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CATS Online: Logistic and Construct Evaluation of Computer Administered Assessment

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Abstract

In an effort to meet the needs of Kentucky students who have traditionally required a human reader as part of their testing accommodations, the Kentucky Department of Education (KDE), in partnership with eCollege[SM], developed the CATS Online Assessment. The CATS Online Assessment allows students to read the Kentucky Core Content Test (KCCT) from a computer screen, using either text reader or screen reader software. With text/screen reader software, students highlight a portion of text that they wish to read and the computer reads aloud to them.

This report examines two major issues regarding the use of computer-based assessment as a valid measure of student performance. First, the report discusses whether the CATS Online Assessment allows students to demonstrate their content knowledge in a way similar to their daily classroom activities. Second, the report explores logistical issues associated with the administration of the test.

Although text/screen reader technology software is a fairly new phenomenon at most Kentucky schools, most participating teachers and students had at least one year of experience working with the technology. Though initially concerned about technical issues, students and teachers seemed generally comfortable navigating the assessment, and students largely reported preferring the computer-based test to the way they have taken it in the past. Similarly, most test proctors felt that the online test helped rather than hindered students in their understanding of test content. Several logistical issues emerged, ranging from technical to procedural concerns. However, all participating students were able to complete the assessment, and no student data were lost. The CATS Online Assessment appears to be allowing students to demonstrate content knowledge in a way to which they are accustomed, with minimal logistical problems.

CATS Online: Logistic and Construct Evaluation of Computer Administered Assessment

Executive Summary

There is a significant sub-population of students (approximately 15%) in Kentucky public schools who require accommodations or modifications in how instructional content is presented to them in the classroom. One such accommodation is the use of human readers to provide access to printed content material. In recent years, technological advances have produced an increasingly sophisticated array of text readers and screen reader software programs that are being used in classrooms in lieu of a human reader. As students become more familiar and reliant on these computer-assisted technologies for working on daily classroom assignments, it is important to ensure students have the opportunity to take state accountability tests in the same manner to ensure that test scores accurately represent student ability. Kentucky has met this technology challenge through the development and implementation of the Commonwealth Accountability Testing System (CATS) Online Assessment.

The CATS Online Assessment is an interactive website that allowed students to access and take the Kentucky Core Content Test (KCCT) for the first time in April 2003. The questions were the same as for non-accommodated students; only the text has been formatted for computerized reading. Two pilot tests were conducted for the online test in May 2002 and the fall of the same year in preparation for the implementation this spring. The pilot test in fall 2002 included about 400 students from 46 schools. Although the evaluation was favorable, there were some problems reported that included the loss of internet connections, text reading software difficulties pronouncing certain words or math symbols, and some student not understanding the computerized voice.

Since the CATS Online Assessment was being offered operationally for the first time in April 2003, KDE contracted Human Resources Research Organization (HumRRO) to conduct an independent evaluation of its implementation. This project documented students' and teachers' descriptions of the testing process and logistical concerns with test administration. The research team visited 12 schools to observe the testing process and record student and teacher feedback regarding the testing experience.

Research Method

The study involved a combination of survey, observation and structured interview techniques. School-level coordinators were contacted to arrange school visits. Three researchers conducted the site visits. A one- or two-person research team visited each school for one day. Researchers arrived at the school prior to the onset of testing to meet with proctors and to determine the best location from which to observe. Pre-test surveys, observation forms, and interview protocols, found in Appendix A, were designed to target certain aspects of the testing scenario (pre- and during-test technical problems, for example), but allowed for researchers to add additional characteristics as they became significant.

Student interviews were conducted in small groups whenever possible to reduce any anxiety that students might feel upon being approached by an unknown adult. Group proctor

interviews were also conducted, when appropriate, in the interest of time. Interviews were conducted immediately following testing, typically in the testing room or an adjacent classroom. In the event that some students had completed testing well before others, small group or individual interviews were conducted. Proctor interviews were conducted following student interviews, typically after students had been dismissed from the testing area.

Data analysis consisted of basic descriptive statistics (frequency distributions, mean and standard deviation) using SPSS 11.5 software in addition to an analysis of the qualitative components. Researchers met on several occasions, both during and following data collection, to compare observation notes and discuss emerging themes.

Demographics

KDE provided the research team with a list of 15 school districts, comprising 29 schools and 204 students who had registered to participate in the CATS Online implementation this spring. Twelve schools were visited (3 elementary, 5 middle, and 4 high) and 105 students and 43 proctors were observed. During the school visits, researchers interviewed 60 students and 21 proctors. Most students (82%) and proctors (62%) had participated in the pilot test conducted in the spring or fall of 2002. Approximately two thirds of the proctors interviewed indicated that they had been working with students who use text or screen readers for more than one year.

