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Having Our Say: Middle Grade Student Perspectives on School, Technologies, and Academic Engagement

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Abstract

Growing consensus among policy makers and educators alike suggests that our education system must be transformed to address the needs of a global society as well as the needs of the 21st century student. Often overlooked as a resource, students can contribute a valuable perspective on education. The purpose of this study, therefore, was to learn from middle grades students, through surveys and focus groups, what engages them to achieve in school. The findings, which centered on student perspectives of school, uses of technologies in and out of school, and academic engagement, are viewed within the context of global changes and the new demands that this trend places on education. (Keywords: technologies, academic engagement, middle grades, student perspectives.)

As we enter the 21st century, a confluence of economic and technological changes, along with advances in our understandings of how humans learn, has created unique challenges for educators. One of these challenges concerns how best to meet the needs of children living in a world of almost ubiquitous information and communications-related digital technologies (e.g., Web, handheld devices, cell phones, gaming consoles). Children growing up today are becoming increasingly comfortable using these technologies for interacting with information and with each other giving rise to what Prensky (2006) refers to as the digital native. The manner in which new information and communication technologies are being used suggests that children today are creating understandings and knowledge in new and different ways. Such knowledge is reflective of constructivist understandings about how humans learn. Constructivism as a learning theory is focused on multiple forms of knowledge, the role of prior knowledge, and the social nature of knowledge and its acquisition (Leinhardt, 1992). Related constructivist pedagogy is based on students' active participation in the process of creating knowledge (Larochelle, Bednarz, & Garrison, 1998). Shaffer (2007) argues that the teaching and learning that emerges in such contexts needs to be "epistemic" or focused on ways of knowing that are inherent in innovative professional life.

The current wave of change in teaching and learning is also reflective of the shifting dynamics in global economics. Friedman (2006) conceptualizes this economic change as a flattening of economic conditions in which as much as

half the world is competing on a level economic playing field. These changing economic conditions have led to a host of educational reform proposals aimed at innovation. The New Commission on the Skills of the American Workforce of the National Center on Education and the Economy (2006) recommended massive educational reform that would refocus the educational system in the United States on learning for creative work. Additionally, the Partnership for 21st Century Skills (P21) (2005) argues that technological, economic, informational, demographic, and political changes require that schools reconsider how they prepare young people for civic, economic, and social life. Proposing to "bridge the gap between how students live and how they learn" (p. 4), P21 has identified six key elements for 21st century education including, core subjects and learning skills as well as 21st century tools, contexts, content, and assessment. Central to their framework is the use of information and communication technologies in authentic contexts. They further suggest that the 21st century workplace is infused with digital communication and information management systems that expect workers to have sophisticated technological skills and dispositions. They observe that since young people are becoming increasingly dependent on technologies to communicate, gather information, and extend social experiences it is essential that our educational system evolves to meet these new demands.

Not surprisingly, transforming education to meet the demands of the 21st century begins with an acknowledgement that today's students have opportunities to learn in different ways than those of previous generations. The way students use technology outside school, from instant messaging, mobile phones, and handheld games to digital music players and video game consoles is similar to how today's workers use technology in their professional careers—multitasking, on-the-go and fast paced. In many classrooms, however, students are "unplugged"—in fact, school policies often prohibit them from bringing their technology tools with them to school (Dede, Korte, Nelson, Valdez, & Ward, 2005; Levy & Murnane, 2004; Spires, 2006).

In this new global economic environment, education plays a crucial role in maintaining prosperity and stimulating economic growth (Stevens & Weale, 2003). Competitive advantage for a region, state, or nation is now built on the skills and knowledge of its general workforce and its capacity to innovate new markets. Critical to that competitive advantage is the quality of education acquired in middle and secondary schools. Within the context of North Carolina's ambitious educational reform agenda, surveys have been administered that target views (e.g., teachers, business community) about how the educational system needs to change in order to meet 21st century needs. Noticeably absent from the dialogue are student perspectives. Students are growing up with evolving technologies and often adapt to them more quickly than educators who are trying to develop new, innovative ways to teach. We believe that student perspectives are particularly important given the unique historical context in which we live today. The objective of this study, therefore, was to highlight middle school student perspectives about what they need to be engaged and achieve in school settings.

METHODOLOGY

Participants

The participants were 4,000 middle grades students (from sixth, seventh, and eighth grades) who were members in a North Carolina statewide after-school program. Stratified random sampling was used to identify the 4,000 participants (out of the total population of 12,000 after school students) based on geographic region, race, gender, grade level and family income. Students from all counties in North Carolina completed one of two questionnaires. Sixty-three percent of the students received free or reduced-price lunch, compared to the state average (39%). The sample included 49% female and 51% male students; 49% African American, 40% Caucasian, and 11% Hispanic, Asian, and other students. More than 85% of the students scored at or above grade level on their standardized math and reading tests. Gaining insights into the perceptions of this group of students is particularly valuable, because technology studies often target the highest and lowest achieving students.

