

## **The Development of Technology-Based Counseling Strategies to Enhance Outreach to Parents and Students**

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### **Abstract**

This paper presents a program for counseling students enrolled in an online charter school located in Las Vegas, Nevada. The author presents a review of the process to establish an online school in Nevada and a unique model for delivery of services that combines face-to-face instruction and online education. The author describes the development of a counseling program that includes strategies for encouraging college attendance. Students and parents are given an orientation to online education, online test-taking strategies, and online resources for admission to college. A sample of a web page for counseling and guidance is provided. In addition, this paper summarizes an intervention and research study conducted by the author while serving as Director of Counseling and Director of Testing.

This paper describes a counselor-led intervention to improve mathematics proficiency, help parents and students access learning and test-taking strategies available online, and help parents and students transition to a distance-learning school. The author explores the connection between failure on the test and failure to attend college. The counseling program was developed to expose parents and students to resources that promote college attendance. This action research study was designed to improve achievement in mathematics and prepare students for the mathematics proficiency test.

The scores on the Nevada Proficiency Test in Mathematics were used to measure improvement. As a result of the implementation of test-taking strategies, there was an improvement in the number of senior students passing the test. Before the implementation of the strategies, the percentage of students passing the test ranged from 0% in February 2003 to 7% in April 2003. The Clark County School District has an average passing rate of 20%. After the implementation of the strategies, 30% of the students tested passed the test (November 2003). The results of the parent survey were positive with a majority of parents participating in the orientation and stating that the orientation provided excellent information.

### **Introduction**

The challenge of promoting academic achievement and enhancing outreach to parents and students in Las Vegas, Nevada, is at times overwhelming for educators. Las Vegas is a twenty-four-hour resort-and-hospitality environment with an emphasis on quick and easy money from gaming and entertainment-focused enterprises. Academic achievement at times receives less emphasis than the glamour and glitz of jobs in the entertainment industry. This is a city where casino employees can make more than teachers. Myth and reality intertwine with stories of valet parking attendants and blackjack dealers who make six-figure incomes. Counseling in this environment is aimed at presenting opportunities and alternatives to students who are not exposed to a variety of occupations and who have not been prepared to succeed in a changing work environment. According to *Las Vegas Life Magazine* (2005) this city leads the country in job growth and added seventy-six thousand new jobs last year. The jobs that now offer the most

## Forum on Public Policy

opportunity for students are outside the casino industry in areas of healthcare, housing, and retail. Las Vegas is now reporting more revenue from non-gambling venues than from gaming.

Las Vegas is a city of contrasts and contradictions. It is a city that boasts that fifty thousand new residents move in year attracted by the climate, lack of an income tax, and job opportunities. It is a city that has a speed limit of forty-five miles an hour on city streets; however, traffic can come to a slow crawl of fifteen miles an hour when you go through a school zone. The population increase and the construction of approximately twelve to fifteen schools a year guarantees that most Las Vegas residents will go through a school zone at least once on a daily commute to work.

A report on Student Achievement and Graduation Rates in Nevada by WestEd (2005) documents an enrollment increase of 188% between 1970 and 2000. It also reported problems with low achievement and low graduation rates for the state of Nevada. According to the Las Vegas Sun (2004) Nevada has a low graduation rate (62%). Nevada also reports large gaps in achievement for the various socioeconomic groups (WestEd 2005). The number of English language learners (ELL) has increased with a report of sixty-five different languages used in the schools. Spanish-speaking students are the largest minority. Students at all levels are experiencing problems in Mathematics as well as English proficiency.

Clark County School District (CCSD) located in Las Vegas is the fifth largest school district in the United States. The district has over fourteen thousand full and part-time teachers and operates 277 schools. Approximately twelve new schools are built in the district per year. The growth of the CCSD is fueled by the migration of over fifty thousand people to Las Vegas every year. New residents are attracted by the (a) low cost of living, (b) absence of a state income tax, and (c) sunny climate (Las Vegas Chamber of Commerce 2003). The population

## Forum on Public Policy

growth and the need for schools has also presented an opportunity for the growth of alternative schools and charter schools.

It is in this environment that the Odyssey Charter School (OCS) was chartered in 1999 as a public charter school that operates in cooperation with, but independent of, the CCSD. The school has a charter through the state of Nevada and is sponsored by CCSD; therefore, it is a public school available to any student in Clark County. Funding for each student is provided by the state of Nevada and the federal government. Although OCS is an independent public charter school, the bureaucracy of the Nevada Department of Education and the CCSD do influence decisions. The school was awarded a federal grant targeted for newly chartered schools. With these funds come strict accountability standards and scrutiny.

Nevada is considered one of the most difficult states in which to charter a school, and OCS faced resistance from teachers' unions as well as from the Nevada legislature. The current national political climate is more positive to charter schools and alternative schools. The administration of the CCSD has become more supportive of OCS. The officials at the Nevada Department of Education were initially resistant to charter schools as well as to distance education; however, now OCS is viewed as a model for the development of other charter schools in the state. OCS was instrumental in getting the distance-learning law passed in the state of Nevada and the school holds a distance-learning license.