Testing Experience

A key issue for this study was determining if the CATS Online Assessment provides a means of testing students that is similar to how students receive information and demonstrate learning in the classroom. One way to address that issue is to determine the level of familiarity students had with text and screen reading technology and with the CATS Online Assessment. Several questions were asked of students, as well as proctors, to probe this issue.

Students and proctors were asked how often text or screen readers are used when doing assignments in class. It was interesting that over 70% (42 of 60) of the students said they either don't use them each week or never use them. Proctors (teachers), on the other hand, answered almost the opposite, with 66% (14 of 21) stating that students use text or screen readers daily or weekly and 29% saying not each week. Several proctors mentioned that they have only had the software since January 2003 and are in the process of incorporating the technology more in classrooms, as they get the resources to do so. During observation of the testing processes students appeared to have no difficulty using the text or screen reading software, and more importantly, seemed quite comfortable with it.

Students also were asked about the CATS testing experience in general. First, they were asked if they liked using the computer to take the CATS test, with 97% (57 of 59) responding that they did like it. Second, students were asked it they felt taking the test on the computer was easier or harder than taking the test without a computer. Again, 97% (58 of 60) responded that it was easier. In support of the positive responses by students, proctors were asked if it appeared that the computer test helped or hindered students' understanding of the questions and answer choices. Most of the proctors, 84% (16 of 19), felt the use of the computers helped students understand test questions, while only 2 (11%) felt it was a hindrance.

Testing Logistics

Another important issue of concern during this study was the logistics of administering the KCCT to students. Analysis of the interview and observation data lead researchers to organize the information in two categories, technical and procedural.

Technical Issues

The technical issues focus on computer hardware and software functionality. These issues cover a wide gamut of topics from difficulties students had keyboarding open-response questions to problems submitting student answers after they had completed the test.

In general, technical issues experienced by the 12 schools during the test did not result in the loss of any student data. In situations where computers locked up or students inadvertently closed windows, proctors were able to re-boot computers or log back into the CATS Online website and pick up where the students left off. However, it is important to note that one school experienced so much difficulty with its district security software requiring students to re-authenticate themselves after each page in CATS Online during the fall 2002 pilot test that they opted not to participate operationally. Prior to operational testing, most students at another school opted out of taking the KCCT online after becoming frustrated that their screen reader software didn't function well while using the CATS Online practice area.

Other technical issues involved software navigation. For the most part, observers noted that there were few navigational issues and that students appeared quite comfortable with the text readers and CATS Online. Even though 13 or 14 proctors indicated that they didn't think CATS Online was difficult to navigate, several did point out some of their concerns. For example, when students finish a section of a test subject (e.g., science or math) the system indicates they are finished taking the test; therefore, some students would submit their answers without going to the next section.

Proctors were also asked if students encountered problems keyboarding their answers to the open-response questions. Out of 17 proctors who responded to the question, 15 (88%) said no and only 2 responded with "some problems." However, when asked if students encountered difficulties with the math section, 4 of the 6 respondents answered "yes." Proctors followed up with comments about difficulties with the software reading lines and math symbols.

Procedural Issues

While the technical issues centered on computer-related concerns or events, procedural issues focus more on the testing process and administration. The one issue that received the most comments concerned the requirement to answer questions online and also complete the test booklet. Nine of the observed 12 schools "bubbled" in the test booklets for students after the tests were submitted and accepted. The remaining three schools had students complete test booklets as they answered the questions online. Most proctors felt that this duplication of effort was frustrating.

Also, the proctor:student ratio recommended in the KDE procedural and security issues document was 1:4. However, in 10 of the schools observed, the ratio was one adult for every two

or three students. Two schools, one middle and one high school, felt they did not need that many proctors but were planning to support students who use scribes. In all 12 schools observers noted that when students requested help during the test, it was immediately received.

Summary and Discussion

There were two primary concerns to be addressed in this study: Does the CATS Online Assessment provide a means of testing students that is similar to how students receive information in the classroom and what logistics issues impact the administration of the test?

First, it does appear that the CATS Online Assessment reflects how students receive information in the classroom. Some schools have used this type of technology for many years due to the nature of their student population, while for most schools it was a fairly recent addition. However, even though many schools have only recently acquired the necessary hardware and software, they have worked to get the technology into the classroom. Only through prior use of the technology could the students have displayed the level of familiarity and comfort observed during the CATS Online testing.

