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**Teachers Learn About ADHD on the Web:
An Online Graduate Special Education Course**

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Abstract:

Describes several possibilities for using Internet-based applications to enhance teacher preparation to better serve students with attention-deficit/hyperactivity disorder (ADHD). Features of the Web-enhanced course, The Learner with ADHD which offers a general introduction to characteristics, treatment and education of students with ADHD. INSETS: Perspectives on distance learning; WebCT-an online course tool.

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Can distance learning fill the gaps in both preservice and graduate education for teachers of children and young people with attention-deficit/hyperactivity disorder (ADHD)? Technological applications, including the Internet, are opening new horizons in teacher education, inservice training, graduate programs, and staff development (see box, "Perspectives on Distance Learning").

This article describes some possibilities for using Internet-based applications to enhance teacher preparation to better serve students with ADHD. We present information on an online graduate course that addresses issues and interventions in ADHD. The focus of the course is the preparation of general and special education teachers learning to use higher-end technology through teacher education faculty as they gain important understanding in the growing area of ADHD.

A GRADUATE COURSE--THE LEARNER WITH ADHD

The Web-enhanced course that we have developed--The Learner with ADHD--offers a general introduction to the characteristics, treatment, and education of students with ADHD. Offered through the Department of Special Education at the University of Florida, the graduate course targets full-time teachers enrolled (part-time) in a graduate program. The course emphasizes identification and educational issues for students with ADHD while reviewing related legislation, identification concerns, and similar issues that apply to the general curriculum environment (Figure 1 shows the course's home page).

The course involves three distinct themes: A person with ADHD; a family member of a person with ADHD; and a teacher of a person with ADHD. Directed by these three perspectives, participants explore ADHD issues via online activities (see Table 1 for an outline of content within the three themes).

Course development has been a collaborative effort between two special education professors. One professor employed his technology expertise in hyper-text mark-up language development while the other special educator planned and delivered the course content with the assistance of University of Florida staff. Fortunately, the WebCT tool facilitated the creation of this Web-based course, minimizing technology expertise and related training (see box page 22, "WebCT").

To support course themes, we developed three online components enabling learners to attain course objectives:

1. "Course Basics" includes a section dedicated to typical information found in a teacher preparation course (i.e., course syllabus, schedule).
2. "Quest" incorporates Web-based applications that (a) enhance traditional instruction, (b) offer access to relevant Web-based resources, (c) direct interactive activities, and (d) incorporate online library resources to bridge the gap between research and practice.
3. "Case Study" integrates video, animated images, text, and sound to create problem-solving situations.

COURSE BASICS

The rationale for Course Basics springs from our efforts to alleviate initial student apprehension by offering familiar information via the Web. The section consists of four basic components: (a) an online course syllabus; (b) a class roster including e-mail addresses, student pictures, and teaching experience; (c) an online discussion forum for virtual interaction; and (d) a review section with online quiz and test questions.

ONLINE COURSE SYLLABUS AND CLASS ROSTER

The course syllabus contains information (e.g., class dates, topics) similar to what students would find on a traditional syllabus. The interactive nature of the Web, however, offers participants hyperlinks from class dates to additional Web pages that provide further clarity to the day's activity. Similarly, the Web offers a platform where student pictures, information about teaching experience, and individual e-mail accounts can be made available to all students. Students are expected to visit the course Web page and familiarize themselves with class participants. We believe student pictures and relevant information contribute to meaningful interactions within the course.

ONLINE DISCUSSION FORUM

Unlike traditional discussion that is often limited to classroom instructional time, The Learner with ADHD course expands student interaction via the Internet. Students are required to have an individual e-mail account and subscribe to the course listerv. Periodic updates and class announcements are reserved for the listserv; however, ongoing conversations are conducted on the Web discussion page.

Organized as a bulletin board, WebCT's online discussion provides the user with the ability to post, read, and search for participant messages. It is an important information source because it provides messages from the instructor, as well as collective questions, answers, and comments of students concerning course-related material. Questions may be posted directly from online notes regarding specific page topics; when searching for answers, the student is able to easily extract related online articles or resources. Meanwhile, WebCT's bulletin board function establishes a virtual forum where participants can read and respond simultaneously, thus providing participants an equal opportunity to be heard. Threaded under particular topics (e.g., diagnosis), conversations are organized to provide structure to student online discussions. Instead of communicating on unrelated topics, threaded discussions confine the virtual community to a specific on-going conversation.