Online learning is relatively new; therefore, there is a need for research to guide those who develop programs and those who wish to implement them. A meta-analysis by Cavanaugh (2001) found a positive effect size in studies of all distance-education programs except foreign language. Cavanaugh found that distance education could result in achievement comparable to traditional instruction in most academic circumstances. The ideal environment is one in which

## Forum on Public Policy

the student can receive help from an instructor during face-to-face contact. This is the Odyssey model. Clark (2001), in a report on virtual schools for WestEd, found that a “mix of online and on-site method for teacher training” (p. 26) was the ideal. Clark found that, to “enhance retention and completion” (p. 26), students should be prescreened and progress should be monitored.

Odyssey is unique because of its technology-based curriculum and its location on the Internet; however, licensed teachers provide instruction. The elementary school has 750 students and is in its eighth year. This is the fifth year of operation for Odyssey Charter High School (OCHS) as a tuition-free high school with approximately six hundred students. The secondary school has a full-time computer-based program offering academic classes through a combination of face-to-face instruction once a week and curriculum delivered to the home through the Internet. This delivery system is described as blended because the students meet with their teachers each week throughout the course, while the majority of the student’s class time is spent in online learning.

All OCHS courses use CCSD-approved syllabi. The online curriculum is aligned with the syllabi. It is the delivery model, and not the curriculum, that is different. OCHS educators use a variety of methods and material to ensure all standards are met. These include (a) face-to-face instruction, (b) interactive Internet instructional materials, (c) textbooks from the state’s approved list, (d) online textbooks, and (e) other teacher-directed assignments as needed to meet all standards (Odyssey Charter Schools 2000).

The students at OCHS attend school once a week for four hours of instruction in all of their subjects. The high school model had a traditional focus for the first three years and students received classroom instruction from licensed teachers in fifty-minute periods during a four- to five-hour block of time. Students then completed their assignments online during the remainder

## Forum on Public Policy

of the week. This model is described as a hybrid or blended model in that it combines an online component with a face-to-face component. The founders of OCS wanted to combine the best in technology with insightful instruction to provide students with a quality education.

The schools have certain unique features; in the elementary school, the teachers visit each student's home once a week to meet with the parent and the student. Instruction is given, work is checked, and goals are reviewed. This model reflects the goal of the founders to combine the best technology with parental involvement and support.

The schools attract a wide variety of students, some of whom are at risk. In 2003–2004 and presently, this group includes (a) former home schoolers; (b) students who have struggled academically and were unsuccessful in traditional schools; (c) students who were bored in traditional schools; (d) students with such special needs as learning disabilities, emotional problems, medical problems, and pregnancy; and (e) students who are pursuing careers in the performing arts and sports.

The OCHS program offers an attractive opportunity for students. The school serves an at-risk population as well as students who need flexible scheduling for a variety of reasons. The school has students who are involved in the performing arts or sports and must travel. The distance-education law allows them to maintain contact with their teachers by e-mail. This model gives flexibility for those students who are ill or injured. Special-education students can also benefit from the flexibility and individualization of the educational plans.

The original model provided for the high school students to attend class once a week for a half day of instruction. The typical student received six fifty-minute classroom instruction sessions. They received assistance from their teachers (a) while on campus, (b) through e-mail contacts, and (c) by phone. Students were attending one day a week and meeting for fifty-minute

## Forum on Public Policy

sessions with their teachers and were enrolled in six classes that include four required academic subjects and one elective. Physical education classes are held in local parks twice a week for a total of four hours a week. Students must spend fifty minutes a day per subject for the remaining four days at home. They can access their curriculum through the Internet and communicate with their teachers via e-mail. They must log their minutes per class in a document that is turned in each week when they are on campus.

The online component provides all content material through the Internet. The Web-based educational platform is UCompass (UCompass 2006). There is also advanced software integrated into the curriculum. This model provides for teacher–student flexibility and meets the diverse needs of the student population.

The online textbooks are provided through Glencoe (Glencoe 2006). Instruction is also enhanced with the Tegrity Program. Tegrity is described as

The first Student Achievement System that impacts learning across the entire institution, improving retention and student satisfaction. Tegrity makes class time available all the time by automatically capturing, storing and indexing every class on campus for replay by every student. Educators know that the more students can see, hear, and experience class resources, the better they learn. With Tegrity, students quickly recall key moments or replay entire classes online, on their iPods and cell phones. Tegrity includes power-point based audio/video presentations. (Tegrity 2006)

This program is available as a resource to supplement online instruction. There are audio options, video options, a document camera, and screen recording and drawing tools. “Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students’ learning” (Hart and Keller 2001).

Although this was a new approach to education in Las Vegas, the OCHS report on accountability (Odyssey Charter Schools 2003) documented improvement in (a) test scores, (b) family involvement, (c) a personal education plan for each student, (d) group-learning activities,

## Forum on Public Policy

and (e) refinements of individual education programs for special-education students. This report is evidence of the success that OCHS has achieved with a high-risk population.

OCHS has an onsite technology department to support teachers, parents, and students. The school has loaner computers available for parents who do not have a computer in the home. This department maintains and updates the OCHS Web site and the school's electronic newsletter and assists with problems that develop with the online curriculum. The technology department can provide remote assistance to families who call in for help.

The *Odyssey Charter* also requires that students take all of the standardized tests required by the state of Nevada (Odyssey Charter Schools 2000). The state has spent \$2 million on a system of assessment, the Nevada High School Proficiency Exam (NHSPE). Since 1982, Nevada has had the NHSPE as a state requirement; however, the content has recently become more rigorous ("Proficiency exam: Taking the test to task" 2001). The NHSPE consists of reading, writing, and mathematics in grades 11 and 12 ("Proficiency Exam" 2001). A science requirement will be added for all students graduating in 2005. According to the *Las Vegas Review-Journal*, Nevada students will be tested for approximately eighty-five hours before graduating from public high school ("Proficiency Exam: Taking the test to task" 2001).

