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Online support for the self-regulated learning of gifted students

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Online Support for the Self-Regulated Learning of Gifted Students

Gifted learners have several characteristics which make them especially good candidates for the use of educational technologies at all levels of learning. Many of these learners are independent in their learning preferences, often not liking to work in groups or preferring to tackle a different topic or problem than the rest of a group. Clearly, the use of online tools, resources, and services offers an optimal match to this style of learning as well as gifted students' preference for complexity and novelty in the learning experience. Students can choose topics, researchable questions, modes of exploration, and models for representation of ideas with the assistance of varied online tools, resources, and services.

A desire to make connections in order to understand a difficult problem is another key characteristic of gifted learners. They love to explore cause and effect relationships and to delve deeper into the "why" of a particular phenomenon. This characteristic of curiosity is present in very young gifted children as well as gifted adults. What better tool to help them to make such connections — many of which are inspired by extracurricular learning experiences — than the Web, which hypertextually links learners to interrelated topics and issues?

Another characteristic of note in gifted learners is their preference for complexity. Not only can they think abstractly at earlier ages than their age peers; they can also engage in more complex thinking, using multiple higher order skills in their learning processes. Teacher-developed scaffolding that ensures an emphasis upon higher levels of thought in the context of resource choices may help gifted learners to explore complex topics in project-based formats. Thus students can engage in analysis, synthesis, evaluation, and creation of a product of choice. Moreover, they can conference with their teachers by email about the project, set and revise timelines for completion of project components, and

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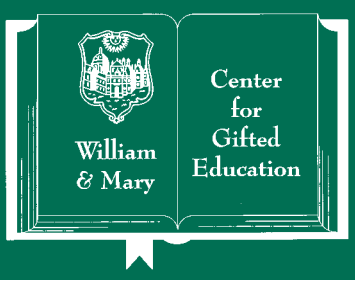

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confer with other students as they are learning. The teacher, in turn, can provide question probes for deeper exploration and ensure that the resources explored encourage consideration of multiple perspectives upon the topic being investigated.

The characteristic of creative thinking is also central to the makeup of gifted learners. These students many times have greater fluency of expression, flexibility in thinking, and elaboration of ideas than do same-age peers. Original thought emerges from the capacity to ruminate in unique ways as well as at deeper levels with reference to an area of inquiry about which gifted students have considerable knowledge. Thus the use of multiple and varied educational technologies with the gifted can provide an important toolset for encouraging creative expression and self-generated learning products.

The exploitation of these characteristics of the gifted for learning requires flexible use of time and resources. Gifted students have the potential to advance their learning exponentially if technology can be systematically and supportively applied to the learning process. Yet teachers and parents are the gatekeepers to making this intention a reality for the gifted. They must see themselves as facilitators of individual learning rates, styles, and levels. They must be comfortable with moderating differentiated learning agendas and outcomes as long as standards are met. They must be able to scaffold the skills of learning to higher levels and beyond the standards in order to accommodate the gifted. Thus teachers and parents are key to changing learning structures to favor student-centered approaches and to respond to more individualized learning needs. (VanTassel-Baska, 1998; 2003)

Self-regulated Learning

The idea of self-regulated learning for the gifted has deep roots in Bandura's self-efficacy research (Bandura, 1989; Bandura, Caprara, Barbaranelli, Gerbino, & Pastorelli, 2003) and Csikszentmihalyi's intrinsic motivation theories about gifted learners (Csikszentmihalyi, 1996; Csikszentmihalyi, Rathunde, & Whalen, 1993). Many models of curriculum for the gifted also include major emphases on project-based or problem-based learning approaches (i.e., Gallagher & Stepien, 1996; Gallagher, Stepien, & Rosenthal, 1992; Renzulli & Reis, 2003). Such models are typically characterized by the following features:

1. The learning is student-centered, based on aptitude and interest.
2. The problem or topic of interest is ill-defined or ill-structured.
3. The learning requires application of multiple higher-level thinking skills.

"Gifted students have the potential to advance their learning exponentially if technology can be systematically and supportively applied to the learning process."

4. The process for problem solving is unclear (i.e. students cannot use predetermined algorithms to solve problems).
5. Access to multiple types of resources is essential to support effective learning.

