Information Infrastructure System

Adolescent Literacy Support Project (ALSP)
Activity Brief

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I. Was is ALSP?

The aim of the Adolescent Literacy Support Project (ALSP) is to create classroom learning environments that support increased science achievement through better and more purposeful reading. We are building and employing three literacy support tools for students' and teachers' use in the classroom. The use of these tools is coupled to disciplinary text and science assessment. Teachers couple their use of the tools with disciplinary text and science assessment as they implement the curriculum "Investigations in Environment Science." We want to examine if increased opportunities in reading allows high school learners to better engage in science inquiry and increase their reading achievement and if these more structured reading opportunities in science influence learners' science achievement.

Conceptual Frameworks Guiding our Efforts

We are guided by the Reading to Learn framework that views the act of reading as an interactive-constructive process (Yore et. al. 1991). In this view, students develop meaning from texts by negotiating an understanding between the text and their prior knowledge and experiences with the subject. Negotiation occurs within social contexts which can support the meaning making process. The Reading to Learn framework recognizes that expert readers have and apply a toolkit of strategies during this process (Pressley, 2000; Pressley & Wharton-McDonald, 1997). Less expert readers lack this toolkit or facility with strategies use often fail to gain information from text.

The reading-to-learn framework places an emphasis on two equally important issues for less-well prepared readers. The approach advocates explicit instruction particularly around strategies. The goal is to apprentice learners into the culture of power and schooling and into the disciplinary community of practice. Students must understand that they can approach text to gain information and know how to approach text in order to comprehend its message.

II. What core problems of practice does ALSP address?

Adolescents do not have adequate skills to read-to-learn in science

By the time students in urban settings reach high school, they often lack the literacy competence to tackle the reading materials from which they are expected to learn. While these skills are still being developed in English and reading classes, students are ill-equipped to grapple with reading in other subject areas, such as science, where reading is still demanding but the ability to read is assumed and teachers' focus is, thus, on the content.

The opportunity to read about and analyze data and text from a variety of sources is of great benefit to students. However, students must have good strategies in reading-to-learn to take full advantage of the units' activities (i.e., decision-making, data analysis and synthesis, and communication) and ensure their development of the conceptual underpinnings of science. Many urban students come to high school unprepared to tackle the reading and data-analysis tasks required of inquiry science units. Consequently, they do not leverage texts to engage in inquiry. They are poorly prepared for domain-specific content area science reading requirements and lack strategic literacy skills to support the kind of reading necessary for success in high school and beyond.

Science teachers do not sufficiently use texts to support students' science achievement

Domain-specific teachers are often under-prepared to use text in their teaching. Specifically, science teachers do not sufficiently use texts to support students' science achievement. A primary reason for this deficiency is that these teachers often have little *experience* with supporting reading comprehension in their subject areas while teaching subject area concepts.

Disciplinary texts are often difficult to comprehend and present a problem for teachers who need to use the texts to help students gain deeper access to the subject area concepts. They are often written in formal, third person discourse. The sentences are often complex and multi-clausal sentences are typical. Transitions are often subtle. Definitions are embedded within text and the vocabulary is difficult. Even when written "at grade level", disciplinary text has difficult vocabulary that is not directly connected to the content but is a necessary part of the message about the content. Disciplinary text also has familiar vocabulary that uses words in sentences in unfamiliar ways.

Most science teachers lack reading expertise to guide students through science texts

Science teachers rarely think about themselves as teachers of reading in science, although recent research indicates that science teachers identify reading as a frequently used form of science instruction. Secondary teachers often feel that they lack the expertise to teach reading. This perception of lack of knowledge often results in teachers enabling students not to read – that is, teachers may lift out important material and discuss the materials with students rather than having students closely read and strategically interact with text. Teachers often "wing it," calling upon their previous instructional experiences, their assumptions and beliefs about students' abilities, and when available, information obtained through one-shot or short-term professional

development to supplement their instruction. Given the growing numbers of second language learners in U.S. classrooms, it seems clear that leaving teachers in the classroom to "wing it" is not a viable solution for educating diverse urban and bilingual students.

Science teachers must cover large quantity of content in a limited time frame

Science teachers, and other domain-specific teachers at the high school level, have a great deal of material that must be addressed during a school year. In school, they present students with content, usually from textbooks or from trade book texts, and move through it fairly quickly. Teachers often worry that there is barely enough time for science learning without the addition of reading activities. We believe that when students learn to read more effectively, they will learn science more deeply. Thus, less time must be spent on reiterating concepts that students should have learned days or weeks before.