Second, in terms of the testing logistics, several technical and procedural issues emerged. In a couple of situations problems were encountered that negatively impacted participation in the CATS Online implementation: difficulties with district network software compatibility and navigational problems with the screen reader software. Otherwise, no other issues were noted that were severe enough to prevent participating students from completing and submitting the assessment. Technical problems were often the result of student keyboarding errors, and could be remedied quickly. Procedural issues that were identified included concerns about the need to complete test forms in pencil in addition to online, the answering of open-response items (typing into the answer space provided in CATS Online, typing in Microsoft® Word, or hand writing answers), and ensuring an appropriate proctor:student ratio (most schools had more than the recommended 1:4 ratio and found that they were overstaffed).

As far as the general testing experience, almost all the students interviewed agreed that they liked taking the test using the computer and found it to be easier than traditional ways to take tests. Proctors largely agreed that students appeared to be helped rather than hindered by the online assessment.

Finally, it is important to have accurate and timely information. Proctors indicated they would like to have more information regarding the testing process, more time to test and practice (including submitting tests), and have available a troubleshooting guide based upon this year's testing experience. The more prepared and aware test administrators are, the better the testing experience will be for students.

CATS Online: Logistic and Construct Evaluation of Computer Administered Assessment

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CATS ONLINE: LOGISTIC AND CONSTRUCT EVALUATION OF COMPUTER ADMINISTERED ASSESSMENT

Introduction

There is a significant sub-population of students in Kentucky public schools who require accommodations or modifications in how instructional content is presented to them in the classroom. One such accommodation is the use of human readers to provide access to printed material. In recent years, technological advances have produced an increasingly sophisticated array of text readers and screen reader software programs that are being used in classrooms in lieu of a human reader. These programs include text readers such as WordSmith© Tools, Read & Write© (versions 5 and Gold), or CAST eReader™ and screen readers like JAWS® for Windows.

Students have become more familiar and reliant on these computer-assisted technologies when working on daily classroom assignments in a variety of content areas. Additionally, students will be using the technology to take quizzes and tests more often in the classroom in the future. In order to ensure that Kentucky Core Content Test (KCCT) scores are an accurate representation of student ability, they must have access to the same technology during testing. Kentucky has met the technology challenge through the development and implementation of the Commonwealth Accountability Testing System (CATS) Online Assessment.

Background

During the 2002-2003 school year, 81,659 students with disabilities, or about 15% of the total student population in Kentucky, received special education and related services (KDE, 2002). Special education students living with a wide range of disabilities, including visual impairment, emotional/behavioral disorders, and multiple mental disabilities, rely on testing accommodations in order to successfully demonstrate what they have learned in the classroom.

Testing accommodations typically fall into one of four broad categories: presentation, response, timing and scheduling, and setting (FCSN, 1999). The use of a human reader is an example of a presentation accommodation; it modifies the way the testing material is presented to the student, but not the test content itself. Previous studies have found that students receiving special education services show significant gains in test scores when test questions are presented to them orally rather than in a standard format (Tindal, et al., 1998; Weston, 1999).

Public school students have been taking the KCCT as part of CATS since 1999. KCCT replaced the Kentucky Instructional Results Information System (KIRIS) tests, which were also administered as part of the state's testing and accountability system since spring 1992. In recent years, computer-based technology, as a replacement for human assistance, has been lauded as a means of meeting students' needs for accommodation (Greenwood & Rieth, 1994). The CATS Online Assessment was initiated by the Kentucky Department of Education (KDE) in response to "the need to

provide a way for students with disabilities to take the KCCT in a manner that is consistent with how they primarily access curriculum content in the classroom setting" (KDE, 2003).

The CATS Online Assessment is an interactive website that allows students to access and take the KCCT. Its first operational use began in April 2003. The questions are the same as for non-accommodated students; only the text has been formatted for computerized reading. There were two pilot tests conducted for the online test in May 2002 and the fall of the same year in preparation for implementation this spring.

The pilot test in fall 2002 included about 400 students from 46 schools. An evaluation conducted by KDE of the pilot test indicated that most teachers and students liked taking the test online, felt that students had a better understanding of the questions, and felt that students tended to be more focused (Salyers, 2002). Although the evaluation was favorable, Salyers noted there were some problems reported, including the loss of internet connections, text reading software difficulties pronouncing certain words or math symbols, and some students not understanding the computerized voice.

Purpose of the Research

Since the CATS Online Assessment was being offered operationally for the first time in April 2003, KDE contracted Human Resources Research Organization (HumRRO) to conduct an independent evaluation of its implementation. This project documented students and teachers' descriptions of the testing process and logistical concerns with test administration. The research team visited 12 schools to observe the testing process and record student and teacher feedback regarding the testing experience.

Research Method

The information presented in this section provides details of the way in which schools were selected to participate in the evaluation and how data were collected and analyzed.

