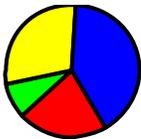




*Evaluation of the Kent
Technology Academy
2005-2007*

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Executive Summary

The Kent Technology Academy (KTA) operated during the school years 2005-06 and 2006-07 as a school-within-a-school magnet program on the Mill Creek Middle School campus. KTA students participated in a technology-rich, smaller learning community for their core academic classes, while taking P.E. and elective classes from those offered to the entire Mill Creek student population.

This evaluation focuses on the results of the program after two years of operation. During the period encompassed by this evaluation, each KTA student received a tablet computer, both for use at school and to take home. The KTA program employed a variety of other technology tools, such as video cameras, digital cameras, and learning management software. The program also used various teaching approaches that are currently considered best practice:

- Cooperative approaches to learning
- Project-based instruction
- Individualized and differentiated instruction
- Sustained writing opportunities
- Integration of subject matter
- High expectations for every student

By every measure examined in this study, the KTA program has been successful. This Executive Summary is organized around both positive findings and opportunities for refining or improving the program. In addition, this summary addresses the extent to which KTA can serve as “proof of concept” for broader implementation of one-to-one laptop programs.

Positive Findings

- As planned, the first two cohorts of KTA students resembled the population of Kent School District as a whole. This is important because, in light of the other findings below, it indicates that the program can work for a diverse group of learners.
- The program is attracting students to the Mill Creek campus; in fact, interest in the program exceeds the available seats.
- Some aspects of the KTA program appear to have benefited the entire Mill Creek campus. Mill Creek students’ technology skills and school climate, specifically, appeared to be stronger than for the district as a whole.
- Achievement of KTA students on the WASL exceeded the performance of the overall district and of the state as a whole.
- If KTA were a school rather than a program, the achievement of KTA students would have caused it to be ranked as the top or second school in the Kent School District—in every subject tested with the WASL, at both

grades 7 and 8, and on the state's Technology Literacy Survey, a standardized self-report instrument.

- KTA students' high achievement appears to be due, at least in large part, to increases in their achievement since entering KTA, and not solely due to their prior achievement.
- Students in KTA (and in some Mill Creek classes using technology) were highly engaged in their school work. In interviews with and observations of KTA students, they were excited about their projects and the strong support from their teachers.
- The teachers in KTA were exceptional—both in terms of their commitment and hard work in the beginning of KTA and their high skill level, but also in terms of their dedication to and rapport with their students. While some of this rapport may have been due to the “smaller learning community” aspects of the program, the original selection process for hiring KTA teachers was also quite rigorous. KTA teachers were observed to be flexible and creative; they had high expectations and positive approaches to classroom management.
- KTA teachers received a great deal of training and they reported that this training had been useful in implementing the approaches used in KTA. A review of this training indicates it encompassed many topics considered to be best practice and was not just focused on technology use.
- Technical support for the program and administrative support from the school and central office was strong, both at the beginning and throughout the first two years. Teachers and students in KTA expressed their appreciation for this support.
- While technology tools will probably always have technology malfunctions, some basic technical problems can now be addressed by KTA students themselves, which allows for both a quicker solution and for advanced technical support to be focused on the more complex problems.

This study cannot quantify the extent to which each of various factors contributed to the success of KTA; e.g., teacher characteristics, extensive teacher training, a smaller learning community, good technical support, a focus on project-based learning, and the capacity of technology to increase student engagement and individualize the instruction. Based on current educational research, it is likely that all of these factors made a contribution and efforts to continue to provide these conditions will be important in sustaining the program.

Opportunities for Improvement

1. The hardware and software glitches at the beginning of the program were probably inevitable, but long-term hardware questions remain to be explored, both in terms of equipment durability and cost. Currently, vendors are not offering products that would meet the optimal needs of KTA.
2. In the first two years of the program, students who left KTA before the end of 8th grade essentially left an unfilled seat. For fall 2007, empty seats in 8th

- grade were offered to students from the waiting list established during the lottery process. The new students were provided with an orientation and training to help integrate them into the program.
3. Many students reported that while they enjoyed their schoolwork and class projects, *including* their homework projects, they volunteered that there were times when they felt stressed about finishing projects on time and to the standards they and their teachers had set for them. Although teachers encouraged students not to let schoolwork interfere with a good night's sleep, the seventh grade students in particular reported that this could be difficult for them. KTA staff may wish to explore how to manage the workload for students, including due dates. In addition, KTA staff can ensure that expectations about the assignments are clear and that every project that tightly aligns with the curriculum. (Alignment is one of the ongoing challenges of project-based approaches to learning.)
 4. Staffing for the program is one key to KTA's success. An unexpected vacancy in early 2006-07 indicated a need to plan for at least some training of new staff members who start after the school year, even if the new staff member is not a permanent hire.

Proof of Concept?

KTA is a complex program with many components. While results from KTA can provide valuable information about implementing a one-to-one laptop program, it is important to remember that KTA is much more than that. The positive achievement results for KTA are unlikely to be obtained by simply broadening the use of technology throughout the district. Nevertheless, much has been learned from KTA about the practical aspects of putting laptops in the hands of middle school students. For example, the types of hardware and software needed, costs in terms of central personnel and support, how to structure tech support, types of training teachers need, how to address security issues, and the physical needs (building, space, furniture) of such an initiative.

Questions remain about whether students in a voluntary program like KTA are more able to handle the responsibility of taking care of their own computers than students who participate in a one-to-one environment as part of their normal school program. In addition, it remains to be determined whether the technical support for a large scale deployment will increase in a linear or even a nonlinear manner, based on the number of computers, or whether there will be some economies of scale.

Conclusions

The heart of KTA is a group of creative, highly dedicated teachers with a knowledgeable leader who have developed integrated lessons that allow more student choice, and encourage students to look more deeply and systematically at the topics in the curriculum. KTA works not only because of the teachers, but because the students also are expected to work very hard. Students are willing to

do this because the learning is engaging, the technology is fun and allows differentiation, and they can work more efficiently because of the technology.

Some of the factors contributing to KTA's success appear to have been:

- Support from administration at the school and district level.
- The KTA teachers and Director have been empowered to be innovative.
- The extent to which KTA teachers have led students to increased levels of responsibility and self-direction regarding their own work.
- Coordinated planning by KTA teachers, along with their willingness to develop new ways to help students learn using technology.
- Good training opportunities for KTA staff.
- Extremely committed staff.
- KTA teachers appear to work well together.
- The increase in parental involvement that occurs through KTA.

Finally, the positive atmosphere created by structuring the program as a smaller learning community was very clear. Teachers frequently gave students oral praise and other verbal indications about how much they care. Some KTA teachers mentioned that they wanted to ensure that every student has at least one teacher to whom they could turn when in need of support. This type of supportive, caring environment is one that research shows leads to increased student success in any program.

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Evaluation of the Kent Technology Academy, 2005-2007

Introduction

The Kent Technology Academy (KTA) is an initiative of the Kent School District that operates as a magnet program on the campus of the recently renovated Mill Creek Middle School. The program operated during the school years 2005-06 and 2006-07 as a school-within-a-school program in which KTA students participated in a technology rich, smaller learning community for their core academic classes. This evaluation focuses on the program during its first two years, although a follow-up study for 2007-08 is planned.

Initial planning for the KTA program began in 2004, with a larger group of participants engaged in planning beginning in early 2005. Although written documentation concerning the original plans for KTA was not available, after two years of operation there was a considerable body of evidence about the goals of the program and the way it operated during the first two years. The KTA program adopted the following mission statement:

The Kent Technology Academy's mission is to prepare every one of its students for lifelong personal and academic success in a technology rich world.

Students will experience a challenging and exciting learning environment that expands their interests and develops their potential.

Towards this end, students in KTA during the 2005-06 and 2006-07 school years received a tablet computer, both for their use at school and to take home with them. The KTA program employed a variety of other technology tools, such as video cameras, digital cameras, and learning management software. In addition, *both* KTA and Mill Creek classrooms on the campus had the following tools:

- ❑ Interactive whiteboards (sometimes called Smartboards)¹
- ❑ Several desktop computers

¹ An **interactive whiteboard** is a large, touch-sensitive display that connects to a computer and projector. A projector projects the computer's desktop onto the board's surface, where users control the computer using a pen, finger or other device. The board is typically mounted to a wall or on a floor stand. Any software that runs on the computer can be used on the whiteboard, and notes or drawings on the whiteboard can be captured on the computer.

- Document cameras
- Sound reinforcement systems (wireless infrared microphones)

In general, the Mill Creek students and teachers had less technology available to them than their peers in KTA classes during the first two years of KTA, but Mill Creek classrooms did have more computers and technology than the other middle schools in Kent.² All Mill Creek classrooms had access to shared laptop carts, and classes could also be scheduled for the computer labs.

Like the other students on the Mill Creek campus, KTA students were assigned to a multi-teacher team for core academic subjects. Most Mill Creek students, however, were assigned to a four-teacher team (language arts, social studies, mathematics, and science) while KTA students worked with a three-teacher team because they received language arts and social studies from the same teacher in an integrated block called Humanities. Students in both Mill Creek and the KTA program were not grouped with their team for art, music, health/fitness, band, or electives. Thus, Mill Creek and KTA students shared extracurricular and elective opportunities.

Program Goals

There were several goals for the KTA program, one of which was a “proof of concept” for implementing such a program on a larger scale in the district. KTA was designed to be a learning environment to identify issues and solutions related to security, hardware, software, maintenance, and other practical details of a technology rich program. Instructional goals included several that are associated with current views of best practices, including proven ways to increase student achievement and student engagement in learning, such as:

- Increased use of collaborative or cooperative approaches to learning
- Emphasis on project-based instruction
- Use of technology to individualize the instruction for students
- Differentiated instruction to support different learning styles
- Improved student technology skills
- Sustained opportunities for writing
- Greater integration of subject matter
- High expectations for every student

Finally, the technology investment in both KTA and throughout the Mill Creek campus was intended to help close the “digital divide” between more advantaged and less advantaged students.

² The ratio of students to computers was approximately 2.1 to 1 at Mill Creek Middle School, versus 3.2 to 1 at middle schools elsewhere in the district at the time of this study.

Evaluation Plan

This evaluation used a mixed-methods approach, relying on both qualitative and quantitative sources. The evaluation is focused on these questions:

- *Who were the students served by the KTA program?*
- *What achievement outcomes have resulted from the KTA program? How well do all KTA students achieve?*
- *How were these outcomes obtained? What background, training and other attributes did KTA teachers bring to the project? What were the staffing levels?*
- *What impact has the program had on teaching and learning?*
- *Is the KTA program meeting its goal of attracting students to the Mill Creek Campus?*
- *What level and type of resources does it take to implement such a program?*
- *Could the program be expanded on a much larger basis? In other words, is it “scaleable,” and what would that entail?*

For this report, the data sources include:

- Information provided by Kent School District’s Director of Instructional Technology and by KTA and Mill Creek staff members
- Interviews with KTA teachers and the KTA director
- Classroom observations of KTA and Mill Creek classes
- Focus groups of 7th and 8th grade KTA students
- WASL achievement test data
- Observation of one Parent Information Night for KTA
- Student survey results
 - Attitudes about school and the learning climate
 - Technology skills

Limitations

As is the case in any research study, it is important to note the limitations of this evaluation. The KTA program is a “choice program” and students who choose to attend such a program may be different than the average student. In an ideal evaluation design, randomly chosen students would be involuntarily assigned to either KTA or their regular program and the program would be randomly assigned to multiple sites. This is usually infeasible in the real world of school districts, but the lack of such a controlled design does limit the generalizability of some results.

There were also limitations to the observation process used in this study that readers should keep in mind when interpreting the findings. It is possible that the classroom activities observations in March did not reflect the types of activities in classes at other times of the year. Also, while 168 time intervals were observed, this was across only 19 classes. Finally, although teachers did not know specifically which classes might be observed, they did know that they might be

observed during a specific two week window and may have adjusted their instruction. Presumably, if this occurred, it could have happened in both KTA and Mill Creek classrooms. It is important to keep in mind that the comparisons of interest were between KTA and Mill Creek classes, not how these classes compare to results of other observational research studies.

Statistical Significance. Most statistical tools used in educational research require a minimum sample size (e.g., ANOVA, ANCOVA, or GLM equivalents; multiple regression; chi square.) The exact minimum size depends on the particular statistical tool and the number of factors being analyzed, measured, or controlled for. In most cases, sample sizes in KTA were not very large. Thus, the primary statistical approach used was to provide descriptive statistics, although there were results for which the statistical significance of changes or differences could be calculated. However, it should be noted that the descriptive results of the KTA evaluation all point in one direction: towards a positive impact for the program. This pattern is unlikely to occur by chance.

Who Were the Students Served by the KTA Program?

As a magnet program, students enrolled in KTA chose to apply for one of the approximately 90 seats in the program. If students were accepted into KTA, the school district provided transportation, ensuring that all students entering 7th grade were eligible, whether or not they lived in the Mill Creek attendance area. The KTA program began in 2005-06 with a cohort of 90 seventh grade students, referred to as Cohort 1 for the purposes of this report. In the fall of 2006-07, as Cohort 1 of KTA students progressed to 8th grade, a new cohort of 90 seventh graders entered the KTA program, referred to as Cohort 2 for the purposes of this report.

Students were selected for KTA through a lottery, although the lottery was stratified rather than completely random. The district wanted to ensure KTA served a population representative of the district as a whole, to establish whether the KTA model would work on a broader basis. In addition, the district wanted to include a substantial number of students from the Mill Creek attendance area. Thus, the selection of students was random but stratified to ensure a diverse population and gender balance. Figure 1 shows that the KTA student population for the first cohort of KTA students was more likely to be non-white than the Kent School District as a whole, with proportionately more Asian and Black students and fewer Hispanics than the district. Figure 2 shows that KTA students were eligible to receive free or reduced-price lunch at the same rate as the school district, but were less likely to be identified as special education students.