Procedures and Analyses

Survey procedures and analyses. Questions were divided into two separate surveys to reduce the potential for respondent fatigue and to establish reliability. The surveys were then randomly assigned to participants. Questions about demographics were asked on both questionnaires to ensure that the samples were equivalent. A five-member panel, including national experts in the field of instructional technology and middle grade educators, generated the questions. Questions were field tested on 100 students to check for content appropriateness and semantic clarity. Reliability between questions was established with a range of r = .82 to 93. Final survey data was analyzed using the following methods: descriptive statistical analyses (e.g., mean, standard deviation), Pearson's chi-square test, and tests of significance (e.g., repeated measures analysis of variance, ANOVA).

Focus group procedures and analysis. To gain additional information about student perspectives on school, technologies, and academic engagement, we conducted six focus groups from the same after-school population across three geographic areas of the state: mountains, central, and coastal. Six schools were randomly selected to participate, including two schools from each geographic region. Using a purposive sampling procedure, students, who would be able to provide additional information about their technology use (beyond the scope of the initial survey), were targeted for participation. Comprised of eight to 10 students each, focus groups followed a semi-structured interview process that was videotaped and lasted approximately one hour each.

All focus group sessions were transcribed by an external transcription service. Two researchers independently read the transcribed interviews and identified initial topics for coding the data. These initial topics emerged based on the frequency with which participants mentioned particular topics. The initial topics were collapsed by similarities and the data were reread and re-coded. During this second reading, a small number of new topics emerged and were coded in a third data reading session. The researchers then clustered the coded data

from the transcripts into themes and made final decisions about which themes to include in the study, based on relevance to the research topic and volume of student responses aligned with a particular theme. For example, in the first data read, both researchers noted frequent responses including technological adaptations of music. After a second data read, this code was collapsed with other references participants made to entertainment-related technologies. Data from the transcripts related to entertainment were finally incorporated into a theme titled "Purposes for using technology." In all, over 50 codes and 10 themes emerged from the data; the 10 themes were merged into four interpretive themes for research reporting purposes.

RESULTS

Quantitative results from the student surveys and qualitative results from the focus groups follow.

Results should be interpreted within the context of the targeted population and the potential limitations a study of this kind presents. Specifically, limitations to the survey results include the nature of the targeted population (i.e., students in after school programs). These students were chosen because of their unique combination of being predominately rural and low income and scoring at or above grade level on standardized math and reading tests. Results, therefore, cannot be generalized to all middle school students. Additionally, results of the focus groups should be interpreted in the context of the purposive sampling procedures; in other words, focus groups results were based on students who were interested in technology rather than a random sample of the larger survey group. Finally, because of the age of the participants and their potential desire to please the researchers, the Hawthorne Effect may present an alternative explanation for results.

Results from Student Surveys

Computer Usage. Differences in middle grades student self-reported computer usage at home, school, after-school programs and the public library are represented in Figure 1. Analyses of variance (ANOVAs) were conducted to examine if students reported significant mean differences in their computer usage at the various locations. Students reported significantly more ($F(2,1130)=16.63$, $p<.001$, $^2=.03$) computer usage at school ($M=3.46$, $SD=0.71$) than at home ($M=3.11$, $SD=1.20$). In addition, students reported significantly more ($F(2,1071)=61.34$, $p<.001$, $^2=.10$) computer usage at home than at their after-school program ($M=2.84$, $SD=1.25$) and significantly more ($F(2,938)=28.60$, $p<.001$, $^2=.06$) usage at their after-school program than at the public library ($M=1.97$, $SD=1.26$).

Basic Computer Skills. Student self-reported knowledge of basic computer skills (word processor and spreadsheets) was examined. As seen in Figure 2 (p. 502), the analysis revealed that students significantly were more knowledgeable than not in the following word processing abilities: write and compose a paper ($^2(1, N=1875) = 1333.47$, $p< .001$), find and replace text ($^2(1, N=1679) =$

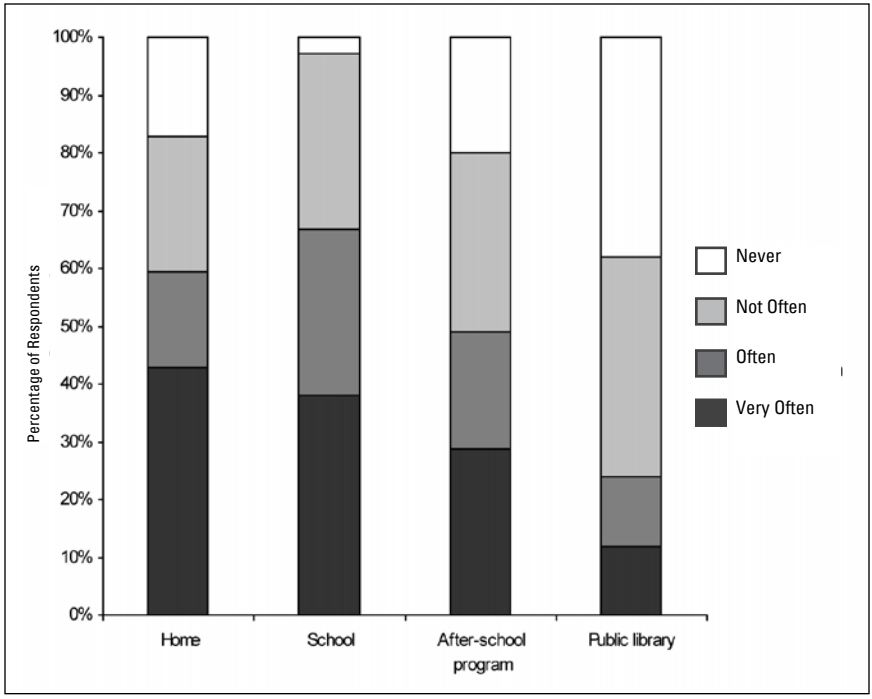

Figure 1: Frequencies of student reported computer usage at home, school, after-school program, and public library.