REVIEW SECTION WITH ONLINE QUIZ AND TEST QUESTIONS

To offer students review and assessment opportunities, Course Basics integrates an online review and quiz/test section. Through the WebCT application, students have the opportunity to review pertinent information, complete sample quizzes, gain immediate feedback, and investigate suggested online resources. Also, students or groups of students--depending on the assigned activity--can complete questions or interactive activities related to assigned readings and course content. Currently, our question format varies, depending on need and course content.

Fortunately, the WebCT application offers five template formats for tests: (a) multiple choice, (b) matching, (c) short answer, (d) calculation, and (e) paragraph entry. Each format offers course administrators the ability to

- * Create content-specific questions.
- * Offer alternate test forms.

- * Limit the time a student can take a test.
- * Add related images, tables, or photographs that might elicit appropriate feedback.
- * Automatically grade the quiz.
- * Provide testing data on each student.

In addition, students can determine whether they complete an activity as practice or for course credit. Meanwhile, instructors are able to immediately track student progress, thus determining the effectiveness of the instruction.

CHALLENGE

Considering the widespread availability of Web-based ADHD resources, we decided to conduct many of the course-related assignments through the Internet. Developed in an area titled "Challenge," students are encouraged to individualize their learning and contribute additional information for fellow students. Here's how it works:

1. We send our students on a Web-based Challenge to gather information on ADHD or a related topic (e.g., legislation).
2. We ask students to create challenges (Web-based assignments) for their fellow students.
3. Students post the completed challenges in their own assigned section.

Immediately available to all participants, this section of the online course is password protected, limiting who can alter posted information. For example, for online individual or group presentations, WebCT has created a student area assigned (by the instructor) to a specific student. Accessible by all, only individuals with developer access can modify the page or contribute additional comments or related information.

To prepare students for their challenges, we identify resources and assign projects including

- * Online readings from various journals, newspapers, magazines, and related online resources.
- * Investigation and identification of issues (e.g., legal, medical) in serving students with ADHD.
- * Location of Web-based resources (i.e., effective searching) and evaluation of relevant content as it pertains to education and treatment for students with ADHD.
- * The creation of a presentation of effective educational interventions for people with ADHD.

ONLINE READINGS

As in many other teacher preparation courses, we assign students in our course readings from a special education textbook (e.g., Lerner, Lowenthal, & Lerner, 1995). This text provides an overview of characteristics, issues, and classroom interventions for people with ADHD. The readings are supported by a glossary of key terms that are posted for students to refer to as they read.

The "Glossary" button, which is accessible across the site, takes students to the Glossary Browser, where they may view all glossary entries or search for specific keywords. Organized in alphabetical order, the glossary browser offers immediate access to key terms related to ADHD content; related definitions are hyperlinked to each other throughout the glossary. Furthermore, illustrations and corresponding Web-based resources (e.g., animated images, photographs, and video clips) are linked to keywords to enhance understanding.

In a related assignment, we direct students to online readings pertaining to assessment techniques, general characteristics, and instructional modifications. From the syllabus area of the Web site, hyperlinks guide students to relevant online journals, newspapers, and other resources. Here are some examples:

Journal of Applied Behavioral Analysis

<http://www.envmed.rochester.edu/wwwrap/behavior/jaba/jabahome.htm>

The Washington Post <http://www.washingtonpost.com>

Time/Warner's Pathfinder Network <http://www.pathfinder.com>

LDOnline <http://www.ldonline.org>

By incorporating online readings, we expand content understanding while introducing students to various Web-based resources for future use.

ISSUES

The issues activity enhances students' ability to locate, interpret, integrate, and analyze current information on ADHD issues. One resource that we have developed for this activity is "Ask the Experts," a Web-based component devoted to first-person accounts concerning ADHD. Here, parents, pediatricians, psychologists, teachers, and other professionals provide expert opinion regarding issues in ADHD. For example, students can click on a picture of the following:

- * A parent to hear her views about medication and her young child.
- * A nurse practitioner to hear about medication and young children from her experience.
- * A teacher to hear about medications effects on young students during the course of the day.