III. What are the key features and functions of ALSP?

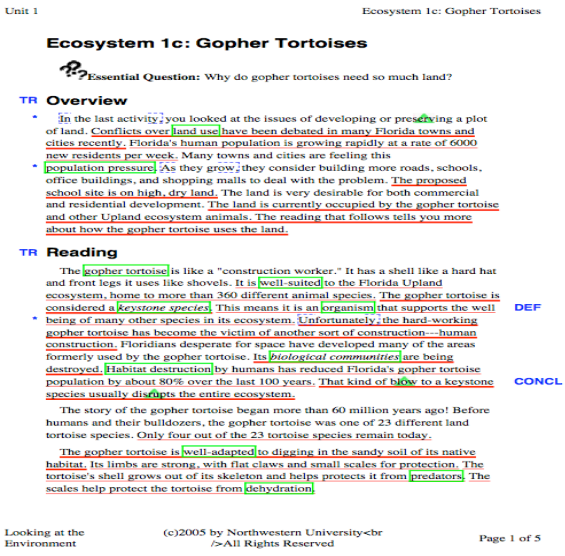
Three major types of tools are being employed to support learners' literacy in science inquiry: annotation, double-entry journals and summary writing.

Annotation

Annotated texts are readings that have been subjected to content analysis. The analysis coding highlights main ideas, supporting ideas, difficult content and vocabulary, transitions, conclusions, evidence, and inferences implicit in the text. Teachers use the annotations to scaffold readings.

With the annotation tool, students can do the annotation directly onto the computer program, rather than in their textbook. Students learn to annotate text so that they become more active readers. This allows students to see where they have missed elements of annotation, such as main and supporting ideas.

Prototype of electronic annotation tool



Unit 1 Ecosystem 1c: Gopher Tortoises

Ecosystem 1c: Gopher Tortoises

Essential Question: Why do gopher tortoises need so much land?

TR **Overview**

In the last activity, you looked at the issues of developing or preserving a plot of land. Conflicts over land use have been debated in many Florida towns and cities recently. Florida's human population is growing rapidly at a rate of 6000 new residents per week. Many towns and cities are feeling this population pressure. As they grow, they consider building more roads, schools, office buildings, and shopping malls to deal with the problem. The proposed school site is on high, dry land. The land is very desirable for both commercial and residential development. The land is currently occupied by the gopher tortoise and other Upland ecosystem animals. The reading that follows tells you more about how the gopher tortoise uses the land.

TR **Reading**

The gopher tortoise is like a "construction worker." It has a shell like a hard hat and front legs it uses like shovels. It is well-suited to the Florida Upland ecosystem, home to more than 360 different animal species. The gopher tortoise is considered a *keystone species*. This means it is an organism that supports the well being of many other species in its ecosystem. Unfortunately, the hard-working gopher tortoise has become the victim of another sort of construction---human construction. Floridians desperate for space have developed many of the areas formerly used by the gopher tortoise. Its *biological communities* are being destroyed. Habitat destruction by humans has reduced Florida's gopher tortoise population by about 80% over the last 100 years. That kind of blow to a keystone species usually disrupts the entire ecosystem. DEF CONCL

The story of the gopher tortoise began more than 60 million years ago! Before humans and their bulldozers, the gopher tortoise was one of 23 different land tortoise species. Only four out of the 23 tortoise species remain today.

The gopher tortoise is well-adapted to digging in the sandy soil of its native habitat. Its limbs are strong, with flat claws and small scales for protection. The tortoise's shell grows out of its skeleton and helps protects it from predators. The scales help protect the tortoise from dehydration.

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Double-entry journals (DEJ)

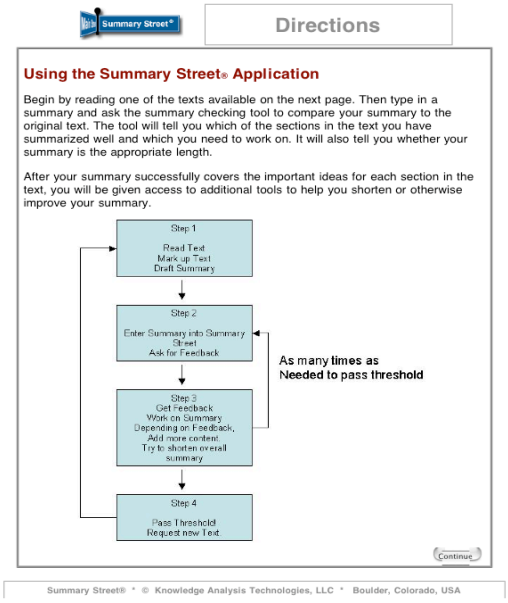
Double-entry journals are reader-response documents that provide a graphic structure for students to monitor and document their understanding of science texts. Students highlight text that they find problematic. Students then engage in a variety of text- and thought-organizing tasks, such as coupling main and supporting ideas or supporting their arguments with evidence from the reading. DEJs provide an opportunity for students to read actively and reflect on their reading. DEJs allow teachers to focus student reading on specific ideas or text structures, such as vocabulary, main ideas with supporting ideas, etc.

