DOCUMENT RESUME

ED 475 924 IR 021 922

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TITLE	Classroom Teachers Working with Software Designers: The Wazzu Widgets Project.
PUB DATE	2002-06-00
NOTE	8p.; In: NECC 2002: National Educational Computing Conference Proceedings (23rd, San Antonio, Texas, June 17-19, 2002); see IR 021 916.
AVAILABLE FROM	For full text: http://confreg.uoregon.edu/necc2002/ .
PUB TYPE	Reports - Descriptive (141) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	*Computer Assisted Instruction; *Computer Software Development; *Educational Technology; Elementary Secondary Education; *Instructional Design; *Instructional Materials; Learning Activities; *Material Development; Mild Mental Retardation; Multimedia Materials; Special Needs Students; Teacher Education
IDENTIFIERS	Washington State University

ABSTRACT

This paper presents results of a year-long project involving K-12 teachers working with student software designers to create "learning objects"--small, computer-based tools (known as "widgets") for concepts identified by the teachers as "difficult to learn." This educational software development project was facilitated by members of Washington State University's Department of Teaching and Learning, and funded by The Arc of Washington Trust Fund. The project is part of the "Wazzu Widgets" (learning object development) project underway at Washington State University. Graduate students of education and instructional design (along with one advanced undergraduate student) were matched with local K-12 teachers to develop instructional software designed to meet the teachers' needs. A specific criterion for participation was that the teachers had at least one student with mild mental retardation in their class during the course of the project. Each of the three teachers chose a concept that they found challenging to explain to their students and worked with the software production team to develop a small, interactive software solution known as a Learning Object. The three learning objects developed for this project were designed to accommodate their students with mild mental retardation. The creation of the learning objects yielded a great deal of information about students' and teachers' perceptions of the processes of instructional design and instructional media development as well as the usefulness and usability of the specific learning objects developed. (Author/AEF)

Classroom Teachers Working With Software Designers: The Wazzu Widgets Project

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ABSTRACT

Results of a year-long project involving K-12 teachers working with student software designers to create "learning objects" - small, computer-based tools (known as "widgets") for concepts identified by the teachers as "difficult to learn."

INTRODUCTION

This is a report of the results of a year-long educational software development project facilitated by members of Washington State University's Department of Teaching and Learning, and funded by The Arc of Washington Trust Fund. The project is part of the "Wazzu Widgets" (Learning Object development) project underway at Washington State University. The creation of the Learning Objects yielded a great deal of information about students' and teachers' perceptions of the processes of instructional design and instructional media development as well as the usefulness and usability of the specific Learning Objects developed.

BACKGROUND

Graduate students of education and instructional design (along with one advanced undergraduate student) were matched with local K-12 teachers to develop instructional software designed to meet the teachers' needs. A specific criterion for participation was that the teachers had at least one student with mild mental retardation in their class during the course of the project. Each of the three teachers chose a concept that they found challenging to explain to their students and worked with the software production team to develop a small, interactive software solution known as a Learning Object. The three Learning Objects developed for this project were designed to accommodate their students with mild mental retardation. However, the Learning Objects were not designed in such a way as to limit use to a single individual (e.g. no specific names or places are used).

STUDENTS WITH MILD MENTAL RETARDATION

Some individuals with mild mental retardation have difficulty learning and generalizing concepts, especially abstract concepts that are not easily represented and manipulated using authentic material (Beirne-Smith, Ittenbach, & Patton, 1998). Attention deficits and motivational factors can further complicate the teaching and learning process (Hickson, Blackman, & Reis, 1995). Furthermore, many materials for teaching concepts may not be age-appropriate if students are learning at a level that is several years below their chronological age. Additional and specialized instruction is often necessary to assure acquisition and generalization of learning. Demonstrating and explaining abstract concepts in ways that students with mild mental retardation understand is often a focus of specialized instruction.

One approach to concept instruction that has proven successful with students with mild mental retardation is Active Student Response (ASR) (Heward, 2000). When using ASR instructional methods, students with mild mental retardation are actively and frequently involved in instruction by responding to activities and tasks (as opposed to passive participation in lessons). However, to keep students motivated and actively involved in instruction, it is essential that the salient features of the materials used are visually stimulating and engaging. ASR approaches are not as effective with students if the instructional materials are boring or repetitious. In addition, ASR, or any other instructional approach, will not be effective if students cannot understand the concepts embedded in the instructional task. It is a challenge to find a wide variety of effective and motivating age-appropriate materials for concept instruction for students with mild mental retardation.