The Nevada Proficiency Test in Mathematics (NPTM), developed by the Harcourt Educational Measurement Company (2002), is a very difficult test with pass rates in CCSD that ranged from 21% in 2002 to 19% in 2003. The seniors at OCHS had a pass rate ranging from 17% in 2002 to 7% in 2003. The current test was developed by Measured Progress (2006). The test examines proficiency in the areas of (a) numbers and operations, (b) algebra, (c) geometry, and (d) statistics, during a testing period that allows for unlimited time. Further, the test measures (a) conceptual understanding, (b) procedural knowledge, and (c) problem-solving skills. To

## Forum on Public Policy

receive a standard diploma in Nevada, students must pass proficiency tests in mathematics, reading, and writing. Students who do not pass all proficiency tests receive a certificate of attendance instead of a standard diploma.

The No Child Left Behind Act (NCLB) has forced Nevada to look once again at proficiency scores and achievement. In June 2003, Senate Bill 1 passed by the 19th Special Session of the Nevada Legislature lowered the passing score on the NHSPE in mathematics from 304 to 290 for students who entered the ninth grade in the 1999–2000 school year (Nevada Department of Education 2004). The Nevada Department of Education was required to review the passing score and then incrementally raise the score necessary for proficiency to at least 304 effective for students who enter the ninth grade in the 2003–2004 school year and anticipate graduating in the 2006–2007 school year. Consequently, the score a student must attain to pass the mathematics test is solely determined by the year in which the student first entered the ninth grade.

This paper describes a counselor-led intervention to improve mathematics proficiency, help parents and students access learning and test-taking strategies available online, and help parents and students transition to a distance-learning school. Parents and students were also introduced to postsecondary opportunities via the Web site and a counselor-led orientation.

This counselor became interested in low achievement in mathematics while working as Director of Counseling for OCHS. In this position, this counselor was responsible for placement of students in the correct classes and reporting of grades on the official transcript. Counseling responsibilities include administration of all mandated testing. As (a) transcripts, (b) grades, and (c) scores on the mathematics proficiency test were reviewed, it became evident that low scores

on the mathematics proficiency test were preventing students from obtaining a standard diploma at graduation.

Another observation was that students, who had not been successful in traditional schools, are attracted by the OCHS schedule. Because students attend school once a week for a half day and have free time the rest of the week, this school becomes an attractive alternative. However, success is dependent on students completing their work and e-mailing their teachers with completed assignments during the week. They are quizzed and take tests during their assigned classroom time. Some students in this high-risk population needed a more structured environment. The parents of these students should be monitoring their study schedule and progress. However, these are the same parents who had difficulty monitoring work in the traditional environment. In an ideal Internet learning atmosphere, the students would be organized and motivated self-starters. Unfortunately, many students at OCHS struggled with issues of (a) self-discipline, (b) attendance, and (c) completion of assignments; the result is low grades.

Online learning programs struggle with high dropout rates and OCHS has a large turnover of students who try this online model and then leave for other alternatives. For students to succeed, they need to be prepared for online learning (Elearnspace 2002). Students need (a) a certain environment—PC, Internet connection, and software—(b) technical skills; (c) subject-matter skills; (d) study skills; and (e) support. The ideal student is described as (a) mature, (b) self-disciplined, (c) experienced, (d) possessing a high emotional quotient, (e) will to ask for help, and (f) an independent learner, (Elearnspace 2002). Osika and Sharp (2002) found that students have difficulty succeeding in an online environment without strong technical skills.

## Forum on Public Policy

These are not the typical traits of high school students and certainly not traits of an at-risk population.

Mathematics proficiency is dependent on students taking the correct classes and also understanding the strategies to solve test problems. This counselor has observed that, if students have not progressed to the level of Algebra I upon entry into high school, they usually do not complete the geometry and higher mathematics found on the proficiency test. This counselor suggested that OCHS (*a*) place students in prealgebra or algebra, (*b*) diagnose deficiencies, (*c*) provide remediation during one-on-one study sessions with teachers, and (*d*) implement test-taking strategies to help students prepare for the test.

In 2003–2004, the students were meeting with their mathematics teachers for one fifty-minute session each week. The mathematics curriculum provides instruction in all levels of mathematics from fundamental math to precalculus and fulfills the Nevada State Content Standards for Mathematics (Nevada Department of Education 2004). The teachers had been working throughout the 2003–2004 school year to teach mathematics and, at the same time, prepare these students for the mathematics proficiency exam.

The proficiency test is an extremely important milestone in obtaining a standard diploma, and also for future employment and college admission. Students will receive a certificate of attendance if they do not pass the proficiency tests in reading, mathematics, and writing. The failure rate on the mathematics test and grades in mathematics classes are indicators of low achievement in mathematics. The mathematics proficiency test is the most difficult of all of the proficiency tests. Students were becoming discouraged by the difficulty of passing the test. Parents and educators were concerned about the future of students who do not have competency in mathematics.