Selection of Sites

To represent districts statewide, schools in 6 of the 8 regional service areas were visited (one region had no districts participating in the CATS Online Assessment and another region had only one district participating, but that district was not available for a site visit). KDE provided a list of districts that were planning to offer the online assessment. District Assessment Coordinators (DACs) from each district were contacted to verify that schools within that district were still planning to offer the online assessment. Upon initial contact, three DACs indicated that their districts were no longer planning to offer the CATS Online (Two stated that their decision not to offer the online assessment was due to technical problems encountered during field testing).

The next criterion for school selection was grade level and subject. From the final list of participating districts, a list of possible schools was generated. School contacts were made to verify testing dates and grade levels/subjects being tested on those dates.

School visits were scheduled in such a way that coverage of grade level/subject combinations could be maximized. Table 1 presents the grade and subject combinations that were observed.

Table 1

Grades and Testing Subjects Observed

	Math			Reading			Science			Social Studies			Writing	Practical Living	Arts and Humanities
	A	B	C	A	B	C	A	B	C	A	B	C			
4th Grade					√		√	√							
5th Grade		√								√	√				
7th Grade					√	√	√	√					√		
8th Grade		√	√							√				√	√
10th Grade					√	√								√	
11th Grade	√	√					√	√	√						
12th Grade													√		

Note. √ = Observed; ■ = Not tested

Researchers visited 12 schools. Although efforts were made to cover the range of region and grade/subject combinations, the small sample size limits the utility of the data for large-scale generalizations. It is also important to note that at each level of contact, districts and schools had the option of not participating in the evaluation. The resulting sample is therefore subject to self-selection bias.

Data Collection

The study involved a combination of survey, observation and semi-structured interview techniques. School-level coordinators were contacted to arrange school visits. They were each sent a pre-test survey, found in Appendix A, and student permission slips for post-test interviews. The pre-test survey was intended for the school's lead proctor to complete so researchers could get a sense of the level of preparation of both proctors and students, and specifically if both had accessed the online practice area. This was also a way for the proctors to become familiar with the study and the questions that would be raised in the subsequent interviews.

Three researchers conducted the site visits in one- or two-person teams; visits in each school lasted one day. Observations were conducted as unobtrusively as possible. Researchers arrived at the school prior to the onset of testing, to meet with proctors and to determine the best location from which to observe. The chosen location was one in

which the greatest amount could be observed while creating the least amount of distraction for students. On several occasions, once students had been testing for several minutes and seemed comfortable, researchers were invited to move about the room. Observation protocols (Appendix A) were designed to target certain aspects of the testing scenario (pre- and during-test technical problems, for example), but allowed for researchers to add additional characteristics as they became significant.

When possible, student interviews were conducted in small groups to reduce any anxiety that students might feel upon being approached by an unknown adult. Group proctor interviews were also conducted, when appropriate, in the interest of time. Interviews were conducted immediately following testing, typically in the testing room or an adjacent classroom. In the event that some students had completed testing well before others, small group or individual interviews were conducted. Proctor interviews were conducted following student interviews, typically after the students had been dismissed from the testing area. These interviews were often limited by proctors' need to return to their classrooms or other duties. Every effort was made to avoid interrupting the normal activities of both proctors and students. Student and proctor interview protocols are found in Appendix A.

Data Analysis

Data analysis consisted of basic descriptive statistics (frequency distributions, mean and standard deviation) using SPSS 11.5 software, as well as a constant comparative method approach to analyze qualitative components (Denzin & Lincoln, 1998). As its name implies, constant comparison involves continual comparison of data until a series of categories or themes emerge and are identified with a code. This process of coding allows for the systematic analysis of qualitative data. Researchers met on several occasions, both during and following data collection, to compare observation notes and discuss emerging themes.

Research Findings

Demographics

KDE provided the research team with a list of 15 school districts, comprising 29 schools and 204 students who had registered to participate in the CATS Online implementation this spring. Twelve schools were visited (3 elementary, 5 middle, and 4 high) and 105 students and 43 proctors were observed. Although not every test for each grade level was observed, researchers covered 21 tests that included at least one observation for all grade levels and tested subjects, as shown in Table 1.

During school visits, researchers interviewed 60 students and 21 proctors. Students and proctors were asked if they had participated in the pilot test conducted in the spring or fall of 2002; 82% (45 of 55) of students and 62% (13 of 21) of proctors (62%) responded that they had been involved in at least one pilot test. Proctors were also asked how long they had been working with students using text or screen readers. Of 18 respondents, 7 (39%) stated one year or less, while 8 (44%) said up to four years.

Testing Experience

A key issue for this study was determining if the CATS Online Assessment provides a means of testing students that is similar to how they receive information in the classroom. One way to address that issue is to determine the level of familiarity students had with the text and screen reading technology and with the CATS Online Assessment. Several questions were asked of students, as well as proctors, to probe this issue.