Student assignments focus on gathering information from the experts, seeking their own "experts" from other sources, and synthesizing their information to create defensible opinions.

An integral part of resources identification involves conducting an effective search. Thus, a portion of the issues assignment features structured practice and helpful hints in using online databases (i.e., ERIC, at <http://www.accesseric.org>) effectively. Fortunately, recent efforts on the part of online databases have resulted in the creation of detailed guides and tools to assist users in conducting searches. To foster further understanding, we have developed an online tutorial for ERIC featuring ADHD terms and educational interventions. Combined with current online supplements (see <http://www.cec.sped.org/ericec/ericecer.htm>), students are directed to get the most from their queries. We hope that improving access to relevant resources will improve student research experience and will encourage further investigation.

EFFECTIVE SEARCHES

An especially important part of Web integration--one that is critical to its effective use--is developing the ability to evaluate the instructional value of an educational Web site. Too often, we have witnessed preservice and inservice teachers spend hours searching the Web for relevant information only to "settle" for a Web site inadequate for their educational needs.

To address information access and subsequent evaluation pertaining to educational Web sites, we have developed guidelines and a related activity for information exploration. First, we introduce students to multiple search engines located on the Web (e.g., AltaVista, Lycos). We direct students to the various search tools and explore how they are actually designed and identify the specific rules--for searching--for each tool (see Figure 2). Practice activities (e.g., Web scavenger hunts) reinforce effective searching as students compare the various searching tools.

After students become competent in site location, they investigate site evaluation and its relevancy to student needs. For this exercise, we have developed a series of questions and a related evaluation form to examine a site's effectiveness. Our goal is to create inquisitive learners who seek to identify Web sites not only for the subject area but also for specific student educational needs. Thus, as one of the Challenges, students are required to search, locate, and evaluate several Web sites that pertain to ADHD. As they complete the Challenge, they must apply their Web-based resources to a teaching context, where they consider their target audience

and appropriate instructional applications. We also challenge participants to consider how they might integrate the Web site into a specific classroom lesson.

PRESENTATIONS

It is important for our students to be able to integrate their learning in a way that enables them to effectively communicate with others about ADHD. As students develop online presentations that address effective teaching practices for learners with ADHD, they extend their learning to a point where they now teach others how to better serve learners with ADHD.

The WebCT Student Presentation Tool makes participants into course authors by allowing them to place material onto the WebCT server, which other students can then access. Using the Student Presentation Tool, students create multimedia Web-based presentations featuring research-based ADHD interventions. Assigned specific interventions, students are directed to locate and disseminate research findings related to their topic.

The goal is to create a database of interventions that can be successfully integrated into the classroom setting. Similar to the University of Virginia, Office of Special Education, online database of intervention techniques (see <http://curry.edschool.virginia.edu/go/specialed/information/interventions.html>), we hope to add to these presentations offering current and future teachers an online resource for research-based effective teaching in the area of ADHD.

CASE STUDIES

The final section of The Learner with ADHD site features several Web-based case studies. Case-based instruction is a curricular innovation that can train preservice and inservice teachers to analyze situations, formulate action plans, and evaluate those actions with respect to specific variables (Greenwood & Fillmer, 1997; Shulman, 1992). The case method creates an environment that permits sustained exploration of issues. This method increases understanding of problems and opportunities that teachers encounter in their day-to-day activities.

Generally, cases are designed to elicit active analysis and interpretations by users (i.e., preservice and inservice teachers). By integrating the Internet into case-based instruction, we enhance the traditional text-based case by providing extended examples, thus building a macro-case. To bridge the gap between theory and classroom practice, the Web-based site features the following interactive components: video and audio clips, photographs, images, interactive forms, links to Internet resources, and discussion formats.

An example of a Web-based case featured on the ADHD site is the case of Joey (Smith & Jordan, 1998). Designed to help current and future teachers explore issues related to the education of students with ADHD in the general curriculum environment, we feature an elementary student with ADHD. As participants review the text-based portion of the case, they learn about Joey's academic, social, and behavioral strengths.

