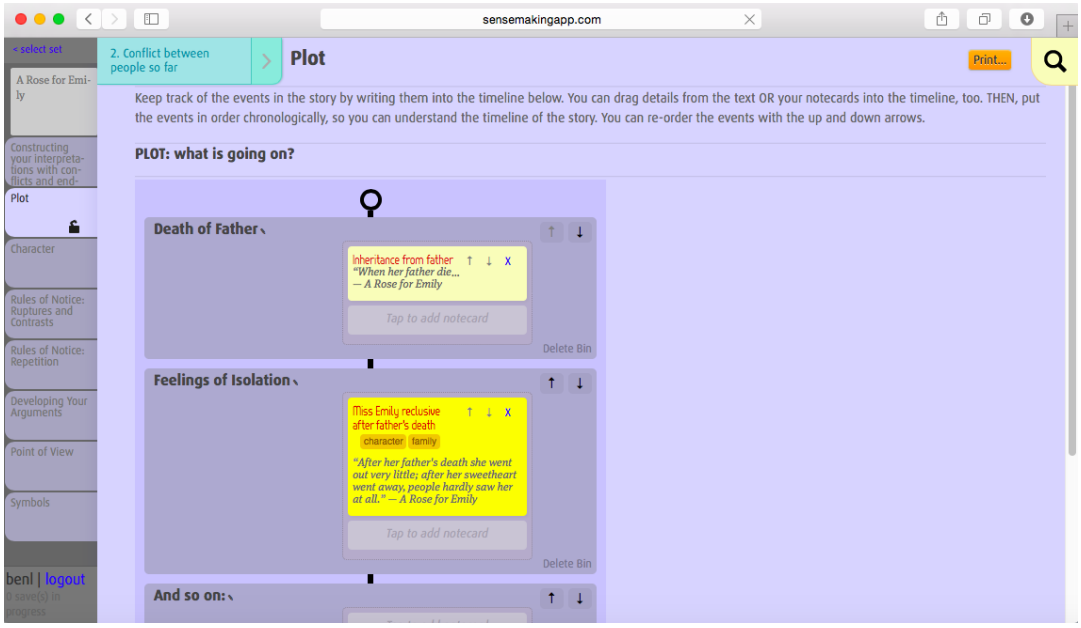
The repeated application of these questions helps students to begin developing more sophisticated reader habits of mind.



Timeline

Another common heuristic graphic organizer that is particularly helpful for readers in interpreting a text is a timeline. A timeline can help students decipher non-linear elements and ground the narrative in a coherent structure. In SMD, students can use a timeline to organize

their notecards, or a teacher might prompt students to create and maintain a timeline to track a particular element of the reading. In the following example, the organizer focuses attention on the chronology of events in the plot of a narrative. In history, such an organizer might focus on the chronology of historical events. This is a flexible organizer in that the student can add new rows and can re-organize the sequence of rows.