809.67, $p<.001$), use automatic spell check (^{2} (1, N=1898) = 1410.11, $p<.001$), make a word bold or italicized (^{2}(1, N=1927) = 1532.46, $p<.001$), and change page margins (^{2}(1, N=1569) = 618.827, $p<.001$). Additional analyses were conducted to look for a difference if a skill was acquired in or out of school. The analyses revealed that students significantly were more likely to learn the following word processing skills in school compared to out of school: write and compose a paper (^{2}(1, N=1875) = 180.03, $p<.001$), find and replace text (^{2}(1, N=1679) = 80.22, $p<.001$), use automatic spell check (^{2}(1, N=1898) = 14.17, $p<.001$), and change page margins (^{2} (1, N=1569) = 61.65, $p<.001$). There was no significant difference in self-reports of where the skill of making a word bold or italicized was learned (^{2} (1, N=1927) = 0.01, $p>.001$).

As seen in Figure 3 (p. 503), analysis revealed that students significantly were more knowledgeable than not in the following spreadsheet abilities: create a file and enter data (^{2}(1, N=1676) = 840.29, $p<.001$), use formulas (^{2}(1, N=1548) = 561.00, $p<.001$), copy a formula from one row to another (^{2}(1, N=1433) = 357.55, $p<.001$), use the sort feature (^{2}(1, N=1494) = 465.78, $p<.001$), and change column widths (^{2}(1, N=1595) = 667.33, $p<.001$). Additional analyses revealed that students significantly were more likely to learn the following spreadsheet skills in school compared to out of school: create a file and enter data (^{2}(1, N=1676) = 127.35, $p<.001$), use formulas (^{2}(1, N=1548) = 413.44, $p<.001$), copy a formula from one row to another (^{2}(1, N=1433) = 136.95,

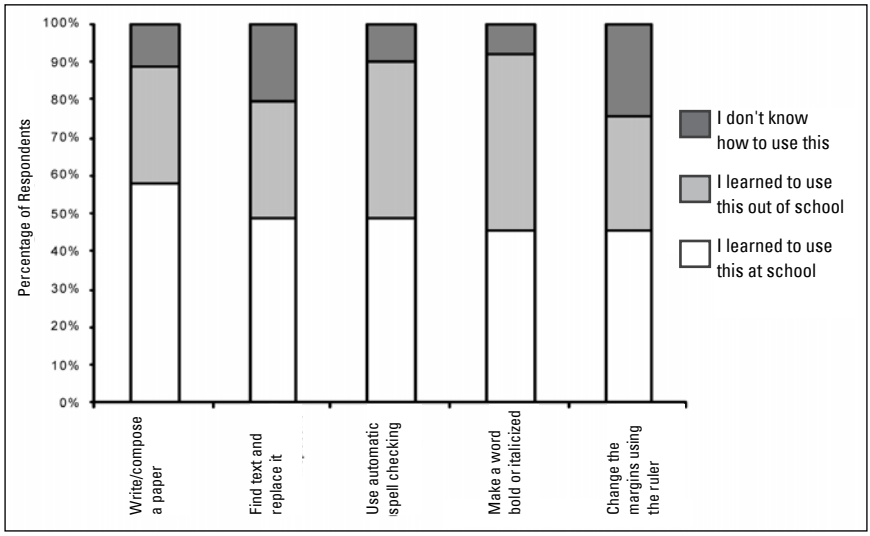

Figure 2: Frequencies of student self-reported knowledge of word processing skills and where the skills were acquired.

p<.001), use the sort feature (^{2}(1, N=1494) = 140.40, p<.001), and change column widths (^{2}(1, N=1595) = 75.49, p<.001).

Technology Use for Sharing Work and Productivity. Analyses were conducted to examine differences in student use of PowerPoint, paint/drawing/design programs, and Web page creation software for the purpose of sharing work. Table 1 provides the percentages of student reported use of these technologies. The analyses show that students reported significantly more use of the following technologies than not: PowerPoint (^{2}(1, N=2046) = 673.64, p<.001) and paint/drawing/design programs (^{2}(1, N=2033) = 888.98, p<.001). There was not a significant difference in self-reports of usage of Web page creation software (^{2}(1, N=2041) = 1.18, p>.05).