Figure 1
Percentage of KTA Cohort 1 and Kent School District Students in Each Racial Group

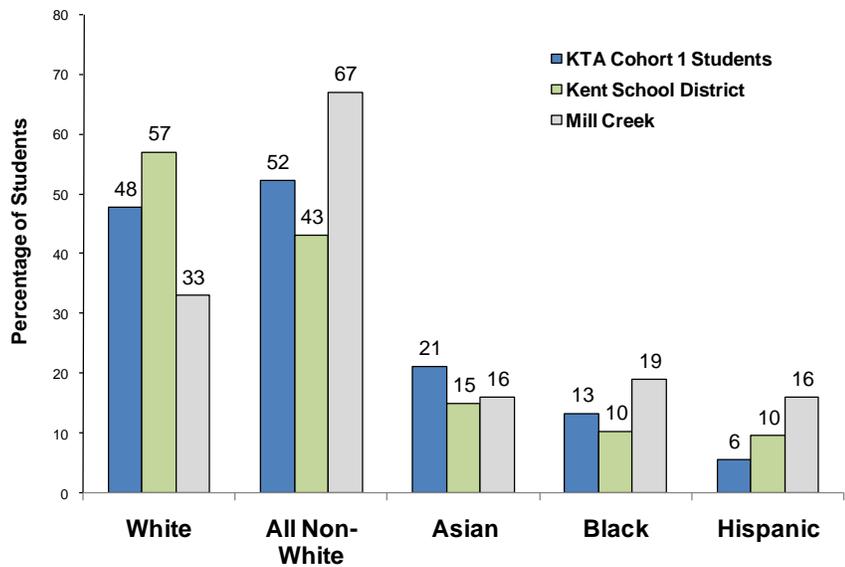
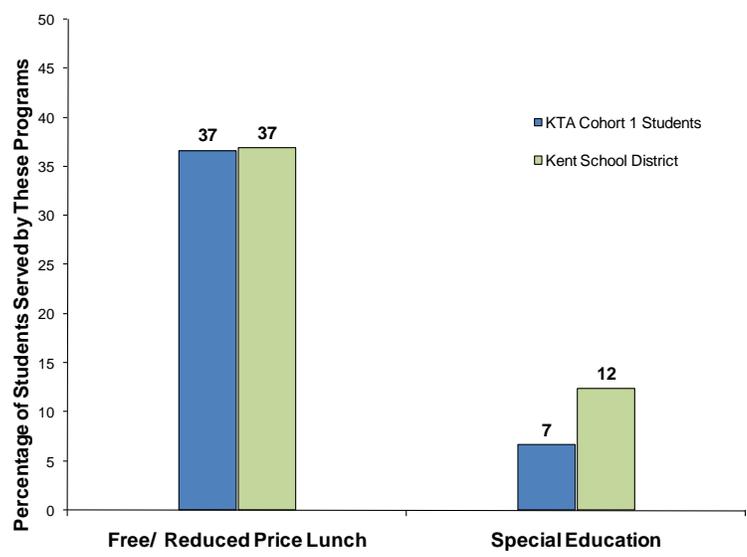


Figure 2
Percentage of Special Education and Free/Reduced-Price Lunch Students in KTA Cohort 1 and Kent School District



Changes in Enrollment From 2005 to 2007

By mid-spring of 2007, some original KTA students had withdrawn from the school district or left the KTA program; specifically, there were only 66 eighth grade students remaining in Cohort 1 and 87 seventh grade students in Cohort 2.

The fact that some Cohort 1 students who were admitted to KTA in 2005-06 were no longer present in the spring of 2007 was not surprising. However, it did raise questions about whether the population of KTA had changed demographically to become more affluent or less diverse, which might affect the generalizability of the findings. Figures 3 and 4 indicate that the students who remained in Cohort 1 were demographically similar to those students who left, although there may have been other differences between those who stayed and those who left that are not apparent in the demographic statistics.

Figure 3
Percentage of Students in Each Racial Group for KTA Cohort 1 Students at the Beginning of KTA and Remaining Students Two Years Later

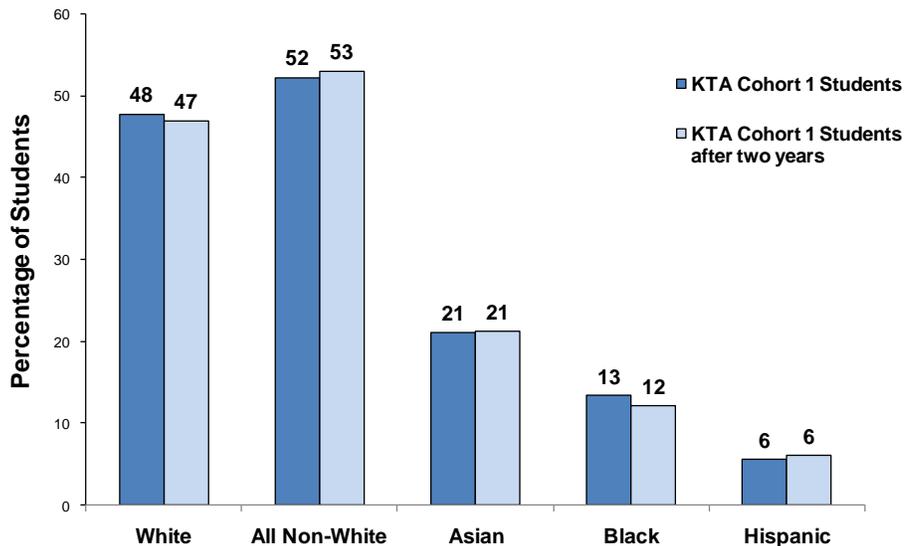
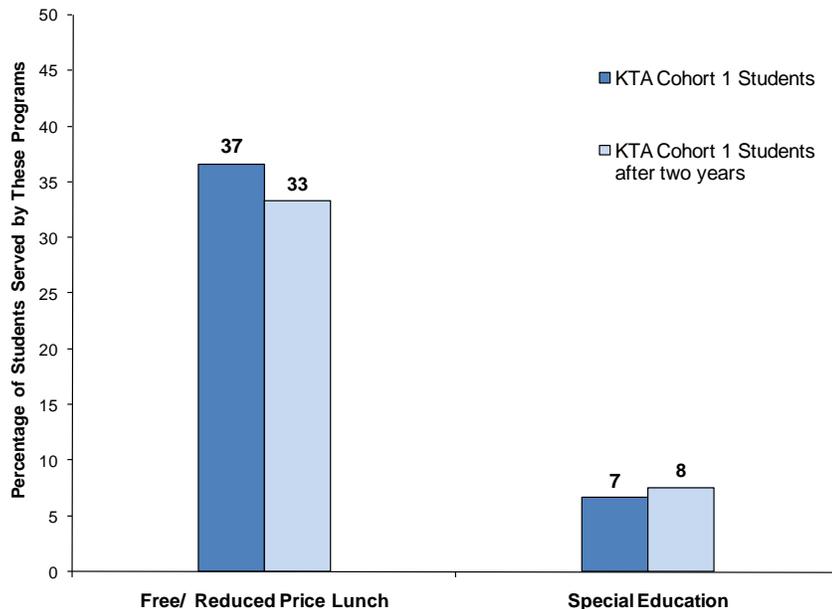


Figure 4
Percentage of Special Education and Free or Reduced-Price Lunch Students
For Cohort 1 at the Beginning of KTA and Remaining Students Two Years Later



Analysis of the students in Cohort 1 who were no longer enrolled by the time of the study revealed that they fell evenly into three groups:

- Six students who had withdrawn from the Kent School District.
- Ten students who were now enrolled in another middle school in the district.
- Eight students who had left KTA but were still enrolled on the Mill Creek campus in the regular middle school.

That some KTA students were no longer enrolled in the school district was to be expected. Nor was it surprising that some students returned to their boundary school;³ by making the program available to all students in the district, some bus rides for students were quite long. Anecdotal evidence indicated that the long, twice-a-day bus ride was the primary factor influencing students who left KTA to return to another middle school in the Kent School District.

The decision of some students residing in the Mill Creek boundary to withdraw from KTA while remaining on the campus may deserve further scrutiny. The KTA Director typically conducted exit conversations with such students and reported that the academic and workload expectations of the KTA program were usually more rigorous than the students and/or their parents were willing to accept. As long as sufficient numbers of students apply to attend the KTA program, the higher level of

³ "Boundary school is a term used by the district to refer to the school a student would normally attend based on their home address and grade level.

academic rigor and the corresponding additional work for students is not necessarily a problem for KTA, but it may have implications when expanding the use of a constructivist, technology-rich approach to learning across the district.

Additional demographic data (on Cohort 2 students) is contained in Appendix I.

Planning for Additional Students Each Fall

Related to the issue of attrition in this study was the need to plan for filling empty seats. In the first two years of the program, students who left KTA before the end of 8th grade essentially left an unfilled seat. For fall 2007, plans were developed to offer empty seats to students on the waiting list established during the lottery process (similar to the approach used by the Kent tuition-based, full-day kindergarten programs.) This approach to filling seats will be examined in the follow-up study planned for 2007-08.

During the observations that were conducted for this evaluation, the evaluator noted that a student entered the KTA program later than the beginning of 7th grade would have missed the technology skills and content orientation covered during those first weeks of the program. Students must learn rules related to the use of the technology in the classroom and at home, how to store their work on the file server, navigate safely through the Internet when needed, use Blackboard and other software tools, take proper care of their laptop, and submit homework electronically, among many other expectations. As so much of the work of KTA students is self-directed, an analogy would be a new employee who reports to work, is expected to be productive, but who has missed the training and orientation to work equipment, rules, and the expectations of the job. Nevertheless, unfilled seats are not desirable in a successful program with so many applicants wanting to attend. Therefore, the staff developed and implemented an orientation process that will allow students to catch up on the skills they have missed and thus transfer into the program at the beginning of 8th grade. It will be important to see how well the new students are able to make this transition.

What achievement outcomes have resulted from the KTA program? How well do all KTA students achieve?

This report will focus on three primary measures of student achievement.

- 2007 WASL Results
- Prior WASL results
- Technology literacy of both Mill Creek and KTA students

Many of the instructional strategies used in KTA are considered by educators to represent “best practices;” e.g., individualized instruction, project-based learning, smaller learning communities, etc. The implementation of these research-based strategies might be expected to produce higher achievement for KTA students, although it is important to remember that new programs often take some time to be fully implemented and effective. (Hence, the decision to wait until the end of the second year for a full evaluation of KTA, as reflected in this report.)

The Washington State Assessment System provides WASL achievement scores in mathematics and reading at all grades 3-8 and 10, although this was not the case until a few years ago. Writing (grades 4 and 7) and science (grades 5 and 8) WASL scores are also available. This section of the report reflects the spring, 2007 WASL results for 7th and 8th grade students, along with comparisons to a baseline of prior test scores where these were available.

The scaling characteristics of the WASL and the relatively small numbers of students in KTA determined the types of analyses of WASL data that were conducted for this report.^{4,5} WASL scores can provide information about the percentage of students meeting state standards of proficiency, as well as mean scale scores that can sometimes be useful for comparing groups of students. In the analyses presented below, the KTA students were treated as if they were a “school,” so that the percentage of students meeting state proficiency standards in each subject could be considered in comparison with the district as a whole and the state, as well as in the context of other KSD middle schools. Not all middle schools in Kent are demographically similar to KTA, and the most appropriate comparison is probably to the district as a whole. Each of the next six charts shows the percentage of students meeting state standards in each of the following groups: the state of Washington, KSD, KTA, and each middle school in the Kent School District.

⁴ With only 55 eighth grade KTA students having both a pre and post-test WASL score in reading and mathematics, multiple regression analyses of scale scores, controlling for various factors, was not feasible.

⁵ Statistical significance testing using Chi Square statistics was not possible because so few KTA students failed to meet state standards that the minimum cell sizes were not attained.

Reading and Writing WASL Results

The integrated Humanities block for KTA students was an opportunity for students to do more extended-writing projects, as well as integrate reading and social studies in deeper ways. Figure 5 shows the percentage of 7th grade students who met state WASL proficiency standards in writing, while Figures 6 and 7 show the percentage of 7th and 8th grade students who met state proficiency standards in reading.

As the charts clearly indicate, KTA students were more likely to meet state proficiency standards in both writing and reading than were students across the state and students in Kent School District as a whole. In fact, if KTA had been a school rather than a program, it would have scored higher than all other middle schools in Kent in writing at grade 7 and in reading at both 7th and 8th grade.

Taken as a whole, the results not only suggest that the KTA model is effective for teaching reading and writing, but that the Humanities block was successful in encouraging students to develop their writing skills.

Figure 5
2007 Percentage of 7th Graders Meeting WASL Proficiency Standards in Writing

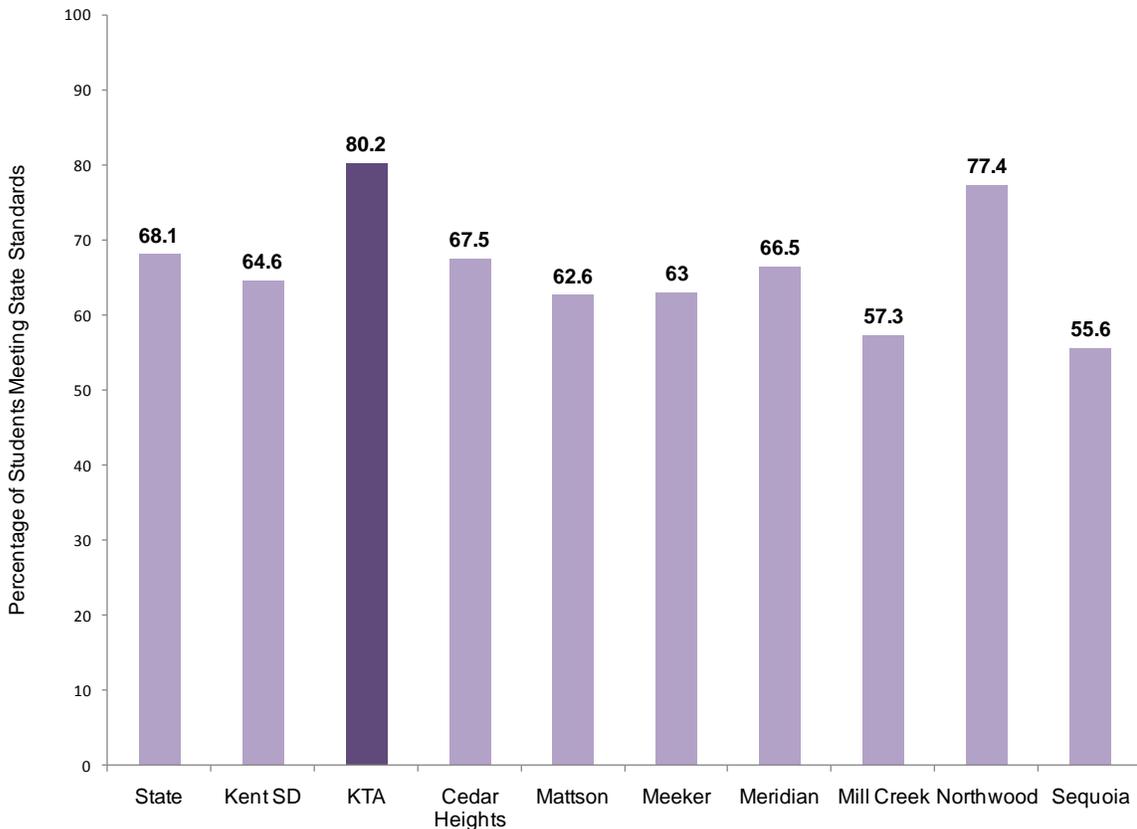


Figure 6
2007 Percentage of 7th Graders Meeting WASL Proficiency Standards in Reading