In creating the case, we sought to have participants analyze five ADHD related areas:

- * Testing and diagnosis of students with ADHD.
- * Instructional support for students with ADHD.
- * Behavioral interventions for students with ADHD.
- * Understanding reasonable accommodations for students with ADHD.
- * Understanding the impact and importance of Section 504 in the education of students with ADHD.

Through various video, audio, and similar interactive examples, users learn about the realities of ADHD and issues related to the disability. The challenge or task is to determine appropriate

general curriculum support for Joey within his current educational placement.

To illustrate the multiple issues of Joey's case, we have included segments of video to offer a rich context for the participants. Here, users can watch brief video clips of Joey interacting with his family, teachers, and fellow classmates. The video is designed to assist students in the problem-solving task by providing a visual example of a given situation (Smith, Martin, & Lloyd, 1998).

To offer a comprehensive picture, we provide participants necessary background information that includes contexts outside the confines of the educational setting. Here, users can review photographs and graphic images that help illustrate the text-based narrative. For example, a user investigating reasonable accommodations might view pictures of various related service personnel, examine a floor plan of the general curriculum classroom, and look at pictures or images of suggested classroom accommodations. Graphics, illustrations, and Web-based animations provide further detail to engage the teacher in problem-solving behaviors.

By using cases, we encourage students to apply their learning in a "reallife" situation and base their recommendations on the theoretical, empirical, and practical issues surrounding the case. When we use the Internet for our interactive case, discussions are not limited to classroom time. Through e-mail, listservs, newsgroups, Web-based discussion areas, and form submissions, students continue their discussions beyond the classroom setting (see Figure 3).

Currently, these discussions include teachers and prospective teachers from various school districts in the Gainesville, Florida, vicinity. By the summer of 1999, we plan to expand this interaction to include Ohio and North Carolina colleges and institutions. Because these cases are accessible on the Web, preservice special and general curriculum educators can gain multiple perspectives from an array of practicing and prospective teachers.

FUTURE DIRECTIONS

As the Web continues to grow, we expect to modify this site to include additional information pertinent to the learner with ADHD. For instance, student-generated challenges will continue to become more sophisticated as the knowledge base regarding ADHD explodes. The most effective student-generated challenges will be integrated within the core of the course. In addition, as we find better and more helpful online readings, we can improve the required reading lists for students.

The Learner with ADHD site also offers new dimensions for evaluation of student satisfaction and evaluation. The day-to-day interactions on the site (which can be monitored electronically) will reflect extent of use; student contributions and interactive exchanges will indicate the quality of participation. Student satisfaction with the product will be solicited via e-mail, surveys, and course evaluations. Eventually we hope to compare students with various levels of participation at the site on various outcome measures (e.g., scores on examinations and quizzes, the quality of written products, and overall course grades).

Considering that students enroll in this course for credit, we have limited visitor access to the Web site. However, we have constructed a special Web site (<http://edhd.bgsu.edu/EDSE/adhd>) for visitors to explore Web-based ADHD resources integrated into The Learner with ADHD site.

Although we have restricted course access, special educators can still use various design features described in this article. Fortunately, many universities and colleges are currently investing in a Web-based tool (e.g., WebCT, Virtual University, Top Class) that will allow online course development with limited technology expertise. Additionally, faculty members can encourage students to search the Web to locate helpful special education resources to enhance

general understanding. If visitors would like additional access to this site, they can contact the first author via e-mail.

FINAL THOUGHTS

As we developed the course, we were astounded at the wealth of current, valuable, and sometimes questionable information available on ADHD, an important and expanding area of educational concern. Research reports regarding medication, first-person accounts of the trials and victories of people with ADHD, online discussions of virtual communities of people with ADHD, advertisements of new drugs, and Web sites devoted to self-advocacy for people with ADHD are just a few of the examples of the information sources available.

Our challenge in the development of this course is not to teach our teachers all about ADHD, but to give them appropriate information and skills that will help them learn how to learn about ADHD. As we do this, we start our students on their own individual quests--to continually search for and find the best knowledge and skills available that will allow them to best educate their students.