In addition, an analysis was conducted to assess if students reported using the Internet to find information over trying to locate a book with the information. Percentages of responses are reported below in Table 1. The analysis suggested

Table 1: Student Use of Technology for Sharing Work and Productivity

	Yes	No
Have you used these software programs to create or share information?		
Power Point (N=2046)	78.7	21.3
Paint/Drawing/Design programs (N=2041)	83.0	17.0
Web page creation software (N=2036)	48.0	51.2
Do you use the Internet to find information instead of trying to find a book with the information? (N=2078)	86.3	13.7

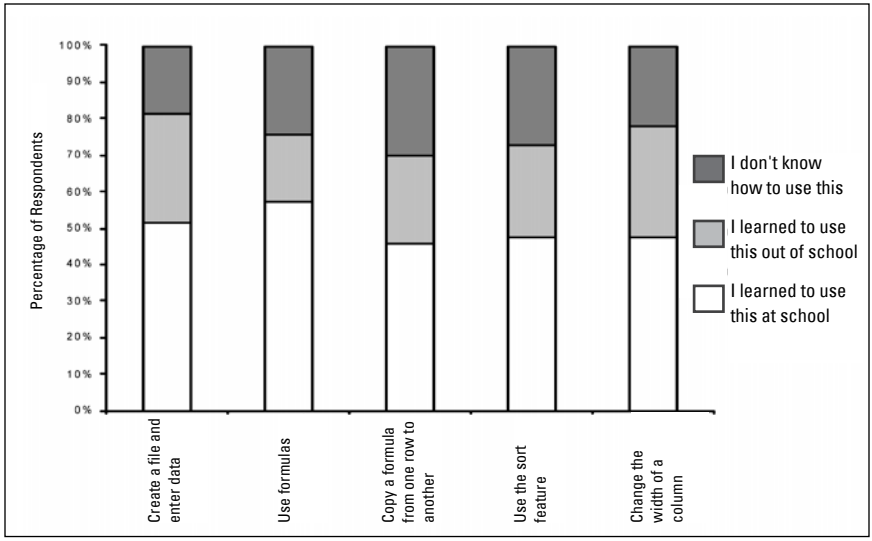

Figure 3: Frequencies of student self-reported knowledge of spreadsheet skills and where the skills were acquired.

that students significantly were more likely to use the Internet rather than a book to find information to be more productive (^{2}(1, N=2078) = 1097.26, p<.001).

Technology Usage for Communication and Entertainment. Students reported their use of technology for communication and entertainment purposes. Percentages of responses are reported in Table 2 (p. 504). Analyses were conducted to examine if students were more likely to report high usage (very often or often) of technology versus low usage (not often or never). The analyses revealed that students significantly were more likely to classify themselves as high frequency users versus low frequency users for playing video games (^{2}(1, N=2111) = 423.03, p<.001), playing Web-based games (^{2}(1, N=2108) = 268.27, p<.001), and listening to music (^{2}(1, N=1731) = 888.52, p<.001). In addition, it was found that students significantly were more likely to classify themselves as high frequency users versus low frequency users of e-mail (^{2}(1, N=2047) = 30.29, p<.001), the Internet (^{2}(1, N=2039) = 253.54, p<.001), and cell phones (^{2}(1, N=2044) = 348.50, p<.001).

Additional analyses were conducted to examine if students were more likely to use e-mail, non-e-mail Internet communications (e.g., chat room, instant messaging, etc.), or cell phones for communication. ANOVA analyses found that students significantly were more likely to use cell phones for communication compared to using the non-e-mail Internet technologies (F(4,2031)=54.43, p<.001, ^{2}=0.01). Likewise, students significantly were more likely to use non-e-mail Internet technologies for communication compared to e-mail (F(4,2036)=210.03, p<.001, ^{2}=0.29).

Activities Liked Best in School. To examine differences in student responses as to which activities they liked best in school, t-tests were conducted among the following variables: 1) working on projects by themselves, 2) doing research on

Table 2: Student Usage of Technology for Entertainment and Communication

	Percentage of Respondents						
	Very Often	Often	Not Often	Never	M	SD	N
How often do you use technology for the following types of entertainment?							
Playing video games	44.8	27.6	19.6	8.0	1.91	0.98	2111
Playing Web-based games	38.0	29.8	23.3	8.8	2.03	0.98	2108
Getting or listening to music	58.6	24.0	11.3	6.2	1.65	0.91	2097
How often do you use the following types of technology for communication?							
E-mail	34.6	21.4	19.7	24.2	2.34	1.19	2050
Non-e-mail Internet technologies (e.g., chat room, instant messaging, etc.)	46.9	20.8	12.2	20.1	2.06	1.19	2042
Cell phones	47.8	22.9	14.5	14.8	1.97	1.11	2046

the Internet, 3) listening to the teacher explain things, 4) working on projects in a group, 5) using computers, and 6) doing worksheets. The group means for the different school activities are represented in Figure 4. The analyses revealed that there were significant group differences among all activities except working on projects in a group and working on projects by themselves (Table 3). Students significantly rated using computers and doing research on the Internet as their favorite activities and significantly rated listening to teachers explain things and doing worksheets as their least favorite activities.