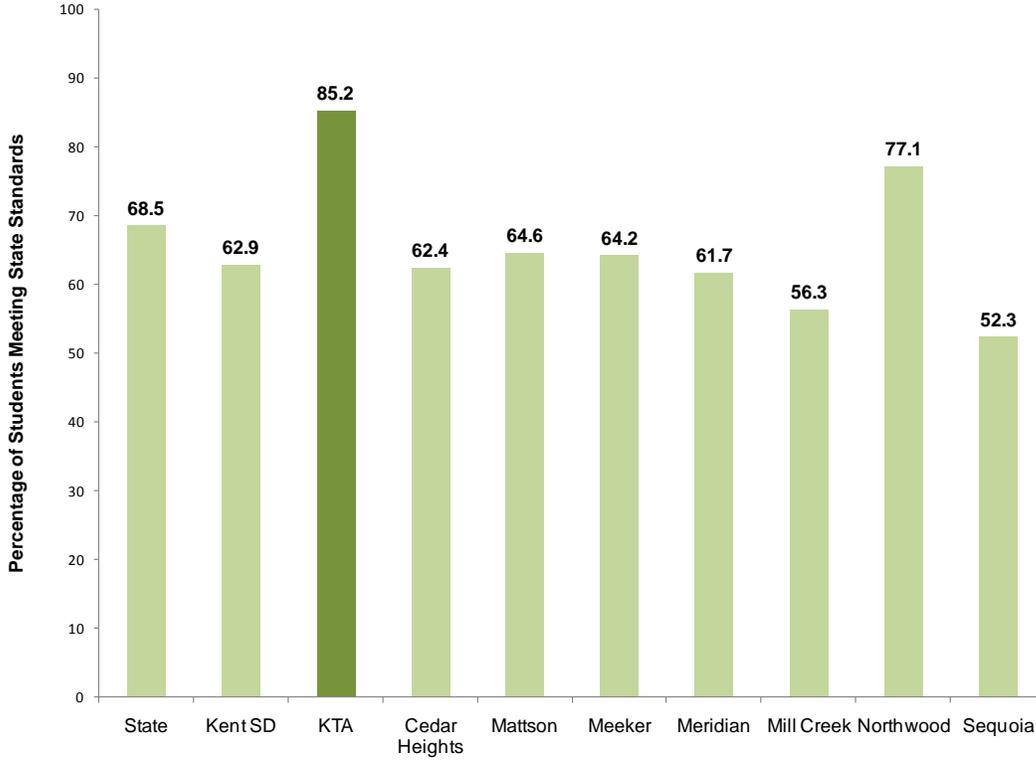
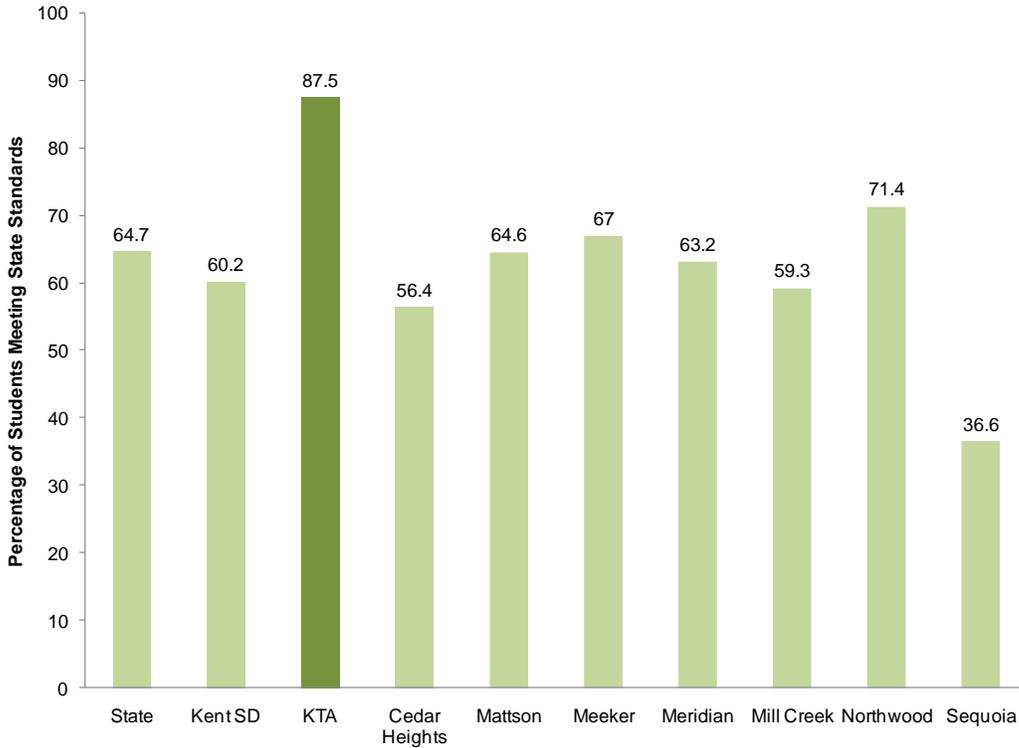


Figure 7
2007 Percentage of 8th Graders Meeting WASL Proficiency Standards in Reading



Mathematics and Science WASL Results

Across the state, WASL mathematics scores for 2007 were somewhat lower than reading and writing scores. KTA students followed the same pattern, but Figures 8 and 9 show that the mathematics results for grades 7 and 8 were positive. Again, KTA students were more likely to meet state standards for proficiency than the district and the state, and also fared well in comparison with other schools in the district, ranking either first or second among middle schools, depending on the grade level.

Science results are shown in Figure 10. KTA students were more likely to meet state standards for science proficiency than the school district or the state. KTA would have been the second highest middle school in terms of percentage of students meeting state standards.

Figure 8
2007 Percentage of 7th Graders Meeting WASL Proficiency Standards in Mathematics

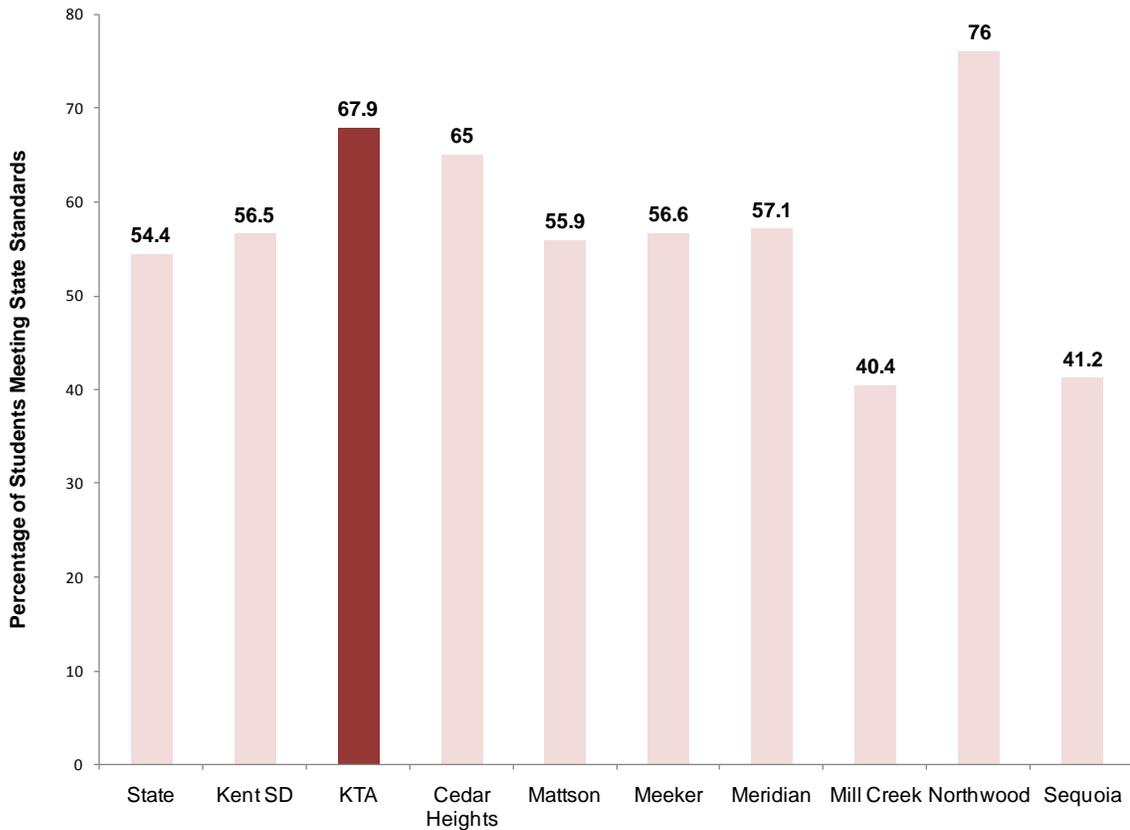


Figure 9
2007 Percentage of 8th Graders Meeting WASL Proficiency Standards in Mathematics

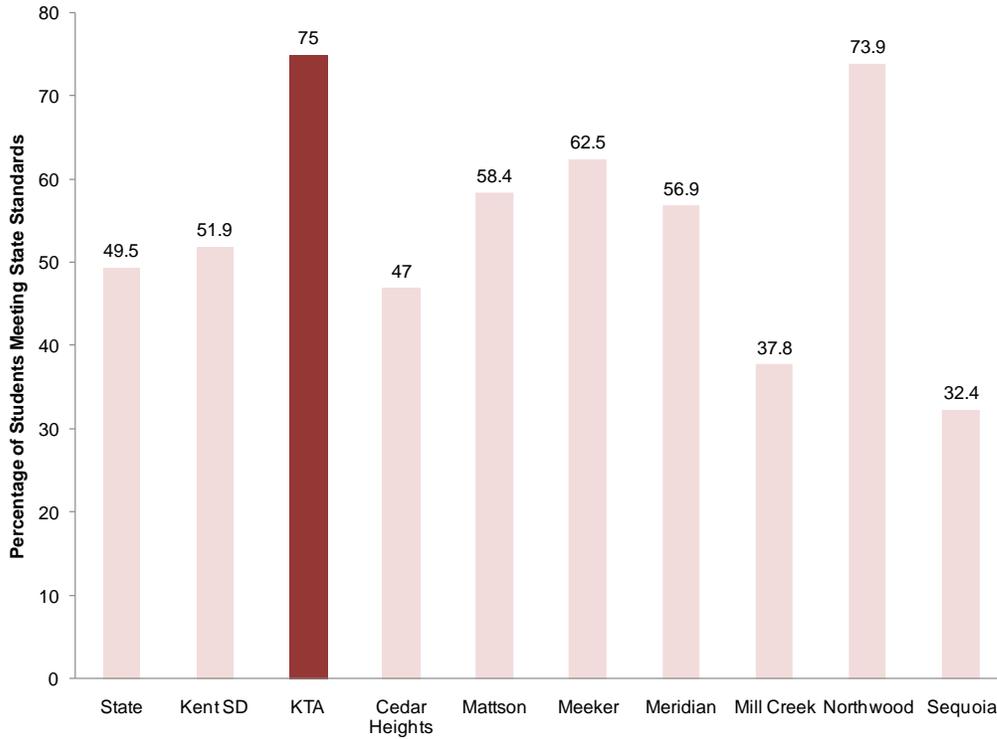
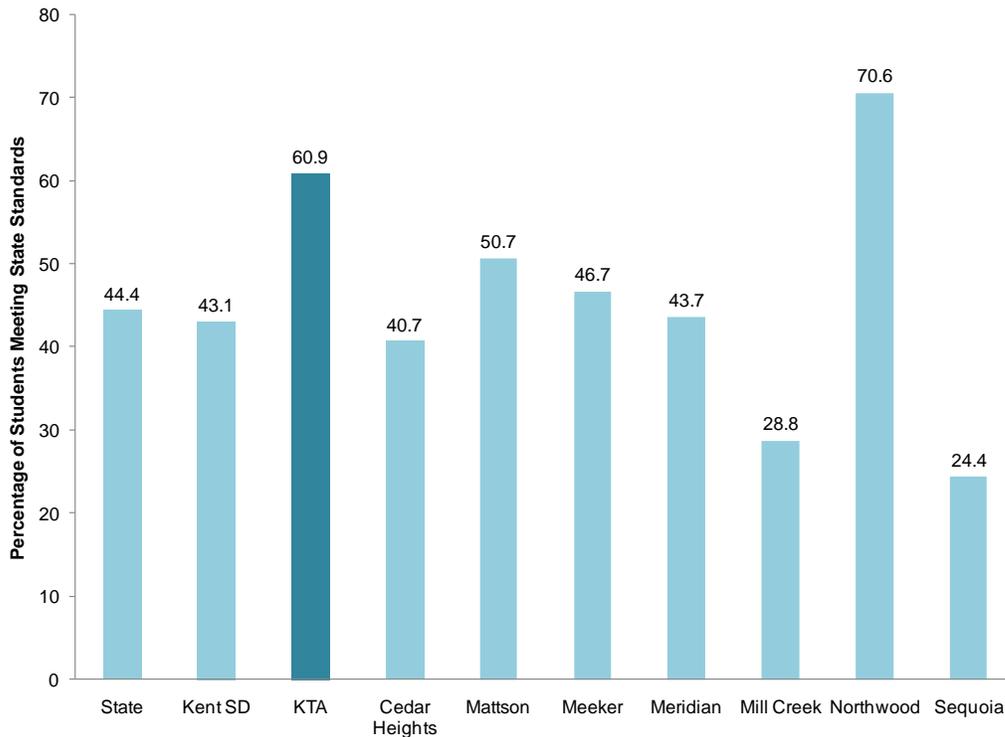


Figure 10
2007 Percentage of 8th Graders Meeting WASL Proficiency Standards in Science



A Longitudinal Look at Achievement of KTA Students

The strong performance of KTA students on the WASL raises the question of whether this pattern was solely the result of students' having higher scores prior to entering KTA. Although KTA students were selected with a stratified sample intended to reflect the district as a whole, the WASL was not given in every subject and grade level at the time the first cohort of students applied. A data file with the WASL history of all middle school students in KSD was created and analyzed to address this topic. Two questions of interest could be addressed with this data:

- Did KTA students show improvement on the WASL, in comparison with their scores prior to KTA?
- If so, how did that improvement compare to other groups of students in the district?

Students who are more stable in their school enrollment are likely to show higher achievement than less stable populations. Therefore, WASL scores for students in these analyses will be different from and generally higher than district and school-by-school results reported annually by the district. Keep in mind that the following tables compare the same students over time. Results for all middle school students with scores from current and prior years—both in the district as a whole and for students from each middle school—provide an important context.⁶ If achievement increased or declined throughout the district, those patterns would be important in understanding changes for KTA students.

Results in Table 1 reflect changes in the percentage of students meeting state WASL proficiency standards in reading and writing. KTA students in both cohorts showed large increases in the percentage of students meeting state standards in both subjects. The gains in reading and writing were also greater than for students in other middle schools and for the district as a whole. In reading, KTA students had higher baseline scores than the district, but also showed more improvement. In writing, KTA students actually began with a lower percentage of students scoring proficient than KSD, but by 2007 had improved enough to score as proficient as any other group except for one.