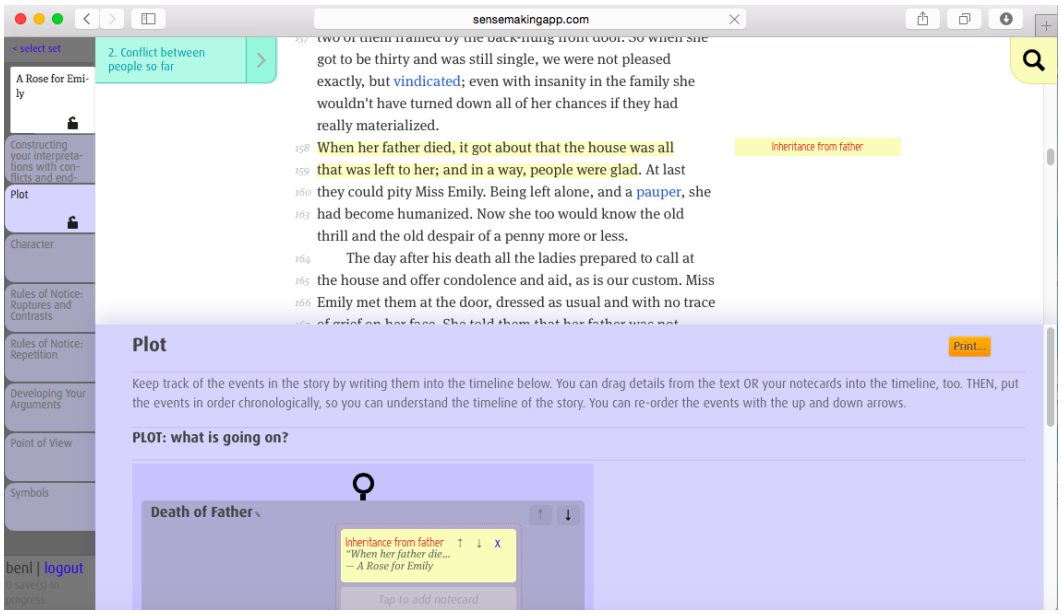
Open architecture

While prompts, tables, and timelines cover a lot of graphic organizers, there are many more forms that can be easily supported. SMD was designed with an open architecture to allow future development of heuristic graphic organizers appropriate for particular domains of analysis.

Organizers trigger review and reflection

Answering the questions posed by organizers requires students to look back through the text in order to identify relevant information. Since some organizers (like tables and timelines) encourage the use of notecards as supporting evidence, working with these organizers can prompt students to review the text and create new notecards for use with the organizer.

This constant back and forth between the text and sense making tools means that the design needs to support simultaneous views of the text and organizers. Supporting this mode of use was one of the central design principles behind the user interface design of the SMD. Students need to be able to quickly and easily open organizers, add notes, and review the text as they work. Organizers need to be always accessible and easily opened.



Supports Multiple Texts, Domains and Pedagogical Approaches

The SMD is envisioned as a tool that can be used throughout a school year by a variety of teachers in a variety of subjects: from social science to literature to science. As such, it needs to support any number of reading sources and any number of different disciplinary heuristics for tackling text comprehension. The tools in SMD support reading in a variety of settings, and are not limited to a single discipline. Organizers can be customized to reflect the different modes of reasoning in each discipline. Curriculum designers, including teachers, can split text into sections as is appropriate to the problems of the text, add custom activity prompts that guide student activity, design graphic organizers that are appropriate to a particular line of inquiry. The long term vision for the tool is one in which teachers are able to enter their own texts and customize scaffolding for their own classes: an open architecture for authoring, but grounded in a research based conception of the demands of disciplinary text comprehension.

As a proof of concept, we have developed a flexible workable authoring and content delivery system that is capable of supporting a variety of kinds of texts. The current tool has been implemented with literature and historical primary source documents.

However, while it is possible to create custom units in SMD, the tool in its current state requires a fairly high level of technical expertise, requiring authors to do a bit of HTML coding in order to enter reading sources with a functional, but not particularly teacher friendly user interface. Developing a user interface appropriate for teachers is the focus of the next grant we are pursuing.

Support for classroom management

Mundane aspects of tools can make or break their success in a classroom environment. Too many digital tools are not designed for use in a classroom, where there is a need to support

multiple users on shared devices overseen by a teacher. Some of the challenges in designing for the classroom include:

Student-friendly user ids and logins

Students in most modern classrooms use a variety of computer systems requiring logins. They are familiar with logging into systems with a user id and a password. Most schools already provide students with a single user id that they use throughout the school day. When we introduce a new tool into that ecosystem, it is important for the tool to be able to interface with the existing systems. As such, SMD was designed to support administrators in implementing user ids that matched students' existing logins. This way, students do not have to learn a new set of logins to use the tool. While in an ideal world we would be able to simply piggyback on top of login systems used by the school, in practicality, with the myriad of systems used by schools, it is impossible to support them all even if they did have an open API (application program interface) that allowed external applications to make use of the login security.

Anonymizing student ids

Another consideration with such an implementation is anonymizing student data for research purposes. User IDs often include identifying information about students. So a secondary system for working with the data in an anonymized fashion is necessary.