ADDED MATERIAL

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Figure 1. Course Overview

Figure 2. Searching the Web

Figure 3. The Threaded Discussion List--Bulletin Board

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PERSPECTIVES ON DISTANCE LEARNING

Over the past decade, the tremendous growth in the identification of students with attention deficit/hyperactivity disorder (ADHD) (approximately 3%-5% of the school-age population) has posed challenges for both general and special education teachers (*Children and Adults with Attention Deficit/Hyperactivity Disorder (CHADD)*, 1992). Many teachers are not prepared to serve this population because of the rapid growth in ADHD.

Unfortunately, many preservice teacher education programs have failed to address ways to identify, instruct, and generally provide a reasonable accommodation for these teachers in the general curriculum. Continuing education programs (e.g., staff development, graduate studies) have begun to fill the void in preparing educators to teach children with ADHD. However, attending staff development and continuing education programs presents problems for teachers. Often, scheduling conflicts, time constraints, and inaccessible locations complicate effective training programs. In attempting to deal with these obstacles, K-12 school districts and universities have made significant efforts to provide flexible distance education programs, specifically in the area of special education (Blackhurst, Hales, & Lahm, 1998; Cheney, Cummings, & Royce, 1990; Collins, Hemmeter, Schuster, & Stevens, 1996).

Because of continuous advances in technology, distance learning has become a viable option for delivering coursework to preservice and inservice teacher education students challenged by geography, time constraints, professional responsibilities, family considerations, and similar obstacles. Within recent years, the development and subsequent access to the Internet has enhanced traditional distance education delivery, expanding student-teacher interactivity. For instance, the tremendous growth in the World Wide Web (WWW) offers students the option to participate in distance education activities via the computer. The Web, with its graphical interface and hypertext links, offers easy access to university, work, or home environments. Of more importance, the development of Web-based software, such as WebCT, designed to manage the delivery of Web-based instruction, has created an application that assists instructors in the development and management of Web-based instruction (see box, "WebCT--An Online Course Tool").

TABLE 1. THEMES AND CORRESPONDING TOPICS FOR "THE LEARNER WITH ADHD" COURSE

THEME I I AM A PERSON WITH ADHD

- Ia. Definition of ADHD
- Ib. Cognitive characteristics
- Ic. Behavioral characteristics
- Id. Lifespan issues of persons with ADHD

Ie. Support organizations for individuals with ADHD [e.g., National Attention Deficit Disorder Association (ADDA)]

THEME II I HAVE A PERSON WITH ADHD IN MY FAMILY

Iia. Diagnosis of ADD/ADHD

Iib. Medical issues in the treatment of ADHD

Iic. Legal issues for families and individuals with ADHD

Iid. Impact of variety of family arrangements (e.g., child with ADHD, sibling with ADHD, parent with ADHD, spouse with ADHD)

Iie. Support organizations for families [e.g., Children and Adults with Attention-Deficit/Hyperactivity Disorders (CHADD.)]

THEME III I TEACH A PERSON WITH ADHD

IIIa. Effective assessment strategies

IIIb. Effective instructional strategies (academics)

IIIc. Effective instructional strategies (behavior)

IIId. Continuum of intervention options for persons with ADHD at various age and ability levels

IIIe. Support organizations designed for the educator who teaches persons with ADHD [e.g., The Council for Exceptional Children (CEC), Learning Disabilities Association (LDA)]

Note: Themes run consecutively during the semester, beginning with Theme I, then Theme II, and finally Theme III.

WEBCT--AN ONLINE COURSE TOOL

WebCT. [Software]. <http://www.webct.com/>

Several universities (e.g., University of Florida, Bowling Green State University) and publishing companies (e.g., Prentice-Hall) have adopted a Web-based instructional management tool called WebCT. Designed to assist people manage the delivery of Web-based instruction, WebCT provides assistance to novice, intermediate, and experienced computer users in developing and delivering Web-based courses. WebCT facilitates the creation of Web-based courses by offering many tools and features that can be integrated into the organization of a course. The following are examples of WebCT tools:

- * A conferencing system.
- * Online chat.
- * Student progress tracking.
- * Group project organization.
- * Student self-evaluation.
- * Grade maintenance and distribution.
- * Navigation tools.
- * Auto-marked quizzes.
- * Electronic mail.
- * Course calendar.
- * Student home pages.
- * Course content searches.