Results for math and science (Table 2) also showed increases for KTA students and these increases were greater than for the district in two of the three comparisons. In these comparisons, KTA students would have shown the third or fourth highest improvement rates, in comparison with other middle schools.

⁶ Eighty-one of the 7th grade KTA students in 2006-07 (Cohort 2) had WASL reading and mathematics scores from the previous year to serve as a baseline. Sixty-two of these students also had writing scores from 4th grade. For 8th graders in 2006-07 (Cohort 1), 55 students had WASL reading and mathematics scores from 4th grade (the latest elementary grade tested at that time) to serve as baseline scores, while 57 students in Cohort 1 also had science scores from 5th grade.

Percentage of 2007 Middle School Students Meeting WASL Proficiency Standards and Their Most Recent Prior Proficiency Levels (Matched Sample With Scores for Both Years)

Reading Percent Proficient

	Grade 6 (2006)	Grade 7 (2007)	Change in Proficiency	Most Improvement
KSD	65.7	66.1	0.5	
KTA	72.8	85.2	12.3	1
Cedar Heights	65.5	64.0	-1.4	
Mattson	69.5	69.5	0.0	
Meeker	69.0	68.5	-0.4	
Meridian	66.3	65.9	-0.4	
Mill Creek*	51.6	50.4	-1.2	
Northwood	77.1	78.4	1.3	3
Sequoia	55.3	57.5	2.2	2

Reading Percent Proficient

	Grade 4 (2003)	Grade 8 (2007)	Change in Proficiency	Most Improvement
KSD	67.5	67.2	-0.3	
KTA	74.5	89.1	14.5	1
Cedar Heights	65.6	62.4	-3.2	
Mattson	75.0	69.4	-5.6	
Meeker	65.8	74.1	8.3	3
Meridian	67.4	70.2	2.9	
Mill Creek*	50.0	60.8	10.8	2
Northwood	79.7	74.6	-5.1	
Sequoia	58.7	45.5	-13.3	

Writing Percent Proficient

	Grade 4 (2004)	Grade 7 (2007)	Change in Proficiency	Most Improvement
KSD	62.7	69.8	7.0	
KTA	61.3	77.4	16.1	1
Cedar Heights	63.5	69.8	6.3	
Mattson	68.8	69.8	1.0	
Meeker	65.3	66.3	1.1	
Meridian	62.2	73.9	11.8	3
Mill Creek*	45.2	56.0	10.7	
Northwood	78.8	82.4	3.6	
Sequoia	47.4	60.6	13.1	2

*For these analyses, following the same students over time, Mill Creek results do not include KTA students.

Percentage of 2007 Middle School Students Meeting WASL Proficiency Standards and Their Most Recent Prior Proficiency Levels (Matched Sample With Scores for Both Years)

Mathematics Percent Proficient

	Grade 6 (2006)	Grade 7 (2007)	Change in Proficiency	Most Improvement
KSD	55.0	60.3	5.3	
KTA	63.0	67.9	4.9	4
Cedar Heights	55.3	66.0	10.7	1
Mattson	58.8	60.4	1.7	
Meeker	57.8	61.2	3.4	
Meridian	59.8	63.3	3.4	
Mill Creek*	35.0	35.8	0.8	
Northwood	71.7	79.1	7.4	2
Sequoia	39.1	44.7	5.6	3

Mathematics Percent Proficient

	Grade 4 (2003)	Grade 8 (2007)	Change in Proficiency	Most Improvement
KSD	57.8	60.8	3.0	
KTA	69.1	76.4	7.3	3
Cedar Heights	58.9	55.7	-3.2	
Mattson	66.2	63.9	-2.3	
Meeker	53.9	68.9	15.0	1
Meridian	57.8	64.8	7.0	
Mill Creek*	32.5	36.7	4.2	
Northwood	70.1	78.0	7.9	2
Sequoia	49.0	42.0	-7.0	

Science Percent Proficient

	Grade 5 (2004)	Grade 8 (2007)	Change in Proficiency	Most Improvement
KSD	28.3	49.5	21.2	
KTA	33.9	57.6	23.7	3
Cedar Heights	27.2	45.8	18.6	
Mattson	37.1	57.1	20.1	
Meeker	28.1	54.7	26.6	2
Meridian	31.7	48.8	17.1	
Mill Creek*	13.3	26.6	13.3	
Northwood	41.5	76.0	34.4	1
Sequoia	10.4	27.9	17.5	

*For these analyses, following the same students over time, Mill Creek results do not include KTA students.

Technology Literacy in KTA and Mill Creek

In a technology-rich environment, students would be expected to acquire more technology-related skills than in a less rich environment. However, the extent to which this was happening—in the KTA program and in Mill Creek—needed to be quantified in some way. One hope for the technology investment at Mill Creek was that it might help close the “digital divide” between more advantaged and less advantaged students.

In another part of the learning climate survey mentioned in the previous section, 7th grade students in KTA and Mill Creek completed a standardized inventory of skills that comprise a Technology Literacy Survey. This inventory is normally given to 8th grade students in the state of Washington and is based on national standards. Data was therefore available for 8th grade students in all schools in KSD, including separate data for 8th grade KTA students and Mill Creek Students (along with the 7th grade data from the special survey for this evaluation.) Students who take the inventory are asked to self-report about their use of technology. Instructions emphasize that it is important to be honest; there are no right or wrong answers and they will not be graded based upon the results. After the survey data are collected, students are classified based on their responses into one of three tiers of technology literacy.

For each question, students respond with the response that best describes their technology use:

- I don't know how to do this at all.
- I sometimes need help to do this.
- I feel comfortable doing this by myself.
- I know this well enough that I could show someone else how to do this.

The section that follows provides a detailed description of the tiers into which students are classified based on their responses to the survey inventory.

Technology Tiers Defined

Adapted from the *Teacher Guide for Technology Literacy Survey*, published by Washington's Educational Technology Support Center Program

Tier 1:

Students use technology primarily for completing school work and for personal use. They know how to connect and use a wide variety of devices with their computer, such as a mouse, keyboard, digital camera, etc. They also understand how and where to save their files, and how to connect the computer to a network. They are acquainted with the ethical use of technology, such as the district's Acceptable Use Policy.

In this tier, students use basic software, such as word processors and spreadsheets, to create documents for their assignments, and can use basic features of those programs, such as spell checkers, thesaurus, charts, and clip art, as they work on their assignment. They can keyboard at a minimum level. And they can apply search strategies to find information online.

Tier 2:

In addition to skills identified in Tier 1, this tier involves students using technology for research and/or public presentations. In Tier 2, students select and use technology and telecommunications tools and resources to collect, evaluate and manage information, and to report results. They use technology to solve problems, and create, publish and present products for an assigned project. They know how to evaluate the accuracy and relevance of online information.

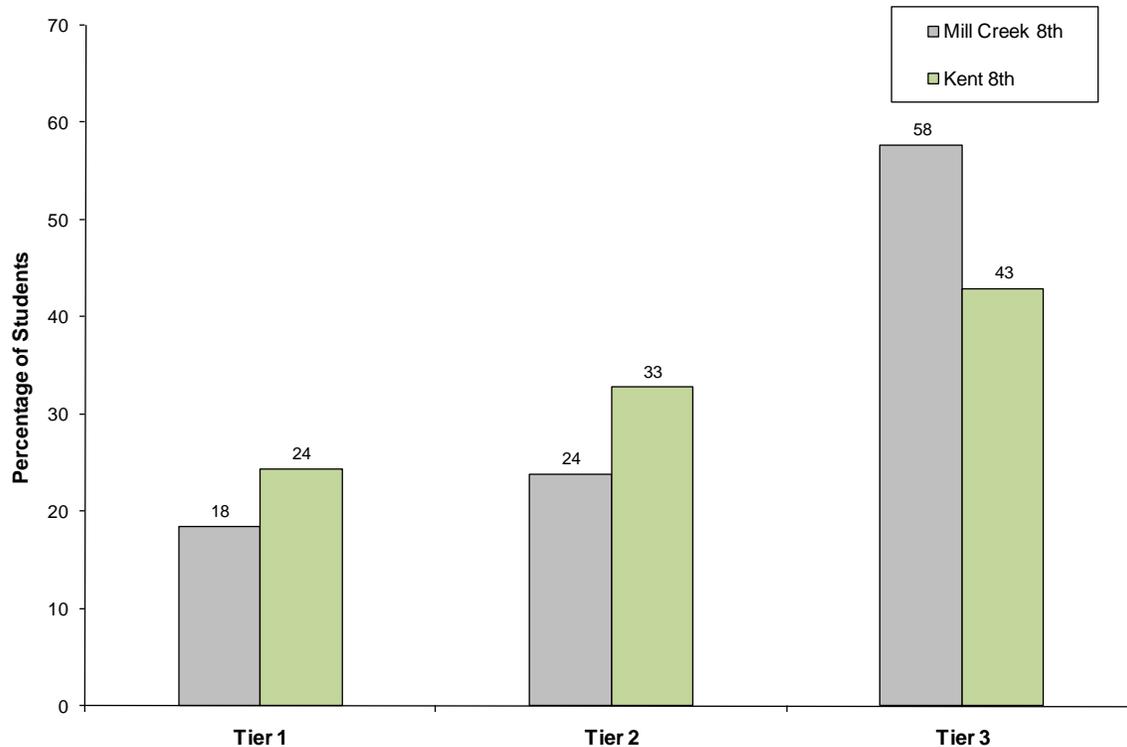
In this tier, their use of the technology demonstrates that they understand issues related to the acceptable and responsible use of technology, such as privacy, security, copyright, file sharing, plagiarism and personal safety.

Tier 3:

Building on the competencies in Tiers 1 and 2, students in this tier use technology for authentic problem-solving and creating products. Students identify the **essential question** for their problem, and select specific technology and telecommunications tools to gather data, visualize information and/or conduct investigations, and then work individually or collaboratively to share their ideas with others, using a variety of media formats.

Tier 3 students use strategies for identifying, solving and preventing hardware and software problems. They evaluate the appropriateness and potential bias of information from a variety of electronic sources. And they demonstrate a deep understanding of ethical behaviors for using copyrighted media, and analyze the consequences of the unethical use of information and communication technology.

**Figure 11: Tiers of Eighth Grade Technology Literacy
Mill Creek Students at Grade 8, Compared to District Grade 8 Students
(Percentage of Students in Each Tier)**



Have Mill Creek students benefited from the technology at their school?

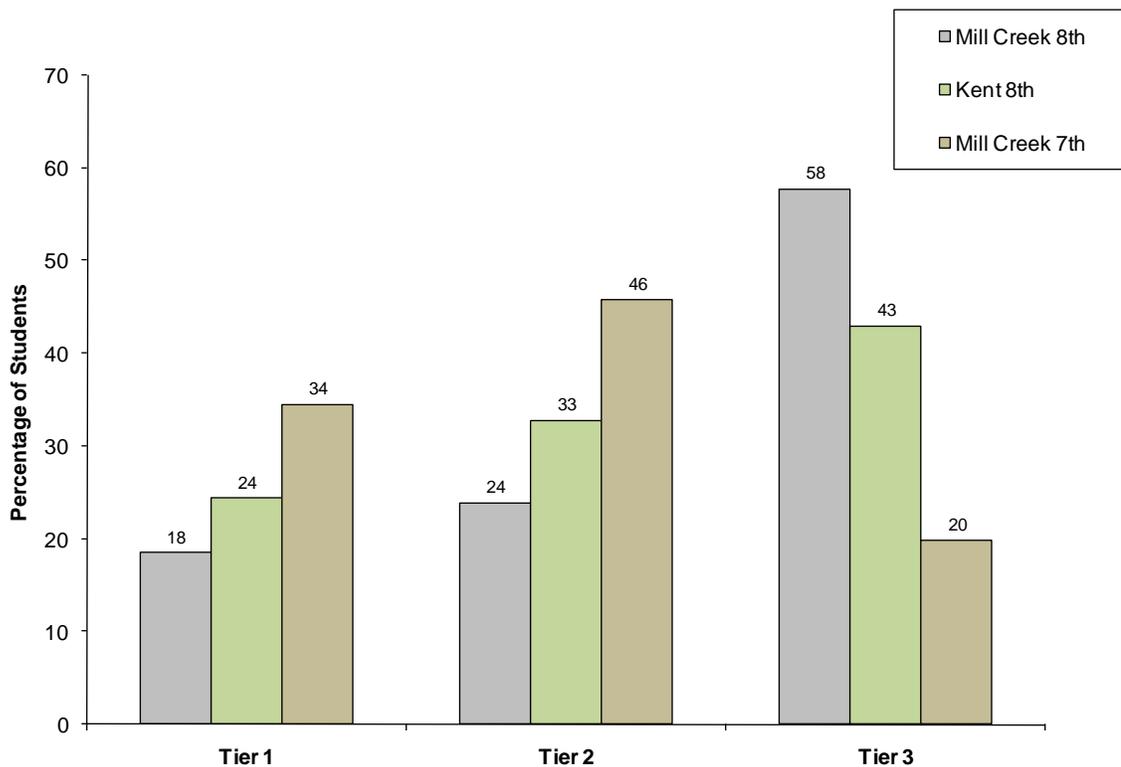
Figure 11 indicates Mill Creek 8th grade students are more likely to rate themselves at Tier 3 than 8th grade students across the district as a whole. While this is good validation for the technology and renovation investments the district has made in the school, was it possible that Mill Creek students had simply entered middle school with better than average technology skills from opportunities at home or elsewhere?

While that seemed unlikely based on the school’s demographic profile, one way to check was to ask current 7th grade Mill Creek students—still in their first year at the school—about *their* technology proficiency, as part of the two-part survey mentioned in the previous section. School attendance boundaries for Mill Creek were fairly stable for the last two years and the two cohorts at Mill Creek are probably very similar. Thus, looking at data on the 2006-07 seventh grade students should give us a better idea of the technology status of 7th graders from the previous year.