## Forum on Public Policy

In the OCHS student population, there are many students who have not been successful in traditional school settings. The *Odyssey Accountability Report* (Odyssey Charter Schools 2002) documents that approximately 11% of the OCHS students have special educational needs—learning disabilities and emotional problems. Over 51% of the students are classified as at risk. In the 2002–2003 school year, nineteen out of twenty-nine juniors who took the test were enrolled in fundamental mathematics or prealgebra. Students were not taking the correct courses and they were being tested on material that they had not covered in their curriculum. These students had several opportunities to pass the NPTM at testing sessions held in the months of November, February, April, and May of each school year.

For the purpose of this study, the scores on the proficiency test are considered one measure of mathematics achievement. In the 2001–2002 school year, four out of twenty-four, or 17%, of the juniors at OCHS achieved at or above the passing level of 304 on the NPTM. In the 2002–2003 school year, the pass rate for these students, who are seniors in 2004, ranged from 23% passing on the November 2002 test and 0% passing on the February 2003 test to 7% passing on the April 2003 test. This low achievement and the failure of students to pass the mathematics proficiency test means that most of the Odyssey students will not receive a standard diploma. The pass rate mirrors the CCSD's pass rate of 21%.

An intervention was designed to address the problem of mathematics achievement. This counselor proposed an intervention that would involve teaching students test-taking strategies as they were being taught mathematics, orienting parents and students to the online strategies, and also orienting them to the distance-learning environment. This research was designed to explore the results of the implementation of test-taking skills. It was hypothesized that by teaching the test-taking strategies from [homeroom.com](http://homeroom.com), students could improve their test-taking abilities and

their scores on the mathematics proficiency exam. It was projected that beginning in the 2003–2004 school year, the percentage of seniors at OCHS passing the mathematics portion of the NPTM would increase 5%. During March of 2003, this counselor conducted interviews with two mathematics teachers and fifteen juniors, asking several questions to gain a more complete understanding of the OCHS students' problem with mathematics achievement: (a) What do mathematics teachers and students think about the NPTM? (b) What strategies do mathematics teachers and students think will help achievement on this test? (c) What do teachers and students think about the current interactive program as preparation for the NPTM? Thirty- to forty-minute interviews were conducted with students and teachers over a period of a week.

*What do students and teachers think about the Mathematics Proficiency Test?* All students thought that the test was not fair. The majority of the fifteen students were aware that they had not been exposed to much of the material that was on the test. Many students had not had algebra or geometry. The students were highly stressed by the consequences of not passing this test. The mathematics teachers commented that most students were not prepared for the test based on past and current mathematics placement. Those same two teachers believed that high school students in Nevada were not prepared in middle school for high school mathematics. The consequence of this lack of preparation is that many students need remedial mathematics and never achieve proficiency in algebra and geometry. Both teachers and students believed that students needed more practice before taking the test.

The mathematics teachers believed that test-taking strategies could be employed to help students improve their achievement on the test. One mathematics teacher who helped develop the mathematics proficiency test observed that the General Education Diploma Test is very similar to the NPTM and could be used for practice. Both mathematics teachers stated that the current

## Forum on Public Policy

practice of having several levels of mathematics in each class at OCHS should be discontinued. Students asked that special tutoring be provided to students to assist in passing the test. Additionally, students believed that they needed more individual attention from teachers during their weekly class period.

*Do teachers and students believe that the current interactive program prepares students for the test?* The teachers believed that the interactive program (Boxer Learning 2002) did not revisit skills that the students have previously learned. More opportunities to review the skills taught in the interactive program were needed. These teachers were frustrated that they were teaching several levels of mathematics in each classroom; in this learning environment, it was difficult for teachers to diagnose specific problems that students had in mathematics. The interactive program does not have a diagnostic test that students could use to help them work on areas of weakness. The program has self-guided and self-paced simulations that help students develop skills. The program also has tests that assess content and problem solving. The teachers are provided with a performance report for each student that tracks the time spent working on problems and achievement. Students were divided in their opinion of the mathematics program. Some students did not use the tutorials that would help them master the material. Most students believed that the program was not preparing them for the test while others said that program was helping them learn their classroom mathematics.

The problem of mathematics proficiency is complicated by the transience of the high school population. This counselor observed during a review of transcripts that some of the students transferring into Odyssey had not taken mathematics courses that would help them pass the proficiency test or prepare them for a postsecondary experience in college or a technical school. It was also observed that if students have not progressed to the level of Algebra I upon

entry into high school, they usually do not complete geometry and the higher mathematics on the proficiency test. This counselor suggested that OCHS (a) place students in prealgebra or algebra, (b) diagnose deficiencies, (c) provide remediation during one-on-one study sessions with teachers, and (d) implement test-taking strategies to help students prepare for the test.

An intervention was designed to address the following questions. (a) Can test-taking strategies be used to improve student achievement in mathematics? (b) What instructional strategies or programs have been effective in helping students in nontraditional schools improve their performance on tests? (c) How can parents become involved and help their children improve their achievement in mathematics?

The American Educational Research Association (2000) has stated “students must have had a meaningful opportunity to learn the test content and cognitive processes” (p. 2). The American Educational Research Association further reported that if high-stakes testing programs are implemented in circumstances where educational resources are inadequate or where tests lack sufficient reliability and validity for their intended purposes, there is potential for serious harm.

Mathematics achievement is usually described as being dependent on student attitudes, motivation, organization, and feelings of competency (Pajares 1996). Goodwin (2000) offered research-based suggestions to improve achievement and recommended that all students have (a) rigorous curricula, (b) smaller classes, and (c) access to support from teachers. Odyssey is in the unique position of having an educational model that can provide this support.