Students and proctors were asked how often text or screen readers were used when doing assignments in class. It was interesting that over 70% (42 of 60) of students said they either don't use them each week or never use them. Only 18 students (30%) reported they use them daily or weekly. On the other hand, 62% (14 of 21) of proctors (teachers) stated that students use text or screen readers daily or weekly and 29% said not each week. One proctor made the point that students will not use this technology in every class every day, but each day they will likely use it in some subject. During the observation of testing, students appeared to have no difficulty using the text or screen reading software, and more importantly, seemed quite comfortable with it. Several proctors mentioned that they have only had the software since January 2003 and even though it is used at least weekly, they are in the process of incorporating the technology more in classrooms as they get the resources and time to do so.

A similar question was asked concerning how often text or screen readers were used when taking tests in class. Over 80% (49 of 60) of students said they rarely or never used text or screen readers for tests. Proctors (14 of 21, or 66%) answered in a similar way. One observer followed up this question and discovered that when the teacher did use the technology for testing, the computer was used only to read to the students and was not used to key answers to the test.

All students were required to access the CATS Online practice area in order to log in to the live test site when their school began testing. One third of students and proctors indicated that students accessed the practice area once. It was interesting that at least a quarter of the students accessed the practice area three or more times. When students were asked if they found the practice area helpful before taking the CATS test online, 98% said it was helpful.

Finally, students were asked two questions regarding the CATS testing experience in general. First, they were asked if they liked using the computer to take the KCCT, with 97% (57 of 59) responding that they did like it. Second, students were asked it they felt taking the test on the computer was easier or harder than taking the test without a computer. Again, 97% (58 of 60) responded that it was easier with the computer. When asked to explain why, one student said that when he saw long questions last year, he guessed at the answers, but this time he understood the questions better and tried to do well. Another student reported that it helps her read and learn better when using a computer.

Proctors were asked if it appeared that the computer helped or hindered students' understanding of the questions and answer choices. Most proctors, 84% (16 of 19), felt

the use of the computers helped students understand test questions, while only 2 (11%) felt it was a hindrance. One proctor, who felt it hindered student understanding, stated that computer testing made her uncomfortable because she couldn't tell if students were really paying attention as the test was being read to them. On the other hand, one proctor said she saw students re-read questions when they would likely not have asked a human reader to repeat the item. Another proctor noted that the computer version appeared to keep students' attention, particularly for longer reading and math items.

Testing Logistics

Technical Issues

In general, technical issues did not create situations in which data entered by students were lost. In situations where computers locked up or students inadvertently closed windows, proctors were able to re-boot computers or log back into the CATS Online website and pick up where the students left off. However, it is important to note that one school, during a practice session, reported that a student lost her entire open-response answer after she typed it. The student and proctors think she accidentally hit Alt Tab, but the result was that she was not comfortable enough afterward to take the KCCT online. The research team also talked to one DAC whose schools were not taking part in online testing because, during the pilot, the district security software (FoolProof™ Desktop Security) kept requesting that students re-authenticate with their password when moving to each new page of CATS Online. Another school had difficulties using JAWS® screen reading software. It wasn't functioning with the CATS Online as students expected and often locked up the computers. Since students were becoming very frustrated (most had practiced in excess of 6 times), they opted not to participate in the operational online test for most subjects and grades. Finally, one school stated that on the first day of their testing schedule they had difficulty getting to the online test. They reported that they thought it was due to a state-wide computer system problem (couldn't access the network until a certain time).

Other computer-oriented issues either reported by proctors or observed by the research team include:

- Many schools (at least 5) stated they had problems submitting the tests. They solved the problem by continuing to submit until the administration screen was updated. One school had to wait about 45 minutes to get an entire batch of student's tests updated, meanwhile, students had to copy their answers into the test booklets.
- Most schools experienced sporadic computer problems (e.g., locked-up, the mouse stopped working) that were solved by both closing and re-starting a program or re-booting the computer.
- A common problem the first few days of testing involved students inadvertently hitting keys (i.e., alt key) that caused computers to lock up or screens disappear (minimize).

Other technical issues involved software navigation. For the most part, observers noted that there were few navigational problems and that students appeared to be quite comfortable with the text readers and the CATS Online system. Even though 13 of 14 proctors indicated that they didn't think CATS Online was difficult to navigate, several did point out concerns they felt were important.

- The word processing part of CATS Online is not as good as the word processing capabilities of Microsoft® Word, which is what the proctor and students are used to.

- After finishing a section such as science or math, the system indicates the student has finished taking the test. Many students would submit their answers instead of going to the next section.

- Students often hit the wrong scroll bar and caused one window to disappear while another window popped up. Several students indicated this was frustrating and one proctor was concerned it could negatively impact student performance.