The computer is one tool that has been effective in motivating students and is very compatible with ASR approaches to instruction. However, much of the computer-based instructional software currently available focuses on one of two areas: providing additional practice of specific skills; or following a specific curriculum sequence that may or may not relate to the goals and objectives determined by the classroom teacher and/or the student.

DEVELOPING APPROPRIATE COMPUTER-BASED TEACHING TOOLS

Teachers and students are concurrently receiving increased pressure to make good use of computers and computing technologies as learning tools. The problem is a paucity of computing software that teachers can use as part of a larger instructional design. There

are a variety of software packages and Web sites that simulate existing activities (e.g. field trips; math manipulatives), but very few resources for presenting concepts and ideas that support a teacher's lesson. This is especially true in terms of software that presents essential concepts in a manner that is chronologically age appropriate for students with mild mental retardation. Instructional designers are beginning to experiment with "Knowledge Objects" (Merrill, 1996): One portion of a Knowledge Object is the "Learning Object" – a small computer program that uses sophisticated interface design techniques along with images and/or sound to explain a concept. These Learning Objects may be of particular utility to teachers serving students with mild mental retardation.

THE WAZZU WIDGETS PROJECT

The Wazzu Widgets Project in progress at Washington State University is currently developing and testing web-based Learning Objects (the activity portion of a Knowledge Object) that facilitate comprehension of concepts and ideas that are typically difficult to explain using traditional classroom materials (e.g. color theory; multiplication of fractions). The goal is to create a database or "object-base" of Learning Objects that teachers can use in instruction. To date, five Learning Objects have been created, three of them were underwritten by The Arc of Washington Trust Fund.

Employing a user-centered development model, the design and development teams worked closely with K-12 teachers to develop Learning Objects that would be truly useful to the teachers and their students. Care was taken to include everyone in the development and production process. Strategies that were particularly helpful included the development of early paper prototypes; these prototypes allowed the less

technologically sophisticated members of the team a chance to critique and comment upon the design without feeling intimidated or overly impressed by the computing tools themselves.

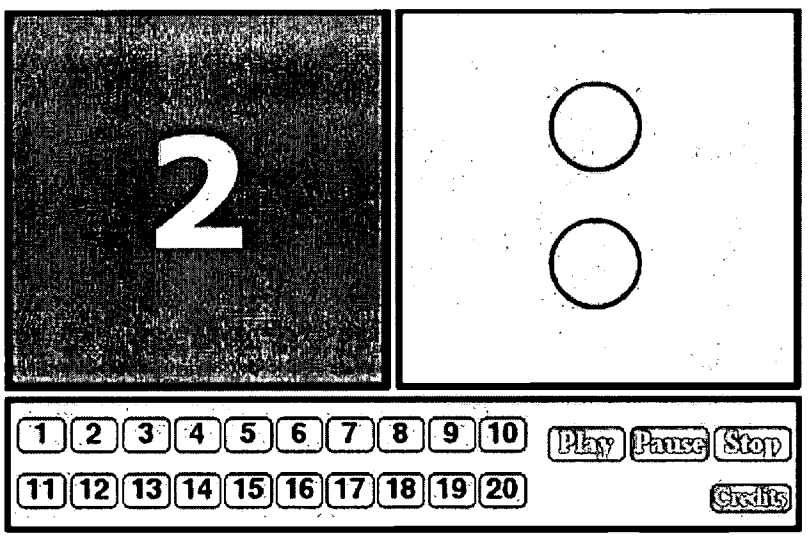

Figure 1. "Counting One to Twenty" Widget (screen grab)

Beyond the design and development of a series of Learning Objects created specifically for students with mild mental retardation, and their distribution through the development of a web site and the distribution of CD-ROMs, the project documented increased collaboration between special education experts (classroom teachers) and instructional design experts (university faculty and graduate students) with the ultimate goal of improving instruction. It is to be hoped that this initial partnership will lead to further collaborative efforts aimed at greater understanding of how computing tools can best be used to support K-12 instruction.

The Wazzu Widgets Web site (http://education.wsu.edu/widgets/) provides access to Shockwave versions of the Learning Objects developed and brief descriptions of their intended use.

ACKNOWLEDGEMENT

This project was funded by the Arc of Washington Trust Fund

KEYWORDS

Learning Objects, Teacher Education, Instructional Design, Multimedia

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