Odyssey subscribes to a variety of online tools to improve achievement. Homeroom.com is one of the Web-based learning tools available to all Odyssey students. The homeroom Web site allows teachers to create assessments and view student performance reports in the same language and sequence as the state standards. Teachers can also administer a homeroom test on

## Forum on Public Policy

paper and scan the test into homeroom for reporting. Administrators can create benchmark tests for the school; these tests are available online or can be printed. “Interactive Inc., an independent educational research and evaluation firm found that homeroom.com improved student performance” (Princeton Review K–12 Services, 2003b).

The test-taking strategies available on the web through homeroom.com were taught during the regular classroom mathematics period as well as reinforced through the online curriculum. The Web site had test-taking strategies for mathematics as well as practice tests and skills practice with lessons and activities. Teachers and students had access to these strategies in the classroom and at home. The computer-based curriculum was monitored carefully to be certain that students were progressing and their questions were being answered. The remediation was ongoing for students who planned to graduate in 2004. The mathematics teachers used the National Council of Teachers of Mathematics Illuminations Web site as a valuable resource (Hart and Keller 2001).

In 2003–2004, OCHS changed the method of assigning students to mathematics classes. All freshmen were assigned to algebra. Sophomores, juniors, and seniors were assigned to classes based on the last class that they passed. The typical sequence of mathematics was algebra, geometry, and Algebra II. By assigning students to the most challenging classes and offering remedial assistance, the teachers worked to improve mathematics achievement. The classroom instruction and the study sessions were used to teach study skills and the test-taking strategies. The technology and the computer-based curriculum were designed to give students opportunities to improve their skills through practice and review. The teachers (*a*) had high expectations for all students, (*b*) encouraged students to take the challenging courses, and (*c*) gave support in the form of remediation. Achievement is related positively to (*a*) rigorous

curricula, (b) small classes, (c) encouraging students to take challenging classes, and (d) support and development for all students (Gutierrez 2000).

There are SMART Board interactive whiteboards in each classroom that are connected to the internet and the online curriculum. The whiteboard allows the user to control and write notes by pressing on the touch-sensitive surface. The user can print, e-mail, or save notes as an HTML file (SMARTer Kids Foundation 2002). The board can be used as an electronic whiteboard and can save notes to a computer. Any program that is available on the Internet can be projected on the SMART Board. This board was used to project and teach the online strategies.

Implementation of these strategies began in September 2003 and took place for two months. Mathematics strategies were introduced in junior and senior classrooms, reaching approximately 150 students. Three mathematics teachers introduced these test-taking strategies at the beginning of the class session. Two strategies were introduced during each class session. The SMART Board interactive whiteboard was used in the classroom to introduce the strategies. The strategies were reinforced by contact with each student during regular teacher–student e-mail contact. The practice exams were on the Web and the SMART Board was used in the classroom to present practice problems. Students were exposed to the test-taking strategies in the classroom and were also given homework problems for practice and review. The practice exams gave students an explanation of why their chosen answer was correct or incorrect. When a student completed an assignment online, the student received immediate feedback. The practice proficiency test was assigned as an online test and also given in class as a paper-and-pencil test. Students could practice taking the test using both formats. This counselor developed the schedule for the introduction of the strategies and provided hard copies for the teachers to give to students.

## Forum on Public Policy

There were a total of fifteen strategies: (a) crossing out extra information, (b) charts and graphs, (c) mathematics vocabulary, (d) substitution, (e) draw it, (f) estimate answers first, (g) order of operations, (h) fractions, (i) converting, (j) translating word problems into mathematics problems, (k) average pie, (l) ratio box, (m) rule of 180 and 360, (n) parallel lines—Fred’s theorem, and (o) the process of elimination. In addition to the test-taking strategies, the classroom teachers used skill resources as part of their weekly mathematics lessons. Two strategies were introduced each week by each of three mathematics teachers. This counselor made classroom visits to observe and monitor the introduction of the strategies during each class period for a two-month period. Weekly meetings were held with the administration and the mathematics teachers to get feedback on the use of the strategies and to solve difficulties with the online mathematics program (Boxer Learning 2002). The mathematics proficiency test was analyzed to allow test questions to be matched with the correct strategy.

*What instructional strategies or programs have been effective in helping students in nontraditional school improve their performance on tests?* The current technology can provide students an opportunity to meet the goals of the state standards (Heid 1997). It is important for students at risk to be enrolled in academic courses. The successful completion of academic coursework and student motivation are important for academic achievement (Anderson and Keith 1997). High standards, a challenging curriculum, and good teachers can help alleviate the achievement gap (Haycock 2001). Study-skills instruction developed for students with learning disabilities may also help underachieving students (Sedita 2000). Study-skills interventions do work (Hattie, Biggs, and Purdie 1996). The National Council of Teachers of Mathematics Illuminations Web site Project (Hart and Keller 2001) is an important resource to support mathematics teachers. Fundamental mathematics courses, which are replaced by transition

courses that lead to algebra and geometry, can improve achievement and completion of a college preparatory sequence (Gamoran et al. 1996).