- Students, who required the text to be quite large using ZoomText®, had difficulty finding navigation buttons and all the information displayed on the web page. A proctor suggested that highlighting only the text students need to see in a separate window might help.

- If the computers don't have adequate processing capabilities, system responses can be slow. A proctor noted that students would hit enter several times and often the computer would lock up.

- One proctor stated that the "review later" option in CATS Online is confusing to their special education students because they were not understanding how and why it would be used. A solution offered would be to add a prompt at the end of a test section to suggest the students review the test to ensure they have answered all the questions to their satisfaction.

- In one of the test sections, an item had a visual with a story followed by test questions, requiring students to scroll up and down repeatedly. The proctor felt it made that item more difficult for the students taking the test online.

- One proctor suggested that the criteria for answering questions should be displayed before the question is presented; feeling students may forget what the question is after reading the criteria.

Proctors were asked if students encountered problems keyboarding their answers to open-response questions. Proctors who responded to the question (15 of 17, or 88%) said "no" and only 2 responded with "some problems." However, when asked if students encountered difficulties with the math section, 4 of the 6 respondents answered "yes." Proctors followed up with comments about the difficulty the software had with reading lines and math symbols. Observers noted similar concerns, and, it appeared to be a cumbersome process to scroll back and forth between the math problem and the open-

response area when constructing answers. It is important to note that one student found he could copy the problem in CATS Online and paste it into Microsoft® Word. He could then work on the answer and copy it back into the test.

Finally, students were asked to talk about the hardest part of taking the KCCT test on the computer. Most referred to the test content or that open-response items were difficult because you had to put everything into words. However, five students mentioned having trouble with the screen or text readers, usually because it would mispronounce or skip words. Three students mentioned that they had difficulty understanding the computer voice. Additional representative comments include: it was hard to have to work in Microsoft® Word since you couldn't print from CATS Online and that note taking (while working on open-response items) was difficult because it is necessary to move between various windows. When asked the opposite question, what was the easiest part of taking the KCCT test on the computer, generally students responded that doing the multiple-choice questions were easiest. One student said reading was the easiest part.

Procedural Issues

Nine of the observed 12 schools "bubbled" in the test booklets for the students after the tests were submitting and accepted. The remaining 3 schools had the students complete the test booklet while they answered the questions online. Most proctors felt that this duplication of effort was frustrating. One proctor said, "it was awful to make the students enter data twice" and noted that it was not the way they practiced for the test. Test booklets should be provided to coincide with the practice test.

Also, the proctor:student ratio recommended in the KDE procedural and security issues document was 1:4. However, in 10 of the schools observed, the ratio was one adult for every two or three students. Two schools, one middle and one high school, felt they did not need that many proctors but were planning to support students who use scribes. Students declined to use scribes the first day of testing, opting to type their own answers. In all 12 schools, observers noted that when students requested help during the test, it was immediately received.

Other procedural issues either reported by proctors or observed by the research team include:

- Observers noted various ways in which schools and students handled writing open-response items:
  - Typed in the CATS Online area (rarely used)
  - Typed in Microsoft® Word and cut and pasted in CATS Online area
  - Typed in Microsoft® Word, printed, and attached in test booklet (answers not included in online submission)
  - Hand wrote open-response in test booklet only
- Students had some problems with capital letters in their passwords. It would be easier if passwords were not case sensitive.

- A proctor noted, "I understand that there is a need for multiple log-ins to get to the different assessments. I am concerned about the number of processes to get to the assessment for younger and more disabled students."

Summary and Discussion

There were two primary concerns to be addressed in this study: Does the CATS Online Assessment provide a means of testing students that is similar to the way they receive information in the classroom and are there logistic issues that impact the administration of the test?

First, it does appear that the CATS Online Assessment reflects how students receive information in the classroom. Some schools have used this type of technology for many years due to the nature of their student population, while for most schools it is a fairly recent addition. However, even though many schools have only recently acquired the necessary hardware and software, they have worked to get the technology into the classroom. Only through prior use of the technology could the students have displayed the level of familiarity and comfort observed during the CATS Online testing. Also, it was noted that when students take tests or quizzes during class, they use the computer to read the scanned test item to them, but they record their answers on paper. Since students, as yet, do not regularly use the computer to record test answers, it is important to ensure that students continue to use the CATS Online practice sessions. Nearly every student indicated that the practice area in CATS Online was helpful prior to testing.