Rural and Low Income Schools. An ANOVA between students from rural and low-income school districts (RLIS) (as defined by the North Carolina Department of Education) and students not from RLIS districts was conducted to examine differences in technology use. Analysis revealed no significant differences between RLIS and non-RLIS student reports of computers usage at home (M=3.14, SD=1.20 and M=3.01, SD=1.23, respectively) ($F(1,1624) = 3.40$, $p > .05$, $^2 = .002$) and computers usage at school ($F(1,1465) = 0.79$, $p > .05$, $^2 = .001$) (M=3.45, SD=0.72 and M=3.49, SD=0.69, respectively).

Additional ANOVA analyses revealed no differences reported between RLIS and non-RLIS students in their use of various technologies outside of school to help with their schoolwork. Specifically, there were no significant differences in RLIS and non-RLIS students use of 1) chat rooms, instant messaging (IM-ing), and/or e-mails to discuss school-related strategies or methods ($F(1,2068)$

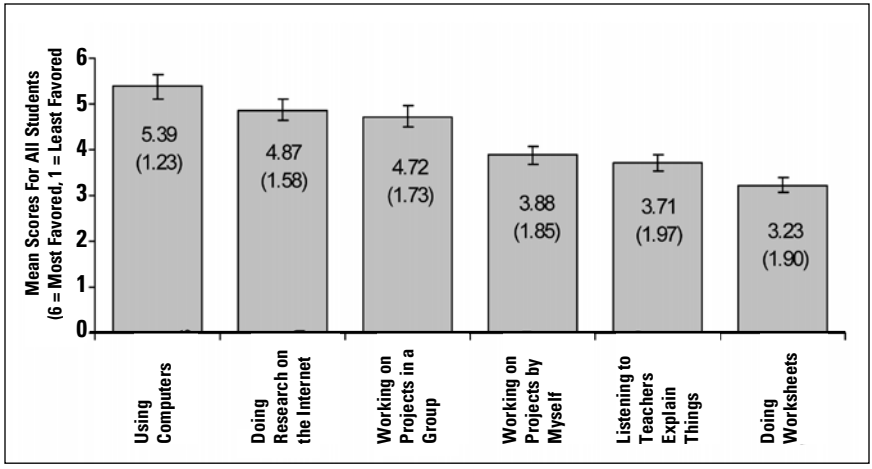

Figure 4: Mean scores and standard deviations of activities most liked in school by respondents.

= 3.45, $p > .05$, $^2 < .01$) (M=2.70, SD=1.36 and M=2.82, SD=1.33, respectively); 2) sharing files ($F(1,2057) = 1.37$, $p > .05$, $^2 < .01$) (M=3.08, SD=1.18 and M=3.15, SD=1.11, respectively); 3) consulting with experts ($F(1,2018) = 3.08$, $p > .05$, $^2 < .01$) (M=3.05, SD=1.14 and M=3.15, SD=1.08, respectively); and 4) conducting Internet research to improve knowledge and gain skills ($F(1,2023) = 1.39$, $p > .05$, $^2 < .01$) (M=2.45, SD=1.05 and M=2.39, SD=1.04, respectively).

Gender and Ethnicity. An ANOVA of gender differences in computer usage revealed that females reported significantly more computer usage at home than males ($F(1,1604) = 5.86$, $p < .05$, $^2 = .004$) (M=3.18, SD=1.17 and M=3.04,

Table 3: Results of t-tests for Group Differences in Activities Liked Best in School

	t	df
Using computers vs. Doing research on the Internet	19.13*	1973
Doing research on the Internet vs. Working on projects in a group	3.65*	1954
Working on projects in a group vs. Working on projects by myself	0.36	1954
Working on projects in a group vs. Listening to teachers explain things	21.43*	1954
Working on projects by myself vs. Listening to teachers explain things	19.84*	1980
Listening to teachers explain things vs. Doing worksheets	15.07*	1957

*$p < .001$

SD=1.23, respectively); however, at school there were no differences between females and males ($F(1,1446) = 1.15$, $p > .05$, $^2 = .001$) (M=3.44, SD=0.69 and M=3.48, SD=0.73, respectively).

ANOVAs also revealed no significant differences among ethnic groups (African American M=5.39, SD=1.22; White M=5.26, SD=1.31; Other M=5.29, SD=1.32) in response to using computers as what they enjoyed most in school ($F(4,1939) = 1.04$, $p > .05$, $^2 = .011$). For all other categories of what was liked best in school (i.e., working alone, working in groups, listening to the teacher explain things, Internet research, and worksheets) there were significant differences among ethnicities. Using computers, therefore, was the one activity that all ethnicities unanimously stated that they liked best in school.

Summary of Survey Results

Survey results cluster into four areas. First, the highest frequency users of computers reported that they used computers at home more than they used computers at school. Females reported significantly more computer usage at home than males; however, at school there were no differences between females and males. Second, the majority (75% to 90%) of students reported that they possess basic word processing and spreadsheet skills, and that most of these skills were learned at school. For skills related to activities outside of school, students classified themselves as high users of digital music (83%), video games (76%), and cell phones (71%). Third, students ranked using computers in general and doing research on the Internet as the school activities they liked best, and listening to teachers explain things and doing worksheets as activities they liked least. Using computers was the one activity that all ethnicities stated as the activity that they liked best in school. Finally, 86% of students reported that they use the Internet to find information instead of trying to find the information in a book.