Achievement in mathematics is related to student factors—attitude and motivation—and school factors—curriculum, teacher attitudes, and school policy. Mathematics achievement can be improved by ensuring that the mathematics curriculum is aligned with the state standards being tested. If teachers are committed to the success of all students and believe that students can be successful, these teachers will support the students as they attempt a more challenging curriculum. School policy and the way students are assigned to classes are important for success. Innovative courses that give students the opportunity to make up deficiencies while transitioning into algebra, geometry, and higher mathematics courses can boost achievement. Students can benefit from strategies that teach them how to use reasoning and problem solving to tackle difficult mathematics material (Malpass, O’Neil, and Hocevar 1999).

Study skills and learning strategies can be used to improve student achievement in a virtual high school (Heid 1997). Study-skill interventions that help the learning-disabled student can be used to help struggling students. Organizational skills that teach the use of calendars, assignment notebooks, and log sheets are valuable tools for all students. Main idea, note taking, and summarizing skills can be used to improve achievement in all classes. Transitional mathematics courses with challenging content can help students’ attitudes toward mathematics and may help them understand the relevance and importance of mathematics (Gamoran et al. 1996). These courses can also help students move into algebra, geometry, and higher mathematics. The Internet and mathematics Web sites can support the teachers’ efforts to improve mathematics achievement. These Web sites have suggestions, lesson plans, and sample test questions for use by teachers and students.

## Forum on Public Policy

Parental involvement is important, and although it may decline as children progress, schools can increase involvement by reaching out to parents (Simon 2001). Although there are several parental involvement programs for the elementary level, there were no programs that address the special situation of parents and students in a virtual high school. If the decline in parental involvement is related to the complexity of schools, some parents will have even more difficulty with a school with an Internet curriculum. Parental involvement declines for all students over time as they progress in school (Crosnoe 2001). The decline in parental involvement may be related to the (a) complexity of high schools, (b) complexity of the curriculum, and (c) tensions of adolescence. However, as schools reach out to parents, their involvement increases (Simon 2001).

Parents' beliefs about (a) their role in their child's education, (b) their ability to help the child succeed, and (c) the school desire to have them involved are important for involvement (Hoover-Dempsey and Sandler 1997). The plan was to increase parental involvement through an orientation that would introduce parents and students to the Odyssey distance-learning environment and the test-taking strategies.

A counselor-led orientation program for students and parents and a program to increase parental involvement were developed to help students succeed and parents understand how to help their child improve achievement in this distance-learning environment. The program was presented to parents after school as they were picking up their children. Parents were introduced to the Web site, the online orientation, and the test-taking strategies from [homeroom.com](http://homeroom.com). Parents were shown how to check the progress of their child by looking at the Odyssey Web site. This is an example of the use of technology to help parents and students improve their academic skills. The orientation served as an outreach to parents to make the school and the technology

## Forum on Public Policy

more inviting. The belief was that the more comfortable the parents became with the technology, the more support they could give their child. Homeroom.com (Princeton Review K–12 Services 2003a) was introduced during the orientation program for parents in October 2003. Parents had access to this program and the test-taking strategies at home. Their familiarity with this program gave them the tools to support their child during their home-study sessions. In October 2003, all parents were invited to participate in orientation sessions offered every evening for a week. One hundred twenty families participated out of a total enrollment of 550 families. This counselor and OCHS teachers taught parents how to access the curriculum and the test-taking strategies on homeroom.com. They learned how to check grades and attendance. The parents learned how to look for teacher communication via e-mail and also how to view the online grade reporting system. The student could send the parent an invitation through the site that allowed the parents to view their work. Additionally, parents were responsible for signing weekly logs that documented the amount of time spent in each subject area. Parents had access to homeroom.com from any computer with Internet access. Parents received information about homeroom.com and the test-taking strategies that are available online. Parents also received a schedule for the introduction of these strategies so that they could encourage their child to practice at home. Information on the OCHS Web site directed parents to the homeroom.com site of Princeton Review K–12 Services (2003a) so that they could encourage their child to learn these strategies. The parent orientation is now offered by going to [www.odysseyk12.org/parents](http://www.odysseyk12.org/parents).

Parents were surveyed during the second week of October 2003 after the parent orientation (see Appendix). The questions were designed to evaluate the parents' understanding of the homeroom.com Web site of Princeton Review K–12 Services (2003a) and their grasp of the importance of test-taking strategies. The questions surveyed their opinion of the importance

of parental involvement for student success and included questions on communicating with teachers and signing the weekly log (see Appendix).

Survey results were used to determine if parents were more knowledgeable about the homeroom.com Web site (Princeton Review K–12 Services 2003a) and test-taking skills after receiving an orientation. This researcher had predicted that the introduction to the Web site and the test-taking skills would help (a) parents feel more comfortable with this resource and, in turn, (b) parents would encourage their child to use the strategies and prepare for the mathematics proficiency test.

In September 2003, the three mathematics teachers at OCHS began using the test-taking strategies from homeroom.com of Princeton Review K–12 Services (2003a) to help students prepare for the NPTM. They introduced the Web site at the beginning of the semester and made sure that each student had a username and password. Each week, a test-taking strategy was introduced in the classroom using the SMART Board. Students were also given a sample of the week's strategy and several problems demonstrating the strategy that had been printed from the Web site. The strategies in written form gave students an opportunity to practice the strategies at home. Further, the OCHS mathematics teachers used review pages from old proficiency tests to help students prepare.

These mathematics test-taking strategies from homeroom.com of Princeton Review K–12 Services (2003a) were introduced in class and reinforced through classroom assignments that students completed at home. In addition, homeroom.com has two full-length predefined tests that have sample problems similar to those found on the NPTM.