Figure 12 shows the results for the 7th grade students, which indicate that entering 7th grade Mill Creek students probably were not technologically advantaged by

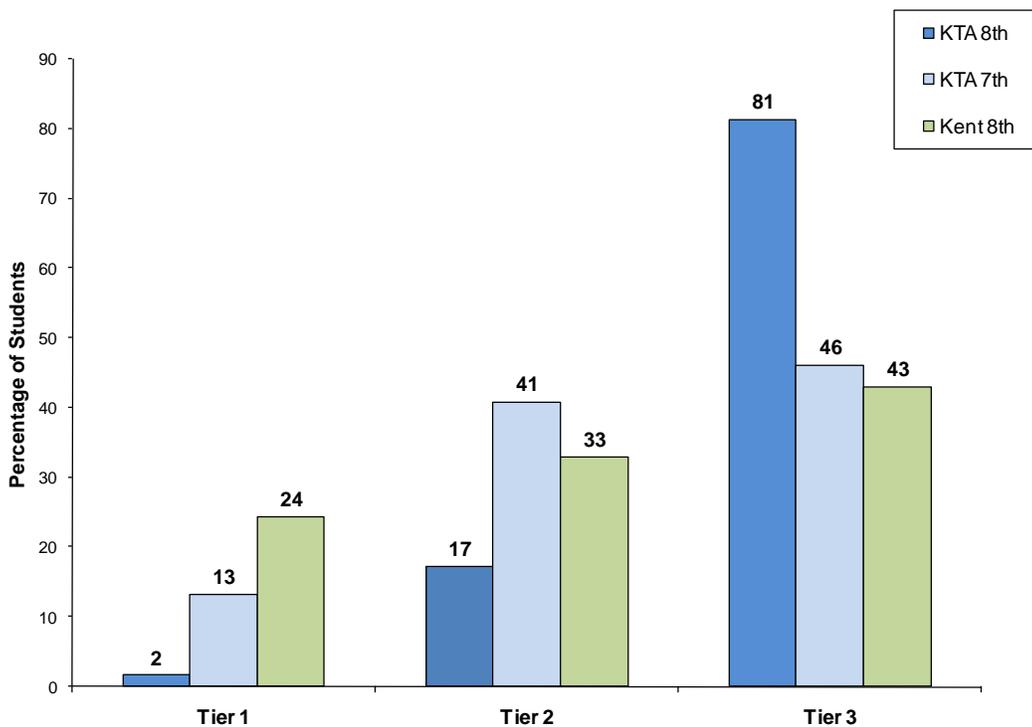
their prior experiences. Instead, 7th grade students currently at Mill Creek are—for the most part—reportedly at Tier 1 or Tier 2. The fact that Mill Creek students by the end of 8th grade are more likely to report being at Tier 3 than the district 8th grade students supports a different conclusion: the technology on the campus seems to benefit Mill Creek students. In other words, Mill Creek students rate themselves as more highly skilled with technology than the district norm because they have better access to technology at school rather than because of any prior experiences at home or school. Not only do Mill Creek *teachers* have more technology, but also through regular class work, informal peer tutoring, osmosis, elective classes such as digital photography, and the increased emphasis campus-wide on technology, the Mill Creek students are benefiting in a variety of ways.

Figure 12: Tiers of 8th Grade Technology Literacy
Mill Creek Students at Grade 7 and 8, Compared to District Grade 8 Students
 (Percentage of Students in Each Tier)



How do KTA students compare to the district on technology skills? One would certainly expect 8th grade KTA students to be more proficient in technology skills than 8th grade students who were not in KTA, but by how much? Figure 13 indicates that KTA 7th grade students are almost as proficient as Kent 8th grade students. Not surprisingly, given the instructional approach of KTA, in the 8th grade, the percentage of KTA students in Tier 3 is significantly higher than for the district.

**Figure 13: Tiers of 8th Grade Technology Literacy
KTA Students at Grades 7 and 8, Compared to District Grade 8 Students
(Percentage of Students in Each Tier)**



How were these outcomes obtained? What background, training, and other attributes did KTA teachers bring to the project? What were the staffing levels?

For 2006-07, the KTA program had a director (who also had responsibilities as an assistant principal **and** in planning for the Kent-Meridian High School Technology Academy component) and six full-time teachers. Mill Creek created a part-time position for 2006-2007 in which a former KTA teacher worked with other teachers at Mill Creek to incorporate technology into their instruction, and this individual continued to provide some support to KTA, as well.

In addition, the district allocated a technical support person for three hours per day to the program. Initial technical support during the fall of 2005 involved many additional hours of support services from the district IT team as various wireless networking, email, learning management system, battery management and other technical challenges were addressed and resolved. Technical challenges such as this were expected and *should be* expected in any expansion of such programs. In addition, the day-to-day staffing for this technical support function will need to grow as the use of computers expands across the district.

Selection of Teachers

The Director of KTA reported that the teachers in the program were chosen very carefully. She mentioned writing the job description for these teaching positions in a very deliberate way: to make it very clear the tremendous amount of extra work and flexibility that would be required of KTA teachers and that innovation would be the expected norm. The basic message to applicants was that only extremely capable, unusually hard-working, and innovative teachers need apply.

This approach to hiring has clearly contributed to the success of the KTA program. It may also, however, have made it more difficult for the program to serve as “proof of a concept.” It is not yet clear how well teachers that did not initially choose to apply for KTA—now that some of the initial start-up challenges have been addressed—will succeed in this technology-rich environment. A carefully planned expansion of the use of such technology may be needed to address the “proof of concept” goal of the project.

As noted elsewhere in this report, teaching in KTA requires a very different approach to teaching and much work outside the school day; not all teachers may be prepared for the degree of change or the workload. It is worth noting that one KTA teacher hired for 2006-07 left quickly after the start of the school year, which presented a staffing challenge. A substitute or “guest” teacher filled in, and was subsequently hired for the remainder of 2006-07. The mathematics content area for this KTA vacancy made the position difficult to fill after the start of the school year.

Training and Education

Training for the teachers in KTA was extensive. The following lists some of the types of training most KTA teachers have received. (One teacher who was hired later in the 2006-07 year did not have formal training in these areas through the KTA program.)

- Small schools concepts
- Project based learning
- Learning management software (e.g., BlackBoard)
- Interactive whiteboard
- Differentiated Instruction
- Understanding by Design
- Strategies that Work
- Discipline policies and procedures
- Management strategies related to equipment
- Northwest Council for Computers in Education Conferences, which included training in tools such as Audacity, Podcasts, Geocaching, Wikkipedia, and Vodcasting

It is also significant that four of the six teachers in the KTA project for 2006-07 had advanced degrees or certifications. Of the three teachers on the 7th grade team, two of the teachers had Masters' degrees in Educational Technology, while the third had a Media Specialist Endorsement K-12 and worked previously helping teachers use the technology available at his school. Two of these teachers also had a background in special education, where individualized instruction is the norm. Of the three teachers on the 8th grade team, one had a masters' degree and a large amount of experience using technology prior to KTA. A second also had a master's degree, while the third teacher was in her first year of teaching.

Additional Attributes of KTA Teachers

During observations and interviews with the KTA teachers, a number of other characteristics of these teachers became apparent (other than being highly trained.) The majority of KTA teachers observed in 2006-07 could be described as dynamic, energetic, and personable. While all teachers work hard, these teachers seemed to be exceptionally dedicated. Other characteristics included:

- **Flexibility.** At times, technology breaks down. A student needs an alternative activity. In a project-based environment, there will be more noise in the classroom and less "control." Individualizing instruction, rather than just providing leveled groups, is complicated. Lessons, projects, and activities will take more or less time than expected. The electricity may be cut off. Students may need substantially more time for their projects than is available in class and yet have no way to physically meet in the evenings. Individual students will have emotional and personal needs that may affect an entire group of students working together on a project. Websites a teacher was planning to use may be down for unscheduled maintenance. While all teachers need a certain measure of flexibility, the technology and approaches in KTA classes seemed to raise the level of flexibility required.
- **Creativity.** The level of student engagement observed in KTA classrooms, which is discussed in more detail in a subsequent section, was not due solely to the technological tools available to students and teachers, although these tools were helpful. Teachers also used lessons that tapped both their own and their students' creativity, such as a student-led poetry slam, playwriting, incorporating sports statistics, using original source materials, creating video clips, research on the physics of sports, and many other strategies. While many of these strategies are widely used by good teachers everywhere, the addition of technology added both options and challenges.
- **Positive Classroom Management.** KTA teachers used a combination of personal magnetism, strong rapport with their students, high energy, interesting and varied assignments, praise, and high expectations to keep a positive, disciplined classroom environment. This occurred in spite of the need for students to get up, move around, leave the room for a project-related task,

and work in another location, etc., in order to complete their projects. The bond between teachers and students appeared to be strong. Most KTA teachers were observed frequently expressing to students how much they cared about them and their success.

- **High Expectations.** One of the goals of KTA was to establish high expectations for students. The classroom observations and interviews with students and teachers provided many examples of how teachers were establishing those expectations and how students were rising to the challenge. For example, teachers first involved students in developing rubrics for scoring their assignments, to help students internalize what a good product would look like. Students were expected to review and make suggestions about each others' work, further learning the standards. Then, if students' work was not adequate when it was submitted to the teacher, students were frequently given the opportunity to re-do it until it was adequate. (This meant more teacher work to re-grade the assignment one or more additional times.) Students who reported staying up late to work on assignments indicated that they did so because they took pride in their work and wanted it to be really good.
- **Willingness to Learn From Students.** Technology changes rapidly. It is virtually impossible for anyone, including a teacher, to know all the possible technology tools that might be used to address a particular topic in the curriculum or a particular project. At times, students will know of a website, a software feature, or a software package, for example, with which teachers are unfamiliar. Students may find themselves teaching this tool to their teacher, using it to solve their own problem, or teaching it to a fellow student who needs it to improve a class project or work more efficiently. It was not unusual for this to occur in KTA classrooms that were observed, but it was not observed in regular Mill Creek classes.

As consideration is given to expanding the use of technology to more classrooms throughout the district, not all teachers will be as well-prepared as KTA teachers were for the challenges, either in terms of technology training and education or the need for flexibility, creativity, and classroom management. How do we teach other teachers to have high expectations for students—to be quite rigorous, while they individualize the instruction--and yet still be willing to learn from a student? Finding ways to help all teachers succeed in a technology-rich classroom will be very important.

What level and type of resources does it take to implement such a program?⁷

Interviews with KTA and district staff members were helpful in beginning to document the resources needed for a program such as KTA. The types of expenditures related to the program can basically be broken into four categories:

- Training, including release time, travel, registrations, etc.
- Technical support
- Initial costs of hardware
- Cyclical replacement of hardware as it wears out
- Initial costs of software
- Annual licensing of software, when applicable, and periodic upgrades necessary for vendor support
- Program Management

A prior section of this report pertaining to teacher attributes, training, and staffing levels lists the types of training KTA teachers received. It is difficult to estimate the costs of such training if it were to be replicated on a larger scale. Presumably, a train-the-trainer model would allow a school district to bring such training “in-house” if it were a large scale initiative. The district’s investment in the capacity of the KTA teachers might help in this regard, but one of the themes emerging in conversations with KTA teachers was a concern about where they would find the time to train other people, given the hectic pace they were already keeping.

Technical support is essential for a program like KTA. As might be expected, the initial implementation in the first year required several weeks of intense technical support. On an ongoing basis, as noted earlier, a tech support staff member was allocated for three hours per day to KTA, after the initial installations in the first year. Some hardware and software vendors may claim that the technical support needed for a new initiative declines after training and implementation, but that depends on several assumptions. Already, the age of the hardware originally purchased for KTA is causing an increase in repairs as the computers are being used for a third year at the time of this report.

In addition—and this pertains to both instructional training and technical support—one cannot simply train a group of teachers on how to use the hardware and software and assume that the majority of that type of activity is done. Teachers retire, move, change positions, leave the profession, get promoted, etc. Two excellent teachers have already left KTA. Granted, their expertise is now being put to use in training and supporting other teachers throughout Mill Creek and the district, but their replacements still required training and will have technical support issues related to their new roles. A follow-up on the technical support question should be considered in subsequent evaluations for 2007-08 and beyond, to determine the ongoing levels of support that are needed on an ongoing basis.

⁷ Additional cost data is found in Appendix 3.

The initial hardware and software costs for the first cohort of KTA students were easier to document. (Although hardware costs *may* drop over time, it is unlikely that software costs will do so, and thus the overall costs cited below may be fairly realistic for the near term.) Thinking in terms of a single cohort of KTA, with a group of 90 students served in three classrooms, the costs below include equipment for KTA staff and workroom, plus “swap out” computers for students to use when theirs was being repaired:

Expenses for each Mill Creek Classroom

Type of Expenditure	Number Needed	Cost Per Item	Total Cost
Document camera	1	\$ 599.	\$ 599.
Projector	1	\$ 1,113.	\$ 1,113.
SMART board	1	\$ 1,393.	\$ 1,393.
DVD/VCR	1	\$ 109.	\$ 109.
Audio Enhancement	1	\$ 1,095.	\$ 1,095.
Subtotal per classroom			\$4,309.

Additional Expenditures for Kent Technology Academy (1:1)

Type of Expenditure	Number Needed	Cost Per Item	Total Cost
Backpacks/ carrying case for tablet computers	100	\$ 60.	\$ 6,000.
Digital Cameras	3	\$ 499.	\$ 1,497.
Tablet Computers	103	\$ 1,682.	\$ 173,219.
Extended Batteries for Tablet Computers	103	\$ 123.	\$ 12,669.
Printer/scanners	3	\$ 2,283.	\$ 6,850
Miscellaneous Other Costs			\$ 9,624
Subtotal:			\$ 203,959.
OneNote Software	100	\$ 23.	\$ 2,353.
Class Server learning management software (2005-2006)			\$ 71,799.
Subtotal:			\$ 74,152.
Video Production Room (see note) ⁸			\$ 57,594.
Approximate Total Costs per 90 students for initial year			\$ 335,705.

In an expansion of one-to-one in the district, KSD is shifting to a learning management system that is open source and has no per user fees. The only ongoing expenses associated with it will be server expenses and staff time. The Microsoft licensing costs now include OneNote. However, Microsoft licensing

⁸ Not all schools will require the investment in a new video production room.

expenses do increase on a per computer basis and so will increase each year as the total number of computers in the district increases.

The district is assuming a four-year life cycle for equipment and software. This is somewhat longer than the three years most experts suggest is appropriate, but is probably more typical of what really happens in local school districts and it coincides with the extended warranty purchased for the tablet computers.

Assuming that all the equipment and software could be used for four years (SMART boards and document cameras may last longer, but computers in the hands of middle school students probably will not,) costs would be approximately \$1000 per student per year. This cost could be considered in light of the *potential* need for fewer textbooks and written materials in a one-to-one environment, given that the technology will allow the use of original source material and other instructional content the district provides.

What impact has the KTA program had on teaching and learning?

This section of the report will discuss the information gathered from classroom observations, interviews, and focus groups conducted with students and staff, along with the student survey results.

One major area of interest for this evaluation was the potential of a technology initiative for increasing students' engagement with schooling. This excerpt, from a publication of the Northwest Regional Laboratory (Brewster & Fager, 2000) sums up this critically important issue.

“High motivation and engagement in learning have consistently been linked to reduced dropout rates and increased levels of student success (Blank, 1997; Dev, 1997; Kushman, 2000; Woods, 1995). Yet, keeping students interested in school and motivating them to succeed are challenges that present themselves year after year to even the most seasoned teachers. In fact, numerous studies have shown that student engagement in school drops considerably as students get older (Anderman & Midgley, 1998). By the time students reach middle school, lack of interest in schoolwork becomes increasingly apparent in more and more students, and by high school, as dropout rates attest, too many students are not sufficiently motivated to succeed in school (Lumsden, 1994).