The prototypical example of the use of technology for self-regulated learning is structured learning opportunities such as online coursework. Participation in online courses can help to develop deeper content knowledge, as well as providing broader applications for that knowledge. For the highly accelerated student, many universities utilize online courses to facilitate learning at more advanced educational levels. For example, Stanford's Education Program for Gifted Youth ("EPGY;" www-epgy.stanford.edu) developed courses for gifted learners delivered with a combination of CD-ROM-based content and online or telephone-based individualized assistance. Other universities allow students of high-school age and younger to attend online lectures or earn credit in correspondence courses. Many gifted learners wish to accrue college credits while in high school either to speed graduation or demonstrate their capacity to handle rigor, a key requirement for admission to many selective universities. For example, Advanced Placement ("AP;" e.g.; www.pen.k12.va.us/VDOE/Technology/VAPS.html) courses are now available on-line through selected educational agencies, including universities.

Web Support for Self-Regulated Learning

As an alternative to structured online coursework, a host of Web-based activities and resources can be exploited in learner-centered inquiry. Twenty different types of learning activities that make worthwhile use of what can be found and done online have been identified to date (Harris, 1998 & 2005). Of these, the following three seem to be among the most appropriate for use in gifted students' self-regulated learning.

1. Web-based topic exploration

One of the most popular ways to scaffold students' self-regulated problem-based inquiry is with teacher-developed WebQuests (webquest.sdsu.edu/webquest.html), which are "inquiry-oriented [activities] in which most or all of the information used by learners is drawn from the Web." WebQuests are designed to "support learners' thinking at the levels of analysis, synthesis and evaluation" (webquest.sdsu.edu/overview.htm). Yet many WebQuests are structured for use only by groups of students in classroom-based situations, and often are more heavily scaffolded than many self-

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directed learners need. Rather than selecting such predetermined paths through subject matter, gifted learners may benefit more from allowing their own emerging questions and interests to guide their learning. To do so, they should use a combination of online indexes, search engines, question-and-answer sites, and telementoring services.

As you probably already know, there is an abundance of information available via the Web. Educational sites that prescreen this information for content and reading levels appropriate for children and teenagers are becoming more common. Notable among these are, for example, indexes such as Library in the Sky's Student Home Page (www.nwrel.org/sky/index.asp?ID=2), B.J. Pinchbeck's Homework Helper (school.discovery.com/homeworkhelp/bjpinchbeck/), Fact Monster (www.factmonster.com), and search engines such as those found at Yahooligans (yahooligans.yahoo.com) or Ask Jeeves for Kids (www.ajkids.com). Self-regulating learners can use the searching and indexing features at these sites to find answers to many of their content-based questions.

Inevitably though, gifted learners will ask questions that can't be answered fully by using one of these sites or searching the Web with a filtered search engine such as Google's SafeSearch (www.google.com/help/customize.html#safe). Substantive answers to more complex or emerging questions may require, instead, either sustained or short-term interaction with subject matter experts. A convenient way to do this is via email or a Web-based discussion forum.

Yet in seeking to help gifted learners to communicate with subject matter experts, there is an instructional decision to make. Will responding to the student's query in a way that s/he will understand require an extended or a brief online conversation? Is it likely that an expert's response will inspire many more follow-up questions—or will this exchange be short-lived? How teachers and parents respond to these questions will suggest whether to suggest that a self-regulating learner consult a telementoring service or a question-and-answer site.

2. Question-and-answer exchanges

For students who are simply in search of an answer to a question or an explanation of a phenomenon, a question-and-answer activity might be most appropriate. These are usually quite brief in duration, lasting for only one or two conversational turns.

Question-and-answer activities often make use of "ask-the-expert" online services. Pitsco, Inc., has organized more than 300 such services into an index (www.askanexpert.com), making it much easier and more efficient for learners to find appropriate places to get their questions answered. The Ask an Expert site categorizes question-and-answer services into 14 subgroups (e.g., science/technology, health, arts, law). It also provides a search engine to help visitors locate and link to the service best suited to answer the question at hand—whether it is Ask a Volcanologist, Ask a Venture Capital Expert, Ask a Veteran, Ask a Veterinarian, or another service on the site's ever-expanding list.