## Results

This intervention proved to be successful with an improvement in proficiency test scores. The NPTM was given in November 2003 to seniors. The participants in this study were 100 junior students and 50 senior students, all enrolled at OCHS. Only forty-four students took the proficiency test in November 2003 because the state of Nevada limits that test to seniors.

Mathematics achievement was measured by seniors' test scores on the NPTM. The OCHS students' test scores had ranged widely as follows: (a) 17% proficient in April 2002, (b) 23% proficient in November 2002, (c) 0% proficient in February 2003, and (d) 7% proficient in April 2003. After two months of the test-strategies intervention, the results of the November 2003 testing showed an improvement as 30% of the seniors who were tested passed the mathematics proficiency test (see Table 2). Of the forty-four students tested, thirteen students were deemed proficient on the basis of their scores. This counselor expected improvement of 5% in the percentage of students passing the NPTM as a result of the introduction and practice of the test-taking strategies. The data from two previous test dates—April and November 2002—revealed pass rates on the mathematics proficiency test of 17% and 23% respectively. The average of these rates is 20%. The difference between this 20% average and the 30% pass rate of November 2003 is 10%. Therefore, the improvement after implementation was actually 50%. The results were made available in February 2004, and the 30% passing rate is the largest ever obtained by students at OCHS. However, this passing rate cannot be attributed solely to the test-taking strategies. The new score tables tie scores to the year the student entered ninth grade, and therefore, more students had a chance to pass the test.

Table 1

*Results of Test Scores on NPTM, November 2003*

Mathematics Students	Proficient		Not Proficient	
	%	No.	%	No.
All students	30	13	70	31
Gender				
Females	35	11	64	20
Males	15	2	84	11

*Note.*  $N = 44$ . Ethnic data were not available for this test date. NPTM = Nevada Proficiency Test in Mathematics.

The parent orientation was also successful as measured by the survey and the parents' comments. Parents at OCHS are an important part of the success of their students in this Internet school. Parents were introduced to homeroom.com of Princeton Review K–12 Services (2003a), the test-taking strategies, and the OCHS curriculum during the orientation from October 13 through October 17. Parents received an hour-long orientation to the high school Web site, information on parental involvement, proficiency testing, and test-taking strategies on homeroom.com. Parents were given information on how to (a) access the online curriculum, (b) view assignments, and (c) contact teachers and tech support. The relationship between the test-taking strategies and the mathematics proficiency test was explained to parents. The parents were surveyed, after the orientation, to assess their understanding of the curriculum, homeroom.com, and test-taking strategies. Table 3 documents the results of this survey.

Seventy-two parents out of 120 families completed the survey. None of the parents *strongly disagreed* with any of the questions; however, not all parents responded to every question (see Table 3). A total of seventy-one parents agreed—forty-eight strongly agreed and

Forum on Public Policy

twenty-three others agreed—that the orientation provided useful information on how to access the Web site.

Table 2

*Results of OCHS Parent Orientation Survey*

Question	Strongly			
	Agree	Agree	Disagree	Undecided
1. The orientation provided useful information on how to access the Web site.	48	23	0	1
2. The orientation provided information on the relationship of test-taking strategies to achievement on tests.	37	25	4	5
3. The orientation provided useful information on how to help my child use the test-taking strategies.	43	22	3	4
4. Parental involvement is important for student success at OCHS	65	7	0	0
5. The orientation provided information on how to communicate with teachers to get questions answered	50	18	2	0
6. It is important for parents to sign the weekly log to document time spent on the curriculum.	59	12	1	0

*Note.*  $N = 72$ . OCHS = Odyssey Charter High School.

The parents had an opportunity to provide comments in the last section—Question 7, additional comments. Additional comments were, in general, very positive, with parents stating that the orientation was very helpful and informative; however, most parents stated that they wished that the orientation had occurred earlier in the semester closer to the first week of school. In the following semester, an orientation was held in January 2004. In addition to the orientations held at the school, this counselor worked with the technology department to design a Web site

## Forum on Public Policy

with the orientation online; this can be accessed by going to [www.odysseyk12.org](http://www.odysseyk12.org) and clicking on the high school site. From that site, parents can click on the parents' button.

The parent-orientation page has three parts: (a) Quick Tour of the Web Site has links with information on announcements, online curriculum, classes and weekly assignments, how to contact teachers, the newsletter, and tech support; (b) Parent Involvement has recommendations for parents, weekly logs, viewing grades online, and download for logs; and (c) Guidance - Testing - Graduation has a guidance page link, college admissions, careers, financial aide, testing information, graduation information, and a link to [homeroom.com](http://homeroom.com) of Princeton Review K–12 Services (2003a) and test-taking strategies. This Web site can be used by parents who did not attend the orientation and also by parents who need a review.

### **Conclusion**

This intervention was designed to improve mathematics achievement and involve parents in the process of improving achievement. The use of the test-taking strategies from [homeroom.com](http://homeroom.com) of Princeton Review K–12 Services (2003a) did have a positive effect on the students' ability to pass this test. More research is needed and additional testing is needed to draw conclusions from this preliminary evidence. It is recommended that mathematics teachers continue to implement these mathematics strategies for all grade levels. Students begin testing for mathematics proficiency as sophomores and practice on strategies may help them prepare for the first test. OCHS teachers will need to continue to monitor test scores and implementation of strategies to determine if this increase in scores is due to the implementation of the strategies.