Second, in terms of the logistics of testing, several technical and procedural issues emerged. In a couple of situations, problems were encountered that negatively impacted participation in the CATS Online implementation: difficulties with district network software compatibility and navigational problems with the screen reader software. Otherwise, no issues were noted that were severe enough to prevent participating students from completing and submitting the assessment. Technical problems were often the result of student keyboarding errors and could be remedied quickly. In extreme cases, the assessment was closed and reopened, but with no loss of student data. Additional concerns were largely related to the ability of text reader software to correctly and clearly interpret printed text (math, in particular) or difficulties submitting student tests after completion. Procedural issues that were identified included concerns about the need to complete test forms in pencil in addition to online, the answering of open-response items (typing into the answer space provided in CATS Online, typing in Microsoft® Word, or hand writing answers), and ensuring an appropriate proctor:student ratio (most schools had more than the recommended 4:1 ratio and found that they were overstaffed).

As far as the general testing experience, almost all students interviewed agreed that they liked taking the test using the computer and found it to be easier than traditional ways to take tests. Several students indicated they tried harder and felt they did better using the text reader and CATS Online system than they would have without it.

Proctors largely agreed that students appeared to be helped rather than hindered by the online assessment. This is evidenced by their prediction of how this testing

experience would impact student participation next year. Not one said participation would decrease and 61% (11 of 18) felt student participation would increase. Two proctors who said it would not change explained that they had to answer that way because everyone who was eligible participated this time.

Proctors indicated they would like to have more information regarding the testing process, more time to test and practice (including submitting tests), and have available a troubleshooting guide based upon this year's testing experience. One proctor suggested creating a short video or interactive demonstration of the CATS Online in use. The more prepared and aware test administrators are, the better the testing experience will be for students.

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Appendix A

This appendix contains the observation and interview protocols.

Student/Proctor Observation Form A2
Student Post-test Interview Protocol A3
Proctor Post-test Interview Protocol A5
Proctor Pre-test survey A8

Proctor/Student Observation Form

PRE-TEST: PROCTOR

Room set-up (partitions, location, PC lab) _____

Were computers operational, logged on for students? _____

What text/screen readers were used? _____

_____

Dedicated tech resource person nearby?_____

Other materials provided (test book)?_____

Did students log in? _____

Problems/solutions? Describe_____

Misc Notes: _____

DURING TEST: PROCTOR

How many proctors ___ Describe roles _____

What type of instructions were provided to the students _____

_____

Did proctor provide students with technical assistance during test?

Describe _____

_____

How did proctor solve technical problems? _____

_____

_____

Misc Notes: _____

_____

_____

STUDENTS

How many students ____ Type of accommodations _____

Were students able to navigate assessment? Yes _ Some __ No __

Describe _____

Did students receive assistance quickly? (any wait?) _____

Did open-response or Math (reading of) create problems? (clarify: to show math work, students will use paper/pencil/word processor)

Yes __ Some __ No __ Describe _____

_____

Did students fill out their test books? _____

What type of questions did students ask? _____

_____

Misc (extended time? how): _____

POST-TEST: PROCTOR

Describe closing procedures and final observations (PC clean up, printed tests, completed student test books) _____

_____

Post-Interview Protocol for Students (# of students __)

First, I'd like to thank you for talking with me. I have a few short questions to ask you about the test that you just finished taking. Your answers will give us important information about using computers to take tests. As you probably know, a special computer program (you might call it screen reader or text reader) read the test questions aloud to you. Now I want to ask you some questions about that computer program and about taking tests on computers.

1. Do you remember if you were part of the testing this program last fall? _____

2. How often do you use a screen reader or text reader when doing assignments in class?

Student	Student	Student	Student
___ Daily	___ Daily	___ Daily	___ Daily
___ Weekly	___ Weekly	___ Weekly	___ Weekly
___ Not each week	___ Not each week	___ Not each week	___ Not each week

3. How often do you use a screen or text reader when you take tests in your classes?

Student	Student	Student	Student
___ Always	___ Always	___ Always	___ Always
___ Sometimes	___ Sometimes	___ Sometimes	___ Sometimes
___ Rarely	___ Rarely	___ Rarely	___ Rarely
___ Never	___ Never	___ Never	___ Never

4. Do you think that taking a test on the computer is easier or harder than taking a test without a computer?

Student	Student	Student	Student
___ Easier	___ Easier	___ Easier	___ Easier
___ Harder	___ Harder	___ Harder	___ Harder
___ Not sure	___ Not sure	___ Not sure	___ Not sure

Why?_____

5. Was this test easier or harder than other tests you have taken using a computer?

Student	Student	Student	Student
___ Easier	___ Easier	___ Easier	___ Easier
___ Harder	___ Harder	___ Harder	___ Harder
___ Not sure	___ Not sure	___ Not sure	___ Not sure

Why?_____

_____

6. Did you like using the computer to take your test?

Student	Student	Student	Student
___ Yes	___ Yes	___ Yes	___ Yes
___ No	___ No	___ No	___ No