Summary writing / Summary Street

Effective summarization, capturing the gist of science text as well as major concepts and details supporting those concepts, is an important reading skill that supports science inquiry. In summarizing, students must comprehend the text, identify main ideas, differentiate secondary ideas, and condense the information while integrating essential elements in a written text that is a succinct, logical, and coherent representation of the original source.

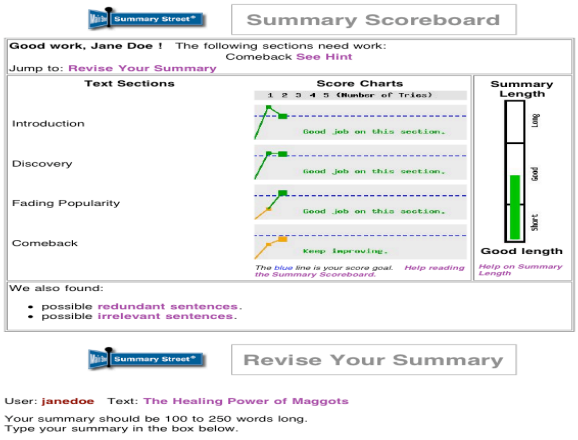
Summary Street helps students summarize by giving feedback on content, spelling, redundancies, and irrelevancies. Teachers can set up any text to be summarized; the tool analyzes the text and allows teachers to adjust many settings, such as difficulty thresholds, desired summary lengths, and sensitivity to plagiarism.

Summary Street gives instructions and provides tips on good summary writing up front.



The program allows students to get instant and private feedback on their work. It provides teachers with the opportunity for one-on-one interaction with students. This will be the first large-scale use of the Summary Street tool in an urban high school setting.

After typing in a summary, students are given a score for each section (subheading) of the text. They are also told if there are spelling errors, redundant or irrelevant sentences, or plagiarism. They can then revise their summary and get continuous feedback.



IV. What value does ALSP add to the work of teachers and students?

ALSP adds value to the work both of teachers and students. It structures the reading of science text for students and helps teachers connect reading activities to science content.

ALSP makes science text more considerate to readers.

Considerate text refers to connected text that is structurally helpful to the reader, in terms of content, and is helpful to the teacher in connecting reading to science content. For example, considerate text might make use of structures like section headings, bolded words, or questions within the extended text in order to guide the reader through the reading.

Tools in ALSP encourage and create structures for reading-to-learn.

Teachers use already *annotated text* to scaffold student readings of science content. As students annotate texts on the computer, they become more active readers.

Students engage in a variety text- and thought-organizing tasks when using the electronic *double-entry journal,* such as coupling main and supporting ideas or supporting their arguments with evidence from the reading.

Summary Street helps students summarize by giving feedback on content, spelling, redundancies, and irrelevancies. The program allows students to get instant and private feedback on their work. It provides teachers with the opportunity for one-on-one interaction with students.

ALSP supports a literacy-focused classroom culture through professional development

The professional development sessions are specifically designed to support literacy during science teaching. In particular, workshops throughout the year focus on helping teachers to use

evidence of reading comprehension to shape and modify science instruction. It also focuses on the creation of formative assessment feedback strategies that make students classroom expectations clearer for both students and teachers. Our goal is to deepen the level of reading and science learning across all classrooms.

V. How is ALSP being developed?

Researchers at University of Illinois at Chicago, Northwestern University, and University of Chicago are working in collaboration with partner Chicago public high schools. With the help of Inquirium, LLC, and Pearson Knowledge Technologies, we are developing computer-based web programs to further help students in their reading-to-learn efforts. We are guiding science teachers through the "Investigation in Environmental Science" (IES) curriculum using the ALSP tools: annotation, double-entry journals, and summary writing.

The "Investigations in Environmental Science" (IES) is a high school inquiry-based environmental science curriculum funded by the National Science Foundation. It makes use of geographic visualization and data analysis tools. Students take on the role of environmental scientists to address several challenges through an environmental science decision-making model.

Students learn about the importance of the intelligent use of land, energy and water in sustaining the environment. Students participate in activities that aim to develop their complex thinking skills. These students analyze data and text-based information to inform their environmental decision-making. At the end of each unit, students must make recommendations for sustainable uses of resources.

Activities address authentic and contemporary environmental issues that these students will face as adults. We conjecture that, to be successful, students must employ reading-to-learn strategies that allow them to take full advantage of the units' activities.