Results from Student Focus Group Sessions

As previously discussed, more than 50 codes and 10 themes emerged from the qualitative focus group data. The 10 themes were merged into four broad themes for research reporting purposes. The four interpretive themes that emerged from the student perspectives were: "Do U Know Us?" "Engage Us," "Prepare Us for Jobs of the Future," and "Let's Not Get Left Behind." Each theme is illustrated with supporting data from the focus group sessions.

"Do U Know Us?" We learned from focus group sessions that the majority of students use a variety of technologies outside of school in authentic, personal, and social ways. Students viewed these outside-of-school technologies as an integral part of their everyday lives. Marc Prensky (2007) refers to students such as these as digital natives; children who live their lives outside of school "preparing themselves for the 21st century world," given the absence of technological relevance inside school (p. 13). Although we did not find a stark distinction between the focus group student experiences in and out of school, these students did express a desire for having more technologies in school for learning purposes. Students voiced a concern that sometimes it appeared that their teachers did

not understand that technology is a big part of students' lives outside of school; students believe if teachers understood, they would bring more technology into the classrooms. As one student put it, "The technology at school is not the same as at home. Because in schools, they tell you what you have to do with a computer, but at home, you don't have the teacher."

Although several students talked about technology-related work in school, they also made clear distinctions between their uses of technology inside and outside of school. One student characterized the differences between technology inside and outside the classroom quite bluntly saying, "Outside it's actually entertaining and here it's just dead boring." Still another student described these differences more subtly saying "We use technology in school… [for] class work instead of what you want to do. Maybe at home you might want to look up stuff and play games, and stuff and listen to music."

The primary difference between in-school and out-of-school technology use relates to personal or social communication and entertainment, with students using technology outside school more for personal and social communication (e.g., chatting with Instant Messenger, using e-mail, hanging out on MySpace, and using a cell phone) and entertainment (e.g., downloading and listening to music, and playing video games). Students in the focus groups described how they use technology outside the school to communicate and socialize with friends and acquaintances both nearby and at a distance. While some students used technology to basically extend interaction with their friends from school, others created and nurtured new friendships or maintained communication at a distance. Students talked in focus group interview sessions about friends in other states and countries with whom they were in consistent communication. One student talked about how she used MySpace to communicate with a friend who had recently moved. "She used to live [here] and we would go out every weekend. Her mom got a job in California and they moved…we send pictures…instant message." Another student talked about how he and a long-time pen pal had lately begun to use MySpace to communicate. "I mean we did MySpace, and he sends pictures. And that's really fun."

Students in the focus groups reported that they used technology outside the school to play games and download and listen to music. Over 25% of the students in the focus group specifically mentioned gaming, and these games ranged from strategy-based and fantasy/role-play games to more academically-based games. The majority of the computer-based games (both non-academic and academic) were played outside the classroom, although two notable examples stand out. A good number of students also talked about their use of technology outside the school to download and listen to music. Interestingly, several students cast their music use in the context of helping them concentrate. As one student put it, "I have some music to help me do my work."

Technology use inside school tended to be more individual-based and academically traditional (e.g., word processing, testing, conducting research on the Internet). Interestingly, students for the most part did not use their social communication devices for academic purposes. The one exception to this was a student who gave an example of how he used Instant Messenger to gain help with his homework:

> A week ago I had some math homework, and it was my honors math class, and it was on stuff we had just started that day. So I had not really learned how to do it. I Instant Messaged my friend and she helped me with the problem. She told me how to do, but didn't tell me the answer.

"*Engage Us.*" Not surprisingly, the data indicated that students want to be engaged and stimulated in school. Students have clear perspectives about academic engagement through the use of technologies in project-based learning (Grant & Branch, 2005) and about the necessity of technological restrictions. Students in this study enjoyed conducting projects that use technology as a tool to learn new information. One student eloquently illustrated the engagement benefits of conducting projects:

> When you do projects you get to find the information. When you take a test, you already know the information. They gave it to you and you just have to study and have a test on it the next day. But with a project you get to look for yourself. I learn better if I look for myself rather than studying something somebody else already gave me.

Students gave specific examples of how technology either was integrated or could be integrated in various academic areas, e.g., in language arts (writing and research); social studies (research projects); math (problem solving); and science (science fair projects). One student expressed, "Our teacher has a Texas Instrument calculator, and what she does is that she goes to prompt simulators and we use dice for that, and she puts up on the over board with an extension cable on the screen, and she likes for the computer to role the dice with it."

Students were able to make fine distinctions between various uses of technology. For example, certain math-based technological applications do not enable students to show their work in math. One student explained this saying, "If [students] want to work out a problem on the computer, they can't really show their work. So, the teacher can't give them credit for it…because [the teacher doesn't] know if they went somewhere and got the answers." Several students viewed technology as enhancing the writing process. One student said simply: "Some people write sloppy, and teachers don't like it." For this young lady, word processing enables students and teachers to reach a happy medium regarding penmanship.

Students also described complexities related to using technologies. Some students recognized physical complications, such as eyestrain and hand cramps. In a similar way, students know technologies provide quicker and more efficient access to information, but also described the complications associated with finding information in unstructured Web-based environments. A student who expressed concerns about using computers in school summed this feeling up saying, "I always feel like the computer is not going fast enough, I can flip through pages better."