There are many factors that contribute to students' interest and level of engagement in learning, and teachers have little control over many of those factors (Lumsden, 1994). However, research has shown that teachers can influence student motivation; that certain practices do work to increase time spent on task; and that there are ways to make assigned work more engaging and more effective for students at all levels (Anderman & Midgley, 1998; Dev, 1997; Skinner & Belmont, 1991).”

In observing classes at Mill Creek and in KTA, it was clear that whenever students were unengaged in the instruction, they were also more likely to misbehave or act out. The research question was whether KTA increased the level of student engagement. Other questions included gaining an understanding of the learning climate in KTA, including the challenges and success factors.

Interviews and Focus Groups

Several themes emerged from the interviews and focus groups, many of which are relevant to understanding the successes of KTA, as well as the challenges likely to occur with expansion. As previously mentioned, the training and additional attributes that KTA teachers brought to the project were critical. This section of the report focuses on additional themes from the research.

Equipment and Technical Support Are Essential. KTA staff indicated consistently that the support from central office was very good and that most of the frustrations in Year 1 were normal for a start-up program. Nevertheless, there were significant problems in Year 1 related to durability of the computers and more general technical problems. Teachers indicated that students' use of the "help desk" and other tech support had decreased now that more students knew how to address some of the more simple solutions on their own and could also help other students. As an example, during the period of this study, the wires to one of the flat panel displays in the hallway had been pulled out by someone walking by. A KTA student fixed the problem without help from tech support.

The primary suggestion offered by the KTA teachers was that every effort be made to ensure equipment for teachers arrives before the first day of school. There were frustrations, still, when equipment for the 2006-07 year was delayed for one staff member.

Empowering Teachers. Teachers spoke frequently and positively about how the school administration empowered them to teach in different ways. There were several reasons for a need within KTA to modify the class schedules. These included the integrated Humanities class, integration of instruction in math and science, and the constructivist approach to teaching and learning, which sometimes requires longer activities or discussions. This flexible schedule allowed teachers to individualize the instruction and supported the use of a project-based approach.

Moreover, the KTA classrooms had a different look and feel to them, in comparison with the majority of Mill Creek classes. A casual observer might even have wondered about the role of the KTA teachers, since they were often serving as facilitators rather than providing teacher-led, direct instruction. Fortunately, according to the teachers, they had support for using these different approaches, and for taking time to attend training that enhanced their teaching skills. The administration also was flexible about allowing KTA students to work on their projects or schoolwork during lunch when students would normally have been in the

lunchroom and at other periods when their schoolwork required more time than was available during class.

Coordinated Planning and Remarkable Dedication. Teachers also spoke about the coordinated planning they did on a regular basis and gave concrete examples of how hard they strived to integrate their lessons and ensure everything went smoothly during the school day. This appeared to involve considerable time in the evening for these teachers, although they had coordinated planning periods during the school day as well. The project-based approaches used in KTA also required more work for teachers “up front,” although the fact that students were self-directed during much of their work helped balance that somewhat. For example, prior to students beginning a project, there might be a preliminary assignment for students to develop a rubric that could be used in evaluating *any* of the several different ways a project might unfold. If the project involved integration of multiple subjects or content areas, the teachers would coordinate all the parameters of the project ahead of time to help students with the rubric assignment. The extra dedication of these teachers went beyond planning, however, since these teachers mentioned and were also seen meeting with students before and after school, during lunch, and during their planning periods to assist or coach the students. One KTA teacher also provided more formal mentoring on a voluntary basis for a group of KTA students after school.

Planned Nurturing of Responsibility. Teachers emphasized the time they spent helping students to grow increasingly responsible—responsibility for both their own learning and for that of their classmates—and how entrusting students with expensive technology had resulted in students taking greater responsibility for these resources. The KTA director and teachers have developed procedures that show students the consequences of not taking responsibility for their computers and reported that there were few problems after the first month or so that students were in KTA. Eighth grade teachers indicated how their expectations increased as the school year progressed, to ensure students had the maturity and responsibility to succeed in high school.

Communication—Teachers, Parents, Students. Another theme that emerged was the greater communication with parents and students that these teachers believed is an important part of KTA. Beginning with a mandatory parent meeting when students first entered the program, teachers learned to know the families of their students. The use of technology allowed parents to check on their student’s assignments (for example, through Blackboard) and communicate with the teachers, often through email. In support of this, KTA teachers were overheard discussing with the students the conversations the teachers had with their parents. Enhanced communication between parents and students also was mentioned as a benefit. Students not only reported being excited about their projects and wanting to discuss them with their parents, but sometimes students reported that they assisted parents with work at home, such as developing animated slides in Power Point for a business presentation.

Students also were able to collaborate and communicate after school hours using their computers. Getting help on an assignment might mean communicating with a peer, but also could mean contacting the teacher using email or Blackboard. KTA teachers indicate that they try to create a nearly paperless society. Student homework, assignments, and assessments are done online and submitted electronically to the teachers.

Smaller Learning Community. The smaller learning community aspect of the program was apparent in talking with KTA teachers. It was a specific goal (mentioned by multiple KTA teachers) that “Every student in the program should have at least one KTA teacher on their team that he or she can go to and have a strong, personal relationship with that teacher.” It was also clear that students were expected to *help* their peers succeed, and teachers described some strategies that they used to further that goal. The success of these strategies was supported when students were observed during the study showing other students how to address not only technical issues, but also other challenges for their group and individual projects.

Formal Classroom Observations

Observations were conducted in 19 KTA and Mill Creek classes across a two-week period in March. Classes were chosen randomly within KTA and Mill Creek, but only from classes representing the core academic subjects. Three of the KTA teachers were out for a training opportunity, so their classes were observed primarily towards the end of the observation window. In addition to a narrative description of each class, a formal coding scheme was also used. The formal classroom observation coding scheme used was adapted from the School Observation Measure (SOM) (Smith, Ross, Alberg, and Lothar, 1999.) Some categories from the SOM were omitted or combined for reporting in this study because the activity occurred extremely infrequently or not at all during the observations.⁹ At the same time, two categories were added: 1) instances of no instruction or 2) student behaviors such as being unengaged, off-task, or disruptive.

Observations were made for each of 168 five-minute intervals¹⁰ of the 19 classes observed, using 17 categories. If a specific classroom activity was observed during a majority of that five-minute interval, the activity was considered to have occurred. The specific categories or activities coded were:

- **Teacher-led, direct instruction** (either whole class or large group.) A lecture format is typical.

⁹ For example, because of proximity to WASL administration, assessments observed were both embedded in lessons and hard to examine, or were focused on improving students' familiarity with item types and scoring on the WASL. Since this was linked to the dates of the observations, the data were not particularly useful.

¹⁰ Classes were not of consistent length due to changes in the daily schedule (in one case, due to a pep rally) and due to the block and flexible scheduling in KTA classes.

- **Cooperative/collaborative learning.** An instructional activity in which students work together and have a positive interdependence.
- **Individual tutoring.** A teacher or another knowledgeable person works with an individual student in a one-on-one situation for a period of time ranging from a few minutes up to much longer intervals.
- **Work centers**—students working in groups or individually at various work centers such as computer stations, science lab stations, reading center.
- **Higher-level questioning and instructional feedback.** Refers to encouraging students to do more than recall information, such as analyzing information or proposing hypotheses.
- **Integration of subject areas.** Uses longer units to cover and extend subject matter so that students gain a deeper understanding and integrate knowledge from different disciplines.
- **Project based learning.** Generally, longer-term learning activities that are often interdisciplinary and integrated with real world issues and practices.
- **Teacher as coach/facilitator.** The teacher serves as a guide or support, rather than as a presenter of information.
- **Independent seatwork.** Students complete problems, worksheets, or similar assignments.
- **Experiential, hands-on learning.** When students participate in some activity, reflect upon the activity, and reach conclusions or insights from the experience.
- **Sustained reading or sustained writing/composition.** Students read or write silently, focusing on longer works of text or writing longer pieces.
- **Sustained independent inquiry/research.** Refers to activities in which learners develop knowledge and understanding through individual activities such as research, hypothesis testing, and information gathering.
- **Student discussion.** Students discuss structured questions with each other, sometimes prior to sharing their conclusions with the larger group or class.
- **Computer for instructional delivery.**¹¹ The computer is used to present instructional material and, at times, monitor learning.
- **Technology as a learning tool.** Teachers or students use the technology (such as computers or video cameras) to perform tasks like complete an assignment, search for information, or make a documentary about what they are learning.
- **Lack of student engagement/off task/ disruptions due to misbehavior.** Rather than focus on the lesson or assignment, students may be daydreaming, talking, playing, sleeping, distracting other students, or otherwise unengaged.
- **No instruction.** Time when no instruction is taking place, such as handing out papers, making announcements, or cleaning classroom work areas.

¹¹ All of the teachers whose classrooms were observed on the Mill Creek campus, including both the Mill Creek and KTA teachers, made extensive use of the interactive whiteboards. When teachers merely used the interactive whiteboard in lieu of a regular whiteboard or blackboard, it was not included in either of these two technology categories. However, if students were using the interactive whiteboards for presentations or teachers used them to explore instructional websites with their students or to deliver instructional content that would not have been possible without the interactive whiteboards, this was noted as using technology as a learning tool.

Results From Observations

Several trends emerged during the observation period. On the Mill Creek campus, explicit expectations existed for student behavior and systems were in place for ensuring an orderly environment. Class changes, lunch times, and special events were handled in a methodical way and students were generally very well behaved. This was true for both Mill Creek and KTA students. In fact, Mill Creek provided a good model for managing student behavior. (This may or may not show up in discipline statistics, but was clear in the orderly school climate apparent to visitors.)

In addition, the use of technology on the Mill Creek campus is not restricted to KTA teachers. Most Mill Creek teachers observed were using technology, especially the interactive whiteboards and document cameras.

During the observations, one type of technology was not used in any of the Mill Creek classrooms and was observed in use in only one KTA classroom—the PC desktop computers found against the walls. In discussions with the Mill Creek teachers, they indicated that it was difficult to orchestrate the sharing of a few computers in a 55 minute lesson. If the lesson involved technology other than an interactive whiteboard or document cameras, Mill Creek teachers indicated they generally used the laptop carts or reserved the computer labs, although there were challenges associated with these approaches, as well. Although not witnessed during these observations, KTA teachers said that they used the desktop computers when a student had lost access to his or her tablet computer due to a rule infraction, or for tasks like video editing.

Classes at Mill Creek

As previously noted, the observer found that typical Mill Creek teachers were using their interactive whiteboards. When the first class bell rang, the teachers typically had a start-up activity for students that reinforced some instructional goal and supported an orderly environment, since students immediately had something to work on. By placing this assignment on the interactive whiteboard, the assignments were always legible and brightly lit, ensuring that students were aware of what they should do. Students tended to pay attention to the interactive whiteboard and this further contributed to an orderly environment. Subsequent lessons during the typical class period were generally teacher-directed in a whole class or large group setting, again using their interactive whiteboards to display information, websites, maps, or drawings.

Of the exceptions to this typical class, two classes illustrated how technology can change instruction. One Mill Creek class happened to be observed using instructional software¹² (TeenBiz3000) in the computer lab. The students were very focused and the teacher reported he was able to provide students with some

¹² A web-based, individualized reading and writing program that provides individualized instruction based on the student's individual reading (Lexile) level.

choices about reading and writing assignments, a chance to practice writing extended responses, and differentiated instruction for some students. The software also provided the teacher with the ability to monitor how students were doing and to have the time to work with any individual student who had trouble.

A second exception involved a teacher who used video he created, along with the laptop carts, to form smaller groups within his class so students could work on long-term projects and assignments. In turn, the students had the benefits of both direct instruction (through the video and interactive whiteboard) and project-based learning when they were using the laptops. Projects and assignments were also individualized to some extent. The group lesson even referenced a virtual field trip the students had taken in a previous lesson.

The level of engagement for *all* students in both of these two classes was very high—unlike that of some students in most other Mill Creek classrooms observed for this study. While the observer found the content in Mill Creek classes interesting, it was clear that some students did not feel the same way. While there were a few, very proficient Mill Creek teachers who were able to make their lessons interesting to most or all of their students, it was clearly hard work. The challenges for the two Mill Creek teachers using more technology were different and focused more on choosing technological tools to support the instructional content.

Classes in KTA

In a typical KTA classroom, students also had work to do immediately upon entering the classroom. The nature of the work varied considerably, however, and seemed likely to appeal to different learning styles. Among the activities observed, students were

- Writing a script or plan, and then making a video about the Oregon Trail.
- Developing PowerPoint presentations to teach concepts related to prefixes.
- Designing a building, then finding the volume of the building and linking it to a particular culture that might have used the building.
- Developing PowerPoint presentations about geometric shapes and helping each other through Blackboard discussions.
- Using the TeenBiz 3000 instructional software
- Working on extended reading and writing assignments, individualized for each student.

There was a certain level of controlled chaos in some (not all) KTA activities, but this is not meant as a pejorative description. When one group of students decides to make a video to illustrate something using students as actors in the video, while another group decides to do a computer simulation using an animation tool, these groups will be talking and moving around more than students do in most classroom settings. Add to this level of activity the extra enthusiasm that the KTA students and teachers bring to their tasks and the room might seem noisy at first. Yet, the conversations were almost all about the work.

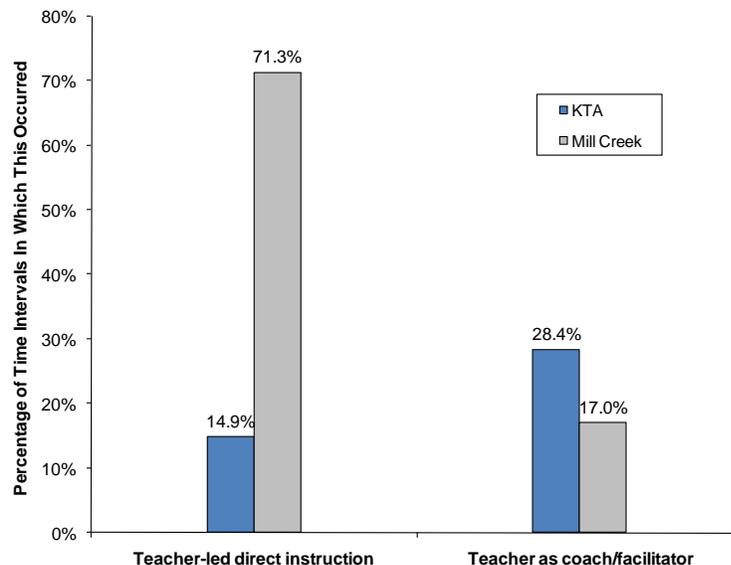
One thing that became apparent while observing classes in the KTA program is that it is more than just a computer or technology initiative. Teachers in the program deliberately used different approaches to teaching, provided individualized instruction and assignments, supplied students with a personal support system within the smaller learning community, and emphasized a project-based, constructivist approach to learning. These teachers had high expectations for students in a variety of areas, ranging from students' personal responsibility, productivity, and depth of work.