7. How often did you practice taking the CATS on the computer before today?

Student	Student	Student	Student
___ One time	___ One time	___ One time	___ One time
___ Two times	___ Two times	___ Two times	___ Two times
___ Three or more	___ Three or more	___ Three or more	___ Three or more

9. Was it helpful or not helpful to use the practice test before taking the CATS test today?

Student	Student	Student	Student
___ Helpful	___ Helpful	___ Helpful	___ Helpful
___ A little helpful	___ A little helpful	___ A little helpful	___ A little helpful
___ Not helpful	___ Not helpful	___ Not helpful	___ Not helpful

10. Do you feel that you got enough help or not enough help when you had a problem or question during the test?

Student	Student	Student	Student
___ Enough	___ Enough	___ Enough	___ Enough
___ Some	___ Some	___ Some	___ Some
___ Not enough	___ Not enough	___ Not enough	___ Not enough

11. What was the hardest part about taking the KCCT on the computer? (e.g., typing open response, knowing how to use it)

_____

_____

_____

What was the easiest part? _____

_____

_____

12. Is there anything else you would like to tell me about taking the test on the computer?

_____

_____

_____

_____

Post-Interview Protocol for Proctors (# of proctors __)

1. Did you take part in the pilot testing of this program last fall or early spring?

Proctor	Proctor
___ Yes	___ Yes
___ No	___ No

2. How long have you been working with students that use a text reader or screen reader?

Proctor	Proctor
_____	_____

3. How often do your students use a screen reader or text reader when doing assignments in class?

Proctor	Proctor
___ Daily	___ Daily
___ Weekly	___ Weekly
___ Rarely	___ Rarely

4. How often do your students use a screen or text reader when taking tests in class?

Proctor	Proctor
___ Always	___ Always
___ Sometimes	___ Sometimes
___ Rarely	___ Rarely
___ Never	___ Never

5. How often did the students use the practice area of the CATS Online prior to the test today?

Proctor	Proctor
___ One time	___ One time
___ Two times	___ Two times
___ Three or more times	___ Three or more times

6. Did using the computer appear to help or hinder the students in understanding the questions and answers?

Proctor	Proctor
___ Helped	___ Helped
___ Made no difference	___ Made no difference
___ Hindered	___ Hindered

Discuss._____
_____
_____

7. Did the students encounter any problems with keyboarding their answers to the open-ended response questions?

Proctor	Proctor
___ Yes	___ Yes
___ Some problems	___ Some problems
___ No	___ No

Discuss._____
_____
_____

8. Did the students encounter any problems with the Math section due to the inability of the text or screen readers to properly "read" all of the math symbols?

Proctor	Proctor
___ Yes	___ Yes
___ Some problems	___ Some problems
___ No	___ No

Discuss._____
_____
_____

9. How often did you access and use the practice area of the CATS Online prior to today's test?

Proctor	Proctor
___ One time	___ One time
___ Two times	___ Two times
___ Three or more times	___ Three or more times

10. Did you find CATS Online difficult to navigate?

Proctor	Proctor
___ Yes	___ Yes
___ Somewhat	___ Somewhat
___ No	___ No

Discuss._____
_____
_____
_____

11. Based on this testing experience, what do you think the impact will be next year on student participation?

Proctor	Proctor
___ increase	___ increase
___ remain the same	___ remain the same
___ decrease	___ decrease

Discuss._____
_____
_____
_____

12. Now that the testing event is completed, what information would you liked to have known or felt was missing.

_____
_____
_____
_____
_____

13. When did you find out you were going to proctor the CATS ONLINE?

Proctor	Proctor
___ a few days ago	___ a few days ago
___ a week ago	___ a week ago
___ several weeks ago	___ several weeks ago

14. Where did you get your information to proctor today's CATS Online test?

Training class __ (who did it_____) Website __ Other _____

15. Were there problems with the training or materials you received in preparation for the test?

_____
_____
_____
_____

16. What improvements would you suggest with regard to the CATS Online?

_____
_____
_____
_____
_____

Evaluation of the CATS Online
Pre-test Preparation Survey

1. Have you been able to gain access to the practice area of the CATS Online?

_____ Yes _____ No

If No, could you briefly describe the difficulties you encountered?

_____
_____
_____
_____

2. Did you have any difficulty in navigating through the practice area of CATS Online?

_____ Yes _____ No

If Yes, could you briefly describe the difficulties you encountered?

_____
_____
_____
_____

3. Were you involved in administering/overseeing student practice testing for the CATS Online?

_____ Yes _____ No

4. Did the students have any difficulties in navigating through the practice area of CATS Online?

_____ Yes _____ No _____ N/A

If Yes, could you briefly describe the problems your students encountered?

_____
_____
_____
_____