This notion that technology is situated and complex was neatly explained by one student who was asked whether he preferred computers when doing

research. He replied, "I sort of have mixed emotions. If I use a computer, I am able to research my topics much faster. I have trouble typing, but I can really write fast. It depends." Another student in the same focus group confessed his concerns with using computer-based technology. "I can tell you, when I use technology, I am a little slower. Because a lot of times you don't get specifics when you are on the computer with math and stuff, and your teacher really gives the specifics, and then you can just think about it. And then you kind of get wrapped in, and you can do it faster than you can with the computer."

Some students expressed concerns about the many restrictions around the uses of technology at school. Students seemed to understand the need for some restrictions but at the same time felt that too many rules have a tendency to take much of the freedom and fun out of learning. Students discussed technology restrictions in ways that reflect a sophisticated level of understanding regarding the academic expectations placed on them by their teachers and society in general. Students were also sophisticated with regard to their understanding of technological restrictions related to Internet security and safety. One student reported her parents' concerns: "My mom and dad think a predator could be there and could actually ask for our address and we'd give it to them and they would come and break in our house." Despite the concerns of adults, many students reported enjoying the social aspects of MySpace and similar sites.

"Prepare Us for Jobs of the Future." Students expressed a vision for using what they deem as "everyday technologies," not only in the classroom for academic engagement, but for preparation for future jobs. Specifically, students would like school experiences to be more directly related to careers that they might have in the future. When asked what professions they envisioned in their future, responses were varied and included drag racer, doctor, anesthesiologist, beautician, architect, lawyer, dentist, and roller coaster designer, to name a few. In many instances, students were able to articulate the types of technologies that are specified for a profession; for example, one student claimed, "I'm going to be an architect when I grow up, so I will need a good graphing 3D technology computer to plan out my buildings." This comment illustrated an understanding that technologies are pervasive and necessary.

Students saw such technology in use in the professional world around them and understood the relevant importance of having technology skills. One student commented on a family member who is in the legal profession. "She has a laptop because she doesn't like writing, so she types her notes…And when she goes to court she brings her laptop and that is how she does the notes." Virtually all the students who talked about technology and careers mentioned using computers to access the Internet. In many cases this access was to research professional knowledge. Students mentioned finding information related to health, law, design, cosmetology, art, engineering, criminal investigation, veterinary medicine, dentistry, music, and sports.

"*Let's Not Get Left Behind*." Students considered specific technological applications, including word processing and Web-based searching, as enhancing their academic productivity in all academic areas. Students were able to creatively represent their ideas about technology in authentic "real-world" contexts. When asked to imagine new uses of technology, students constructed uses that were

interactive and media-oriented. For example, one student suggested that she would like to use digital video cameras to create an oral history of her town. Other students suggested even more imaginative uses of technology related to academic productivity. "I know this is sort of like a far fetched idea, but like a fax machine that… has a special place in the county to pick up your homework, and it comes directly from your school. And they just fax it to that place, and then you come pick it up."

Students expressed a clear interest in having more technology in their classrooms—especially laptops. Demonstrating a sophisticated sense of what is needed to be successful in today's society, they voiced concerns about their schools not being up-to-date in terms of facilities, technologies, and curricula. Students noted that their schools did not look like the world in which they live. Their visions for an ideal school were imaginative, expressing a desire for schools to be contemporary environments with aesthetically pleasing designs, colors, and amenities; they also envisioned using cell phones and laptops during class as way to look up information "just in time" on the Internet and having smart boards in every classroom. A few students described experiences in their schools, which represented the imagined uses of technology described by others. In two cases these experiences related to the use of smart boards. One student described a lesson in which "You get the smart board and then you could connect it to the computer and then when you do it on the computer it does it on the board. And then you go to the smart board and do what you need to do and then you print it out." Although these experiences were limited, they provided students with real-world anchors for their imagined uses of technology. Clearly, students who participated in this study were capable of envisioning educational possibilities beyond the realities of their current schooling contexts and communicated a modest sense of urgency about wanting improvements in their schools.

DISCUSSION AND CONCLUSIONS

Through survey and focus group data, this study presents results on what students need to be engaged and successful in school. The discussion will synthesize data across survey and focus group results to address student perceptions of *school*, *technologies*, and *academic engagement*, as well as address policy implications of the findings.

With respect to student perceptions of *school,* students want their schools to look more like the world in which they live. They want aesthetically pleasing environments that inspire and motivate them to learn and achieve. Student descriptions of these environments reminded us of some of the state-of-the art schools that have been designed, e.g., High Tech High in Los Angeles, California, where schools are evolving to reflect the environments people will be working in. Modern features include: 1) wireless connectivity and bright, inviting sitting areas that let students work wherever they are, and 2) open-plan areas and interior windows connecting administrators to students to emulate information-age work places (O. Edwards, 2007). Additionally, students view school as a place that often restricts their access to technology. Because students

tend to have more freedom and choice with technologies used at home, these restrictions sharpen the contrast of using technologies in and out of school. A specific example consistently mentioned by students was the use of cell phones in school. Although students did not assert examples of how cell phones could be used for instructional purposes, they expressed their dismay that cell phones are not welcome in schools. Prensky (2006) claims that students "are capable of reinventing school for themselves" (p. 202). He believes that in this time of fast-paced technological change and innovation, students should be inventing the "best designs for their learning, and not waiting for us to do it for them" (p. 202).