Comparisons of Data from Two Types of Classes

Data from coded observations of time intervals were tallied and analyzed, both as raw frequencies for the purpose of statistical testing, and as a percentage, used to present the data graphically—in what percentage of the intervals observed did this event or activity occur?

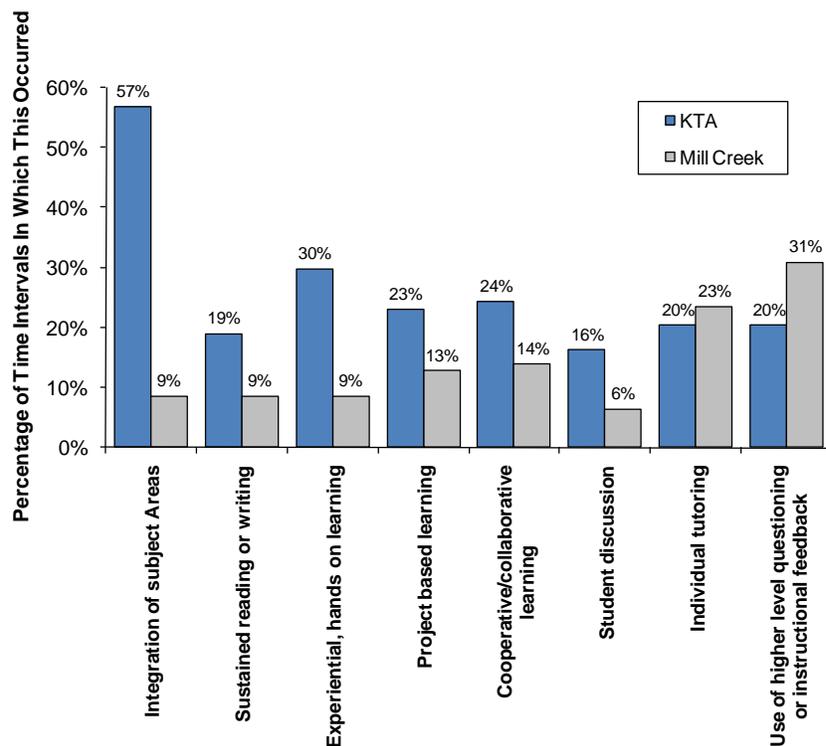
Differences existed between the classroom activities observed in Mill Creek and KTA classes, as shown in the following graphs. Note that the Mill Creek data includes those classes previously mentioned as making extensive use of technology on that particular day. The largest area of difference occurred in the percentage of time teachers in the two programs were providing direct instruction. This difference was statistically significant ($\chi^2 = 50.7321$; $p < .001$) versus the time spent in the role of coach or facilitator (Figure 14) or other activities (Figure 15.)

Figure 14: Teachers' Roles During the March 2007 Classes Observed
(Percentage of Time Intervals in Which This Occurred)



KTA students were involved in finding answers and solving problems using the technology and other tools provided by their teachers, with the teachers' role focused on supporting and guiding them in this process. It was clear when observing the KTA classes that their teachers' typical answers to questions had to do with reminding students of sources available to them, rather than just answering the question. This is not to say that KTA teachers never provided any content directly, but rather that they would follow a short didactic lesson with assignments that were more long-term and project-based, as shown in Figure 15.

Figure 15: Activities Occurring During March 2007 Classes
(Percentage of Time Intervals in Which This Occurred)

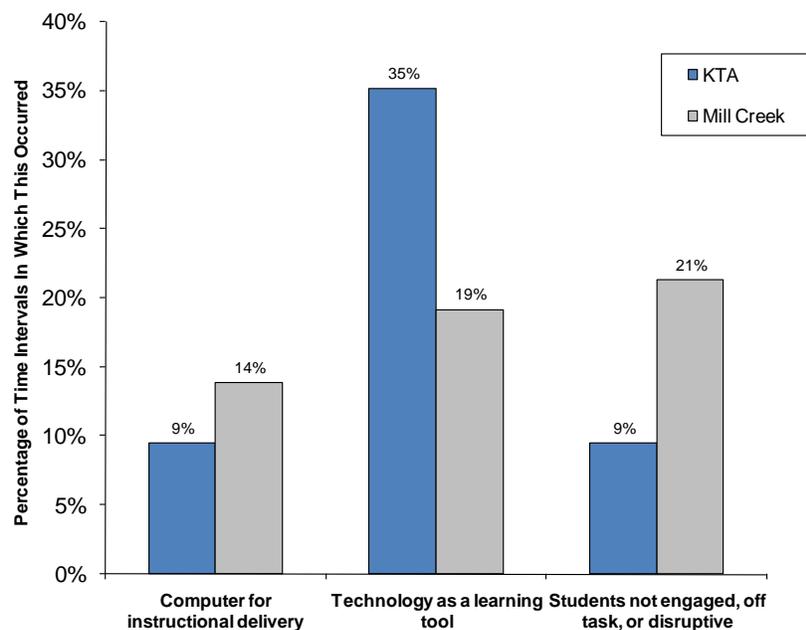


The first comparison in Figure 15 shows KTA teachers were much more likely to provide integrated instruction than Mill Creek teachers ($\chi^2=43.825$; $p < .001$), but it is important to remember that the schedule for KTA students was built to include a humanities class instead of two separate language arts and social studies classes. However, observations indicated that there was integration in KTA science and math classes, as well. The next five comparisons above show that KTA teachers were more likely to have sustained reading or writing activities, more hands-on, experiential activities, more project-based learning, more cooperative/collaborative learning and more student discussion. (Because of the sample size, the only differences that were statistically significant at the $p < .05$ level were the frequency of using experiential, hands-on learning and student discussion, but all results were in the direction expected for the KTA classes.) The nonsignificant, slightly lower rates of KTA teachers using higher level questioning and feedback resulted because those questions were imbedded in the design of the lessons and the fact that the

KTA teachers were doing less direct instruction, where those questioning events would have been observed as part of the teacher-led discussions.

Figure 16 shows that **both** Mill Creek and KTA classes sometimes used technology to deliver instruction. However, recalling that use of the interactive whiteboards was occurring in every class observed and therefore not coded, the use of additional technology in Mill Creek classes was primarily restricted to the two teachers previously mentioned (one using video and the laptop cart, the other in the computer lab using Teen Biz3000 software.) KTA classes used technology **as a learning tool** significantly more often (35 percent versus 19 percent of the time) ($\chi^2=.4.678$; $p<.05$), again with most Mill Creek instances occurring in just two classes.

Figure 16: Other Activities Occurring During March 2007 Classes
(Percentage of Time Intervals in Which This Occurred)



Finally, there were significantly fewer instances of students being off task, not engaged, or disruptive in KTA classes ($\chi^2=3.845$; $p<.05$). The data, however, do not capture the enthusiasm KTA students showed for their work. In one case, two students were overheard in the cafeteria continuing to talk about their project. They were discussing the scoring rubric and how to make sure they incorporated all of the elements of the assignment. One student was quizzing the other, “How did you make sure you addressed that requirement?” In another case, a student who was ill and at home was able to participate in a collaborative project using his laptop to respond to emails from his classmates about the project. In several other instances, KTA students were observed coming into class early, skipping lunch, or

staying late to work on projects because they wanted to do so. Finally, a student working on her project in a Humanities class learned a new software tool from a fellow student (a tool the teacher did not know nearly as well as the student.) For the next 30 minutes, while working alone on her project, the first student exclaimed several times during the class period, “This is so cool,” and “Wow! I am so excited.”

Other Findings

While there were some activities that were more common in KTA classrooms, it is important to note that these occurred in some Mill Creek classrooms, as well. For example, some Mill Creek teachers made references to multiple subject areas during teacher directed instruction or used project-based learning and various technology tools such as instructional software. The fact that this occurred more often in KTA classrooms is probably due in part to the fact that the ease of access to more technological tools make it easier to do these types of activities, as well as the fact the teachers in KTA were selected with an expectation that they would use these approaches almost exclusively.

As mentioned earlier in the report, teachers on this campus were using their interactive whiteboards in the observed classes, although the ways in which they used them varied across teachers. Even when they were used in lieu of the normal whiteboard, there were advantages: the ability to save an image from the interactive whiteboard for use as a handout or to return to it again and again made them a more effective tool than the normal whiteboard would have been.

The incidence of unengaged students was much lower in KTA classes than in most Mill Creek classes. The exceptions:

- The previously mentioned Mill Creek social studies class in which the teacher was using a great deal of technology.
- A Mill Creek science class in which the teacher used experiments and questioning strategies that kept students engaged.
- The Mill Creek language arts class using the Teen Biz 3000 software in the computer lab.
- A Mill Creek social studies class in which the teacher used the interactive whiteboard to graphically show the spread of the Roman Empire, combining this with a very tightly planned, interesting presentation and excellent questioning strategies that kept students alert.

As these examples point out, it was possible to engage students without the use of computers, but the data suggest that it was harder to do.

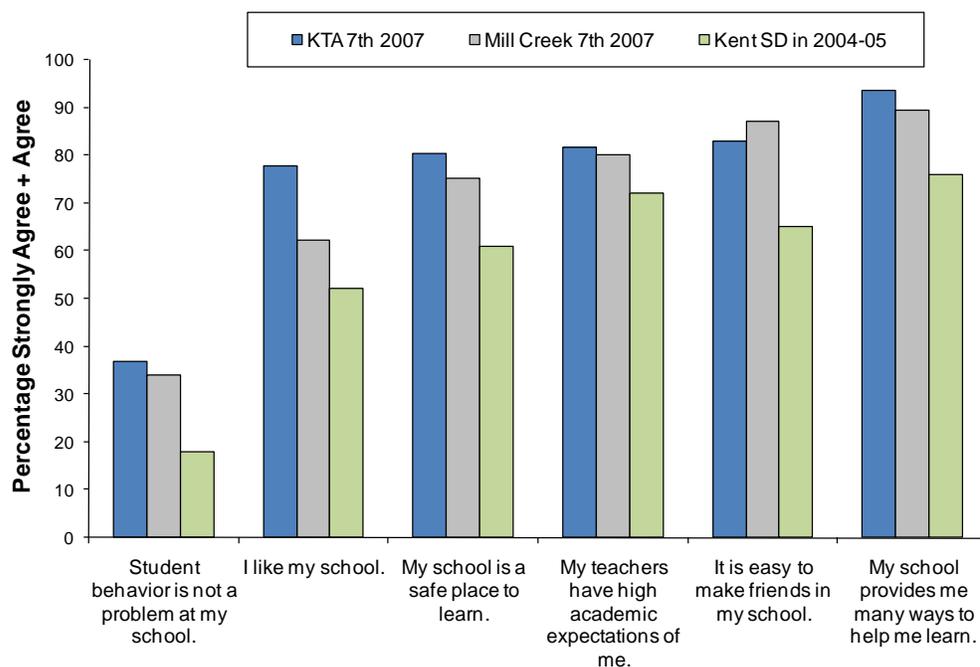
Student Perceptions of the Learning Environment

To supplement the observations of the learning environment in KTA, the study collected data from students concerning their perceptions. Both focus groups and surveys were used. First, a two-part survey was used, with one section devoted to questions about the learning climate as perceived by 7th grade students in both KTA and Mill Creek. Six questions comprised this section, all drawn from the

longer Middle School Climate Survey used in Kent School District in 2004-05. Each question asked students to respond to a statement, indicating whether they strongly agreed with the statement, agreed, were unsure, disagreed, or strongly disagreed.

Results of the survey reflect positively on both KTA and Mill Creek. The responses for students in KTA and Mill Creek (see Figure 17) were very similar, and were generally more positive than the district results for all middle school students in 2004-05.

Figure 17: Student Survey Data
Percentage of Students Strongly Agreeing or Agreeing



Student Focus Groups

Five focus groups of Cohort 2 students and two of Cohort 1 students were conducted in May 2007.

The student focus groups were asked a series of questions to stimulate discussion. These questions were:

- 1) Think back to 6th grade. What were your hopes when you chose the KTA program? What made you decide to “go for it?” Were these the same reasons your parents wanted you to come to KTA?
- 2) Were you interested in technology before you heard about KTA? Did you have a computer at home? Internet access?

- 3) What do you like about the KTA program?
- 4) What do you dislike or think would make it better? Have you faced any challenges that the folks designing the program should know about or try to fix?
- 5) Can you think of a project or assignment since coming to KTA that you really liked?
- 6) For 8th grade only: Who is going to KMTA? Why or why not?

Reasons for Choosing KTA

Most students described their reasons as being the same as their parents' reasons: the program sounded innovative and they liked the chance to use technology. In a few cases, the parents first heard about the program and pushed for their son or daughter to agree, but these students were pleased that their parents had done so. While almost all students mentioned that the technology sounded appealing, their interest was also peaked by the chance to do projects, rather than worksheets, and work collaboratively with other students.

Several students mentioned that they had been concerned initially about leaving their boundary school and their friends to attend a school where they knew no one. Some of them felt that their shyness might make it hard to make new friends. All of them said that the projects working with other students and the different ways of teaching helped them to make new friends quickly and that loneliness or missing friends was not an issue.

Prior Technology Interest/Access

Slightly more than half of the students indicated a prior interest in technology, but a substantial minority said that technology had not been a big interest before. The recruiting for KTA had effectively intrigued these students or their parents.

More than half of the students indicated that there was at least one computer in their home before KTA, and many (but not all) of these homes also had Internet access. In most cases, these home computers were shared among siblings and parents, limiting the ability of any one family member to access the computer. Many students mentioned how old their home computers were and the difficulty of using them, if they were able to get access. There were a few students, however, who had been using computers at home on a regular basis prior to KTA.

What Students Like About KTA

Students liked many things about KTA, but the technology was not always the first thing they mentioned. Regardless of grade level, they talked about the friendships they formed because of the collaborative atmosphere. Several students mentioned how they felt trusted to be responsible, because of the expensive equipment they were expected to take care of. They indicated that the projects were fun. Many of the 7th grade students mentioned the opportunity to make choices about their

assignments and the degree to which they felt supported and cared for by their teachers.

Nevertheless, technology was also something the students frequently mentioned. They talked enthusiastically about how much easier it was to communicate with each other about assignments because of the technology tools, and how working with peers to review their work helped them do a better job *before* they turned in assignments. Students seemed to find the science equipment and video/photography equipment to be particularly fun; several also mentioned that they liked to do animation and plays that were videotaped and shown to an audience.

Finally, they talked about how the technology shaped their relationships with parents and teachers. They liked the ease of communicating with teachers about assignments and the fact that they could always get to their assignments on Blackboard. If they couldn't remember what was due and when it was due, they knew how to find out and avoid missing a deadline. The 7th grade students, in particular, mentioned that they appreciated that their parents were in communication with them and with their teachers. They also mentioned being excited about showing their parents things on the computer and having interesting schoolwork to discuss with their parents. By contrast, they mentioned that in the past there was not much to talk about when parents asked what happened at school that day.