Roster management

In addition to standard user management tools (e.g. password reset, adding/deleting users), a classroom friendly tool also needs to account for some unique issues. For example:

- Students all need to be assigned to a teacher. The teacher needs to be able to administer student user accounts. But an administrator also needs to be able to do the same thing.
- Students might be in more than one class using SMD, so their records might be administered by more than one teacher.
- Students might change classes during the semester, requiring their record to be moved from one class to another, or added or dropped.
- Students' enrollment in a particular class is temporary. They are only a part of a class for a short period of time (e.g. a semester) and then they move on, so when they log in, they should only see their currently active classes.

Support for research

As a tool for research, we developed a number of features to facilitate researcher analysis.

Data dump

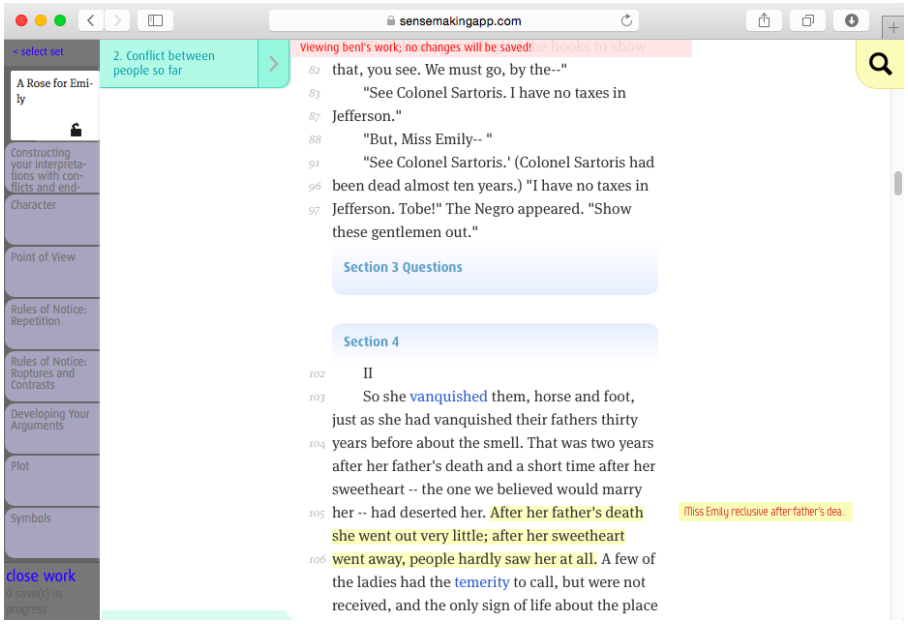
At the simplest level, a researcher can "dump" all of the data in SMD: this provides a printout of all the notecards created by the student, all the section questions answered by the student, and all of the graphic organizers created by the student. The challenge here is that graphic organizers are

by nature visual, so simply exporting all of the text of organizers into a comma delimited file is not adequate. The same can be said for notecards: you need to view a notecard in the context of the text in order for it to make sense. So while a dump does provide all of the data, it doesn't provide the data in a format that is particularly useful for analysis.

Teacher view of student work

In order to view student work in the context, teachers and researchers can log into SMD and view student work exactly as the student sees it. This is essentially a read-only mode to prevent teachers and researchers from accidentally changing student work. They can view the text, the notecards and the highlighted text they refer to, the section questions embedded within the text, and the heuristic graphic organizers.

This view is particularly useful if you want to investigate the work of a particular student in detail. It is less useful for comparing students or trying to look at student work on a global level.



Interactive research tool

To facilitate analysis across students, we developed an interactive research tool that provides an overview of student work for a particular classroom. With this tool, teachers can view all students simultaneously and get a sense for where and how students highlighted and added notecards for a particular text. Researchers can then zoom in and out to view the work by sections or by a particular sentence, giving them a variety of lens scales to analyze the data. This makes it much easier for a researcher to browse the data in order to identify interesting patterns and students to focus on. They can then use the "Data dump" and "Teacher view" tools for more in-depth analysis.

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