From the results of the study, students see a clear link between the use of *technologies* in school and their *academic engagement*. As one student stated, "When we get to use technology, learning is more fun." High frequency technology users listed listening to music, playing video games and using cell phones as their top technology-related activities outside of school; likewise, high frequency users claimed that they use computers more at home than they do at school. Although students reported using computer technologies in their classes, technology needs of the high frequency users are not being met at school. These students want more creative and ubiquitous technology use (e.g., cell phones, personal gaming systems). Interestingly, using computers is the one activity that all ethnic groups referred to as their favorite activity in school. Student comments categorized under the themes of "Do You Know Us?" and "Engage Us" clearly show that students want educators to understand their need for technology tools as a part of learning in school. Student comments categorized under "Prepare Us for Jobs of the Future" and "Let's Not Let Get Left Behind" demonstrate student desires for schools to relate to future careers that they may have and their ability to imagine new uses of technology, which were interactive and media-oriented.

Students' desires and needs to have more access to technology as a tool for learning and academic engagement poses serious demands on schools and districts. Recent policy reports (see V. Edwards, 2007) have explained the systemic nature of providing and maintaining a well equipped and managed technology program, and asserted that states need to implement policies that will ensure technology needs are being met. Several parts of the "technology elephant" must be addressed simultaneously to meet the needs that students expressed in this study. These areas include: 21st century curriculum, instruction and assessment; 21st century tools in the classrooms, including appropriate hardware and software; connectivity and networks—the mechanism to create the interaction and access to information; and professional development for educators. Due to lack of resources, districts often address one of these areas but lack resources to address all of them. Funding is often a challenge, particularly in a tax-averse district, or one that does not have industry partners within the community. Many issues are not addressed comprehensively in states that lack coordination at the highest levels. For example, a state may invest in hardware for all schools (e.g., Maine Laptop Initiative), but not invest in a systemic approach to increase bandwidth and connectivity across the state. The net effect is that although all

students have a computer, they may not all have equitable access to Internet resources. Likewise, not all stakeholders agree that technology is important and that it can have significant effects on student achievement.

More states are attempting to address technology issues at the state level rather than relying on individual districts to figure out how to fund the work. For example, North Carolina has launched several statewide initiatives in an attempt to address technology in a systemic fashion: 1) the goal of the North Carolina School Connectivity Project (http://connectivity.fi.ncsu.edu/) is to bring high-speed connectivity to each classroom; 2) the North Carolina Virtual Public School (www.ncvps.org) is a way for all students to have access to state-of-the-art digital content in K–12 education; and 3) in 2005 North Carolina was the first state to create a state level partnership with the National Partnership for 21st Century Skills; shortly after, the North Carolina Department of Instruction adopted the national framework on 21st century skills as a way to contemporize the state curriculum and assessment techniques. Although second generation frameworks are beginning to evolve (e.g., Jenkins, 2006; Leu & Castek, 2006), the national framework has generated broad support in a relatively short period of time. Beyond the multiple layers to technology access—which is an infrastructure issue—focused, high-quality professional development is an essential element in determining whether students receive a 21st century education. As each obstacle to technology integration is removed, more and more focus and resources can be placed on professional development for educators, which is how substantive change in the teaching and learning process ultimately will be possible. For a full discussion of the implications of the current study on teacher education and professional development, see Lee, Spires, & Turner (2007).

Results from this study indicate that middle grade students have a point of view when it comes to school, technologies, and academic engagement. As mentioned earlier, results cannot be generalized to the larger population of middle grade students, since a specific group was targeted. Additionally, results may not form a completely accurate view of participant perceptions due to a possible Hawthorne Effect. Despite potential limitations, however, it appears that students want to bring their technology experiences as part of a social network outside of school *into* school to increase academic engagement. Our findings are in line with results from the national survey conducted by NetDay (http://www.netday.org/SPEAKUP/), which targets a broader cross-section of students as well as teachers and parents; and with findings from other recent reports (e.g., Kaiser Family Foundation, 2005; Norris, Sullivan, Poirot & Soloway, 2003; Pew Internet & American Life Project, 2005). These reports demonstrate a growing trend in increased reliance on technologies for entertainment and communication among students.

Prensky (2006) asserts that "Kids are training themselves—in the absence of anyone doing it for them—to be ready for the world of the twenty first century" (p. 203). Although some educators may view Prensky's claim as extreme, we believe that he makes a valid point in terms of how important it is for students to be full participants in their own education. Especially now in times of rapidly

emerging technologies that have potential for impacting the learning process, input from student "digital natives" is of extreme value. If we make student perspectives a regular part of the educational dialogue and action agenda, we may create a proactive stance to student academic engagement and achievement needs and subsequently contribute to a more responsive and innovative schooling process.

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