The Center for Improved Engineering and Science Education (CIESE) at Stevens Institute of Technology has compiled another helpful index of ask-an-expert sites (k12science.ati.stevens-tech.edu/askanexpert.html) that organizes question-and-answer services by broad curriculum areas, such as "Science and Math" and "History and Social Studies."

While many question-and-answer services serve learners of all ages, others are designed specifically with primary through secondary learners in mind. Sponsored by Washington University's Medical School in St. Louis, the Mad Sci Network (www.madsci.org), for example, "collective crania of [more than 700] scientists answering questions in many areas of science," offers an Ask-a-Scientist service with K-12 students in mind. The site offers a database of thousands of already-posed-and-answered questions that visitors are encouraged to search before sending in science-related queries that have not been posed previously.

Other question-and-answer sites offer similar collections of previously posed questions. Notable among these are How Things Work (howthingswork.virginia.edu/home.html), Ask Dr. Universe (www.wsu.edu/DrUniverse/), and Go Ask Alice (www.goaskalice.columbia.edu/). These collections of questions and answers should be consulted as the Mad Sci Network organizers have suggested: before sending in a question for an expert to answer. This is to ensure that participating experts are not asked to answer similar questions multiple times, and so that users get the information they're seeking as quickly as possible.

3. Telementoring

There are now more than 605 million people worldwide with access to on-line information and computer-assisted communication (www.nua.ie/surveys/how_many_online). Many of these millions are subject matter specialists whose knowledge encompasses a wide spectrum of expertise in many content areas of interest to gifted learners. Telementoring efforts, such as the International Telementor Program (www.telementor.org), CyberSisters (www.cyber-sisters.org), and the Electronic Emissary Project (emissary.wm.edu) bring volunteers from this group into contact with K-12 learners virtually to communicate directly and longitudinally with students who are studying about the experts' specialties.

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According to a set of recently-released national guidelines, telementoring – also called "E-mentoring"

- Is a caring, structured relationship.
- Focuses on the needs of the mentored participants.
- Adds value to the lives of those involved.
- Uses technology to connect people across time and/or distance.

(Source: National Mentoring Partnership, "Elements of Effective E-Mentoring Practices," http://www.mentoring.org/common/effective_ementoring/effective_ementoring.adp?Menu=nav_left_run.adp&Preload=resources)

Telementors typically communicate with students over time, both asking and answering questions as they guide students' learning and thinking in a particular discipline. Telementors can also help learners to explore career options in a personal and active way, as they do in online efforts such as icouldbe (www.icouldbe.org), iMentor (www.imentor.org), and NetMentors (www.netmentors.org). Though the operational details of telementoring differ from project to project, typically, communication continues for months, semesters, or years—and is often characterized by genuine interpersonal connections forming between mentors and learners.

Matching Web-based Resources and Activities to Learning Needs

It is particularly important for us, as educators, to help gifted students understand which kinds of online resources—content indexes, search engines, question-and-answer sites, or telementoring services, are most appropriate to consult for each type of question they have at each stage of their self-regulated learning.

If a thorough search of content indexes and "safe" search engines do not yield the type or depth of information that a gifted student seeks, question-and-answer services should be consulted – first to see if they have information stored from previous queries that can satisfy the student's curiosity. If not, then a question can be offered through an appropriate Q-and-A service. Answers from experts may spawn more questions, and a few can usually be posed as follow-up questions to the same service. More than a few probably require a longer-term and more in-depth interaction with a subject matter expert – an online, content-related mentoring relationship.

In exploring topics of interest, gifted learners often do not need the sophisticated level of understanding offered by a subject matter specialist. Telementoring services are not meant to be used interchangeably with content indexes or question-and-answer services. They should not be gifted learners' first (or second) stop when looking for information. Instead, they should be consulted when a content-related question is complex enough to warrant a direct and interactive response from someone very knowledgeable in a particular subject area. The question should be interesting enough for a student's curiosity to be sustained over time and through multiple interactions with a knowledgeable and communicative mentor.

Conclusion

The match of Web support for the self-regulated learning needs of gifted students is a critical one. This article has begun to explore key opportunities and strategies for deliberately forging such connections. The roles of teachers and parents as facilitators in this process can enhance the overall goal of such learning: to spur student interest to new levels of original and creative work.

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