The parent orientation was an indisputable success as evidenced by the survey and the additional comments. This orientation is now offered on campus and online through the OCHS Web site at [www.odysseyk12.org/parents](http://www.odysseyk12.org/parents). OCHS has made an important first step in involving

parents in the process of improving student achievement. Research shows that students' learning is maximized through familial or parental involvement in their schooling (Valdez 2003). Parents are an important part of students' success at OCHS. Because students attend only once a week for 4.5 hours, parents must monitor the learning at home. Many parents want to be involved but do not fully understand the online curriculum or how to access teachers and assignments. This parent orientation that was held each day for an entire week in October 2003 gave parents a chance to learn how to use the Internet and the OCHS Web site. Parents could attend any day after they picked up their child. It is now also a part of the OCHS Web site so those who could not attend the orientation can now look on the Web and see the same step-by-step presentation.

### **Follow Up**

In 2003–2004, OCHS became part of the Accelerated Schools program. The principles of Accelerated Schools have (a) unity of purpose, (b) empowerment coupled with responsibility, and (c) committed to building on strengths. The Accelerated Schools Project (McCarthy and Riner 1996) is a comprehensive approach to school change designed to improve schooling for students in at-risk situations so that they may enter the educational mainstream. The Accelerated Schools Program is designed to structure schools that build on the strengths of all children and accelerate their learning by making changes in curriculum, instruction, and organization that will facilitate academic and social progress. As part of this program, teachers work together in collaborative groups to address low achievement and attendance.

Two years ago, in the 2004–2005 school year, the high school delivery model was changed to address the problems of low achievement and attendance. The focus was changed from fifty-minute lectures to using the Internet to teach. The Odyssey faculty explored the use of technology to teach student strategies so that they can take control of their learning. Instead of

## Forum on Public Policy

seeing five teachers and spending fifty minutes in a lecture, the students now work with teacher facilitators and learning strategists. The instructional facilitator works to develop a group of twenty students as a community of learners. The learning strategists teach learning strategies to students, staff, and families. The faculty now works in instructional teams that include the (a) administrator, (b) special-education teacher, (c) instructional assistant, (d) counselor, and (e) content-area teachers. All content instruction is online.

Students now attend school four hours weekly and learn strategies for two hours with Content Enhancement Specialists trained in the Strategic Instruction model from the University of Kansas. This is a research-based approach that has as its aim the development of independent learners. “In sum, Strategic Tutoring has been found to improve student performance on quizzes and tests in general education classes; skill levels in math, reading, and written expression; and knowledge of cognitive and metacognitive strategies” (Hock 2003).

The remaining two hours are spent in a homeroom class monitored by two teachers. This homeroom is designed to monitor, counsel, track progress, and provide feedback to students. This design was implemented to increase direct contact and communication between students and teachers.

The school also has additional services to provide support to struggling students. There is a learning lab that gives students additional access to their teachers, a physical education program (two credits) that requires students to meet twice weekly for instruction. In the Enrichment Program, a program facilitated by Odyssey teachers, students are mentored in exploring their chosen area of focus.

## Forum on Public Policy

In conjunction with the University of California, Santa Barbara, and the University of Nevada Las Vegas, the Words of the City Project explores local stories with global connections. This project explores culture, history, and the local southern Nevada environment.

For the students at Odyssey, technology is an instructional tool in the learning process. Odyssey teachers have found that technology can be used to promote student engagement and achievement (Yeager and Elder 2005).

In addition, the school has two grants directed at helping students improve achievement and at helping parents understand the online curriculum. A Twenty-First Century Learning Center Tutoring Program (Stars Academy) operates daily before school and after and provides strategic tutoring, and academic support. Odyssey also operates three off-site tutoring sites and parent education sites in three areas of the valley two evenings and three afternoons a week. This grant is available through Senate Bill 404 Funding.

The problem with mathematics achievement has not been solved, but the administration and faculty at OCHS are using the technology and research-based strategies to improve achievement and offer a quality education in an online environment.

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Published by the Forum on Public Policy

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## **Appendix**

### **Parent Survey after Orientation to homeroom.com**

The following survey will be given to parents after the orientation to homeroom.com. The orientation will take place during the first two weeks in October 2003.

Directions: The following survey is being administered to provide feedback on the orientation to Odyssey Charter High School. Please rate each item on a scale of 1 to 5, 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, and 5 = strongly agree.

1. The orientation to homeroom.com provided useful information on how to access this Web site.
2. The orientation provided information on the relationship of test-taking strategies to achievement on tests.
3. The orientation provided useful information on how to help my child use the test-taking strategies.
4. Parental involvement is important for student success at OCHS.
5. The orientation provided information on how to communicate with teachers to get questions answered.
6. It is important for parents to sign the weekly log to document time spent on the curriculum.
7. Additional comments from parents.

**Odyssey Charter High School**

Current Demographics – May 4, 2006

Total Enrollment .....	581
Males.....	288
Females .....	293
White – A.....	395
Black – B.....	58
Asian/Pacific Islander – C .....	32
American Indian/Alaskan Native – D.....	11
Hispanic – E.....	85
Grade 9.....	247
Grade 10 .....	165
Grade 11.....	116
Grade 12.....	53
Percentage of Students that qualify for free and reduced lunch: .....	71%