What Students Would Like to Change About KTA

Students' suggestions fell into two categories. The first had to do with managing the workload of their assignments. Students acknowledged that teachers had begun to coordinate due dates on assignments so that two or more large assignments were not due on the same day or same week. In addition, they acknowledged that teachers had begun to enforce interim due dates for portions of assignments, such as outlines or first drafts, to help students stay on schedule. In spite of these changes, however, students reported staying up as late as 10:30 at night to complete all of the work. They felt that they must choose between adequate sleep and doing a good job on their assignments. It was not clear from these comments whether the assignments were too large or the students were trying too hard to make their work products good. The good news was that they had internalized high standards. The unfortunate by-product was an unusual amount of stress due to several hours of homework every evening and on many weekends.

The second theme was mentioned only by 8th grade students. They were concerned that the purpose of some assigned projects was unclear. They suspected that there might be some projects assigned purely to keep students working as hard as possible, rather than to ensure that they learned what they needed to know. It was hard to assess the accuracy of their perceptions, given the

extremely high test scores for KTA students (see the achievement section of this report), the late spring timing of the focus groups (after the WASL testing,) and the tendency for ennui to set in by late spring for students in the terminal grade level at any grade span or school. Perhaps the way to address this concern, and the concern about workload in general, would be to review the projects planned for the year with an eye towards making sure they were aligned with the curriculum and had a clear purpose that students could see.

Is the KTA program meeting its goal of attracting students to the Mill Creek Campus?

Applications to the KTA program have been strong and increased from 2005-06 to 2006-07. In 2005-06, there were 196 applications for 90 seats. The second year of the program saw 487 applications for the next 90 seats.

Applications for 2007-08 (the third cohort) exceeded 300. Some parents commented that they would have applied for 2007-08, but the limited number of seats available discouraged them from doing so. Clearly, the program is working well in attracting students to the Mill Creek Campus.

Could this program be expanded on a much larger basis? In other words, is it “scaleable,” and what would that entail?

Scalability is a property of a system which indicates its ability to either handle growing volume or to be enlarged. There were research questions from the beginning about whether components of the KTA program could be implemented on a larger scale. To some extent that question needs to be refined. Are we really thinking about expanding KTA, with all of the features such as the humanities block and an expectation that all teachers will implement project-based learning, or are we just talking about providing one-to-one computers for more students?

KTA is a complex program that has many components. While it can provide information about implementing a one-to-one laptop program, it is important to remember that KTA is much more than that. The positive results for KTA are unlikely to be obtained by just broadening the use of technology. The smaller learning community of KTA, the teachers who adapted their entire approach to teaching, the large amount of teacher training, and the constructivist instructional approaches are just a few of the KTA elements that will not necessarily occur in a widespread implementation of a one-to-one initiative. Nevertheless, many lessons have been learned from the KTA program so far. These lessons include more institutional knowledge within the school district about:

- The types of hardware and software required for a laptop initiative
- Hidden costs in terms of central personnel and support

- Durability of hardware
- How to provide a tiered approach to tech support that starts with students fixing their problems as the first step
- The amount of training teachers need
- Security issues and how to address them
- The physical (building, space, furniture) needs of such an initiative.

As policymakers in KSD consider future directions, perhaps some discussion around the following points will help guide them, along with the data in this report.

1. Expansion of the laptop portions of the KTA program needs to be handled carefully. Existing KTA staff at Mill Creek could be a valuable resource for other teachers. For this reason and because the Mill Creek students have shown a readiness that exceeds that for the district, expansion at Mill Creek seems like a logical possibility. KTA teachers felt that it is important not to “reinvent the wheel” given all that they have learned and are willing to share.
2. Planned construction for the cafeteria at Mill Creek is underway, potentially making it difficult to expand the “smaller learning community” approach of KTA by creating additional teams that are housed together.
3. In any expansion, consideration of the resources needed from central office should be considered. The district has implemented an expansion to Kent-Meridian High School in fall 2007 and will expand to the 10th grade in the fall of 2008. The high school program is called the Kent-Meridian Technology Academy (KMTA.) That year (2008) will also be the 4th year of life for the original tablet computers. Technical support related to any other expansion will require additional effort at a time when the KTA computers are showing some wear and tear and are likely to need more frequent support, as well.
4. There are Mill Creek teachers that are eager to have one- to-one computers available to their students on a regular basis. (It is likely that there are also some teachers who do not share that enthusiasm.)
5. Teachers who are interested in using more technology in their classes may not be distributed neatly by grade or subject matter.
6. Teachers who are interested in more use of technology in their classes may not be willing or ready to implement all of the components of the KTA model, but they will still need extensive training and direction. Such training may compete for time and resources with other district initiatives and needs. Research studies have shown, however, that new initiatives (e.g., smaller class sizes, more computers) implemented without training are unlikely to produce change.
7. There is a bit of “controlled chaos” in KTA that works because the students have learned to be responsible and they are contained somewhat in the smaller learning community. Given the emphasis on a safe, orderly climate at Mill Creek, the school administration will need to decide how much “controlled chaos” they can allow in other areas of the school.
8. Mill Creek does not have the option of turning students away just because they entered the school year late and missed all the instruction on how to use the learning management system, the file server, their laptops, and other

tools. Any school or teacher making heavy use of technology will need to provide support for new students entering at any time during the school year.

Conclusions

KTA is not really a technology program, although it uses technology extensively and can help us understand what technology-rich environments will require. Rather than a technology program, the heart of KTA is a group of creative, dedicated teachers with a knowledgeable leader who have developed integrated lessons that allow more student choice, and encourage students to look more deeply and systematically at topics in the curriculum. It works not only because of the teachers, but because KTA students also are expected to work harder than other students. Students are willing to do this because the learning is engaging; the technology allows differentiation and the ability for them to work more efficiently.

Students in both Mill Creek and KTA will need the ability to live in a technology rich world. It appears that both groups are benefiting from the district's investment.

Based on the interviews, observations and other data, some of the factors contributing to KTA's success have been:

- Support from administration at the school and district level.
- The KTA teachers and Director have been empowered to be innovative.
- The extent to which KTA teachers have led students to increased levels of responsibility and self-direction regarding their own work.
- The amount of coordinated planning by KTA teachers, along with their willingness to develop new ways to help students learn the required material using technology.
- Good training opportunities for KTA staff.
- Extremely committed staff. KTA teachers appear to work well together.
- The increase in parental involvement that occurs through KTA.

Finally, the positive atmosphere created by structuring the program as a smaller learning community was very clear. Teachers frequently gave student praise and other verbal indications about how much they care. Some KTA teachers mentioned that they wanted to ensure that every student has at least one teacher to whom they could turn when in need of support. This type of supportive, caring environment is one that research shows leads to increased student success in any program.

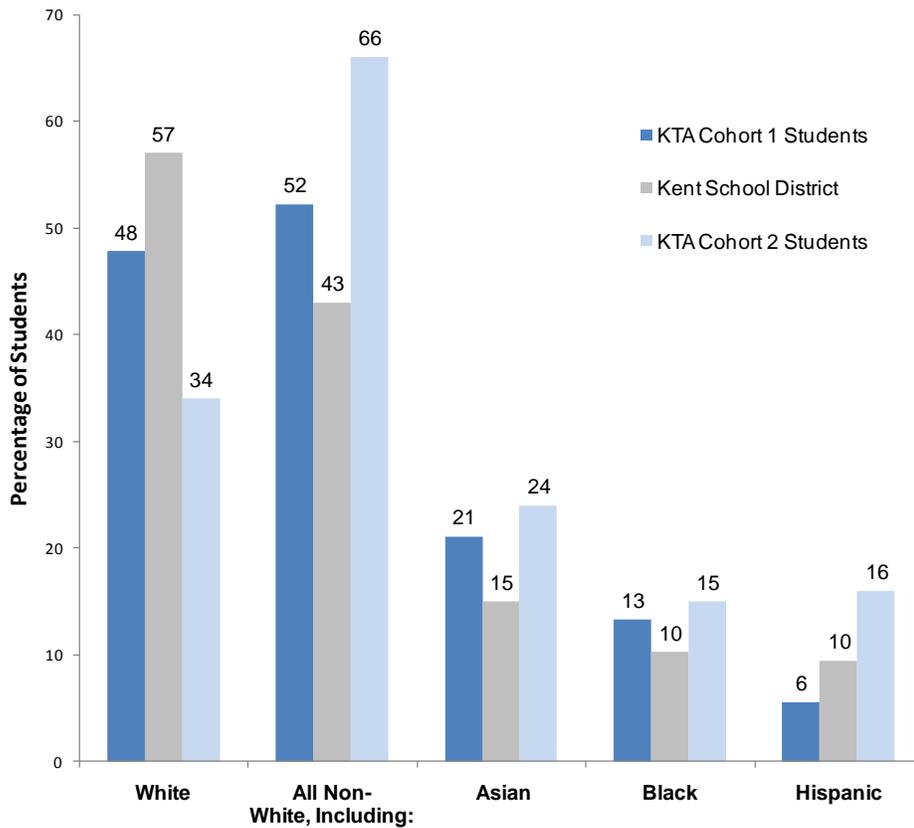
References

- Anderman, L.H., & Midgley, C. (1998). *Motivation and middle school students* [ERIC digest]. Champaign, IL: ERIC Clearinghouse on Elementary and Early Childhood Education. (ERIC Document Reproduction Service No. ED 421 281)
- Blank, W. (1997). Authentic instruction. In W.E. Blank & S. Harwell (Eds.), *Promising practices for connecting high school to the real world* (pp. 15-21). Tampa, FL: University of South Florida. (ERIC Document Reproduction Service No. ED 407 586)
- Brewster, C. & Fager, J. (2000) *Increasing Student Engagement and Motivation: From Time-On-Task to Homework*. Portland, OR: Northwest Regional Educational Laboratory. Retrieved April 6, 2007 from the World Wide Web: <http://www.nwrel.org/request/oct00/index.html>
- Dev, P.C. (1997). Intrinsic motivation and academic achievement: What does their relationship imply for the classroom teacher? *Remedial and Special Education*, 18(1), 12-19.
- Kushman, J.W., Sieber, C., & Heariold-Kinney, P. (2000). This isn't the place for me: School dropout. In D. Capuzzi & D.R. Gross (Eds.), *Youth at risk: A prevention resource for counselors, teachers, and parents* (3rd ed., pp. 471-507). Alexandria, VA: American Counseling Association.
- Lumsden, L.S. (1994). *Student motivation to learn* (ERIC Digest No. 92). Eugene, OR: ERIC Clearinghouse on Educational Management. (ERIC Document Reproduction Service No. ED 370 200)
- One-to-One Laptops in a High School Environment: Piscataquis Community High School Study Final Report. The Mitchell Institute, February 2004. Retrieved April 12, 2007 from http://www.mitchellinstitute.org/Gates/pdf/One-to-One_Laptops_Report.pdf
- Skinner, E., & Belmont, M. (1991). A longitudinal study of motivation in school: Reciprocal effects of teacher behavior and student engagement. Unpublished manuscript, University of Rochester, Rochester, NY.
- Smith, L, Ross, S, Alberg, M, & Lowther, D. (1999). School observation measure: Observer's manual. Memphis, TN: University of Memphis, Center for Research in Educational Policy.
- Woods, E.G. (1995). Reducing the dropout rate. In School Improvement Research Series (SIRS): Research you can use (Close-up No. 17). Portland, OR: Northwest Regional Educational Laboratory. Retrieved October 2, 2000, from the World Wide Web: <http://www.nwrel.org/scpd/sirs/9/c017.html>

Appendix 1

Additional Information on Demographic Trends

KTA students in Cohort 2 were less likely to be White, in comparison with Cohort 1 and the Kent School District as a whole. This was primarily due to an increase in Hispanic students, in comparison with the previous cohort, and slight increases in other racial groups except for white students. These trends are consistent with the district's expressed interest in increasing technology access for a diverse group of students.



Both cohorts remained essentially balanced in terms of gender from the time of their formation through the end of the 2006-07 school year.

Appendix 2

Additional Data on Achievement

One of the goals of the KTA program was to improve the educational access and achievement of diverse groups of students through the use of technology and other instructional approaches.

Percentage of 7th Grade KTA Students Meeting State Standards on WASL in 2007								
(Does not include extremely small groups of students to protect confidentiality for individual students)								
Reading			Writing			Math		
Race/Ethnicity	KTA	State	Race/Ethnicity	KTA	State	Race/Ethnicity	KTA	State
Asian	94.7	75.0	Asian	84.2	77.7	Asian	78.9	64.7
Black	75.0	54.1	Black	66.7	56.3	Black	33.3	30.0
Hispanic	81.8	51.2	Hispanic	81.8	51.4	Hispanic	72.7	31.9
White	84.6		White	80.8	72.3	White	76.9	60.9
Total	85.2		Total	80.2	68.1	Total	67.9	54.4

Percentage of 8th Grade KTA Students Meeting State Standards on WASL in 2007								
(Does not include extremely small groups of students to protect confidentiality for individual students)								
Reading			Mathematics			Science		
Race/Ethnicity	KTA	State	Race/Ethnicity	KTA	State	Race/Ethnicity	KTA	State
Asian	85.7	72.5	Asian	71.4	58.9	Asian	57.1	50.6
Black*	100.0	48.0	Black*	71.4	24.4	Black*	57.1	20.8
Hispanic*	100.0	49.8	Hispanic*	75.0	27.1	Hispanic*	50.0	21.2
White	90.0	69.1	White	80.0	59.9	White	66.7	51.2
Total	87.5	64.7	Total	75.0	49.5	Total	60.9	44.4

* Indicates KTA group sizes smaller than usually reported, but included here for descriptive purposes only.

Appendix 3

Additional Cost Information

Throughout the report, references were made about the training KTA teachers received, as well as the use of “best practice” approaches to teaching. In addition, the report explained the need to train teachers new to KTA and any students entering KTA after the 7th grade, so that any empty student seats can be filled. The chart below shows some costs that are typical for this type of program, based on the KTA and some KMTA experiences to date. The estimates are based on assuming a three-teacher team.

Typical Expenses for Technology Academy-type Training and Events

Type of Expenditure	Number Needed	Cost Per Item	Total Cost
Initial Year- 80 extra pay hours per staff member	3	@avg \$40 per hour	\$ 9600.
Year 2 – 40 extra pay hours per new staff member	3	@avg \$40 per hour	\$4800.
Instructor time for Year 2 to prepare new staff members	60 hours	@avg \$40 per hour	\$2400.
After hours support meetings- 1 ½ hours each	6	@avg \$40 per hour	\$1,080.
Attendance at NCCE conference	3	\$1000	\$ 3000.
Blackboard trainer fee	1	\$12,000	\$12,000.
Blackboard training staff time -22.5 hours	3	@avg \$40 per hour	\$2700.
Summer Camp for new KMTA ¹³ students (22.5 hours)	4	@avg \$40 per hour	\$ 3,600.
AALF Laptop Institute (KMTA)	4	\$2,000.	\$8,000.
Urban School Summer Laptop Institute	4	\$2,000.	\$8,000.

¹³ The high school program is called the Kent-Meridian Technology Academy or KMTA.