

When Kids Build a School: Needs Assessment of K-8

Volcano School of Arts & Sciences (VSAS)

For: Friends of VSAS

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June 2016

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INTRODUCTION

This reports on a needs assessment conducted at the Volcano School of Arts and Sciences (VSAS) in March 2016. We were contracted by the Friends of Volcano School of Arts and Sciences (FVSAS) to offer guidance toward the building of the new campus at the current Keakealani site based on the needs of the students of VSAS, with a particular focus on how to use indoor and outdoor space most effectively. We examined all previous materials generated by VSAS (SEE APPENDIX A) and FVSAS regarding the projected new campus that dated back to 2010. We also conducted a literature review. Both of these steps helped us develop our interview guide. Our goal was to conduct 1 focus group session per class for Kindergarten and Grades 1-8. This was accomplished, and in this report we highlight our results and recommendations.

BACKGROUND OF GREEN SCHOOLS

At the forefront of education are innovative efforts to create a successful learning environment for contemporary students. Our literature review on energy efficient schools show that educators and architects worldwide are striving to incorporate school mission and curriculum with sustainable building construction. Energy efficient schools promote the environmental benefits of green construction by reducing a school's carbon footprint. These benefits may include greater water conservation, better air quality, and less environmentally hazardous materials. This is not only healthier for the environment, it is also better for staff and students to have less exposure to toxic materials, which can have an effect on academic performance. "Green" schools are active learning tools used by instructors to engage students by applying the school's design features to teaching lessons. With long term cost effectiveness in

mind, green construction allows for reduced daily operating expenses and can even qualify for various tax incentives, and attract fiscal donors.

These “green” schools apply passive building design concepts to use natural energy sources, thus having less of an impact on the environment and cutting back on expenses over time. Passive design concepts predominantly incorporate natural lighting and ventilation, as well as solar power. Temperature control and acoustics within rooms are also important considerations in the construction of the school. In fact, studies demonstrate that ventilation, temperature, lighting, and acoustics have a measurable impact on students’ academic performance. For example, classrooms with views of green landscapes help students recover from stress faster, and improve student performance on tests of attention. Students with more exposure to green school areas show better academic performance in both English and Math. Studies also show the number of students at grade level for reading and math increased by 33 percent after attending a green school. Test scores gathered from Texas’ West Brazos Junior High students attending school in their new LEED building versus their old building showed improvement in reading, math, and social studies. Research in England shows that green school designs result in lower absenteeism for both students and teachers, with less stress for teachers, and less instances of bullying amongst students (for more details on academic performance in green schools see Edwards 2006, Kovac 2011, Li & Sullivan 2016, Miners 2008, and Wu et al. 2014).

Utilizing natural elements partly depends on a school’s surrounding landscape, and positioning buildings to make the best use of primary wind direction and natural lighting. Daylighting is an essential element of “green” schools, and is by far the easiest to obtain in terms of passive building construction. Ultimately, sustainable school designs are at the mercy of their

surrounding landscape. Schools in rainy areas can benefit by collecting rainwater for flushing toilets. Many schools, especially those in areas with predominately clear skies, opt to install photovoltaic systems to lessen standard energy consumption. Another aspect of sustainable building is finding locally sourced materials, and considering their long-term durability, which can be cost effective in the long run and lessen a school's carbon footprint. Some schools incorporated gardens and green roofs into their school designs, although these schools were not in the majority.

School designs can also be made to support a school's mission and teaching methods. One example of a "green" school expressing their values is a campus comprised of single building classroom construction per grade level, demonstrating the ideals of a village for a small school. Some schools with a central gathering area often used a star formation, having hallways for various grades spread outward from the central area, indicating distinct areas for each grade yet still allowing a space for all grades to unify. School design also takes into careful consideration classroom design, in which characteristics of the rooms and furniture have the ability to promote qualities like independent thinking, creativity, and communal workspaces. Scandinavian schools express these values by creating areas within the school for students to assemble, and placing creative nooks as spaces to hang out and study. Furniture, and sometimes walls, are moveable, allowing students to work individually or in groups. The shape and comfort factor of furniture in student common areas and classrooms were also taken into consideration, as Scandinavians believe a comfortable environment is constructive for learning. Their innovative use of space is worth noting, as the Scandinavian educational system consistently ranks as one of the best in the world.

There are many variables to consider when renovating school buildings or adding on to an existing campus, such as the surrounding landscape, school mission and values, space available, and financial capacity. American schools have Leadership in Energy and Environmental Design (LEED) and Collaborative for High Performance Schools (CHPS) as guides for the sustainable building process. LEED is a third party certifier for green buildings, and viewed as the gold standard in terms of energy efficient building guidelines in the U.S. LEED provides helpful information in PDF, as well as a checklist for schools to use during their building process. However, it is essential that an envisioning process occurs prior to building, and that it includes the wants and needs of students, school staff, the community, and any other stakeholders. The design changes to The Volcano School of Arts and Sciences, with its critical role within the community, and its historical framework, deserves careful consideration to ensure changes made to the school are advantageous for future generations of students.

METHODS

A focus group session with each grade was conducted with 135 Students from VSAS. First we asked the students what they liked about their school. Students were then asked to describe what they would like to see improved in their current school, and what they would like to see in a brand new campus. Placing the students in the position of the builder, we explored how their classrooms and their campus would be ideally constructed. Grades 4-8 were asked to go a step further, by having each student write down what they felt were the three most important criterion when envisioning their 'ideal' school, although many students listed more than three. We felt this was an important data collection technique that allowed students the opportunity to have their individual voices heard, while minimizing peer pressure. All written student

submissions were anonymous. Focus group sessions were conducted by either two or three members of our research team and recorded with both an electronic recorder, and by hand, ensuring no details were missed. Teachers and teaching assistants present in classrooms helped facilitate the focus groups with their students.

SUMMARY OF RESULTS FOR ELEMENTARY SCHOOL: KINDERGARTEN–FIFTH GRADE

Every grade at the elementary school had unique interests and concerns; however, some topics surfaced as shared interests.

Outdoor

Students at the elementary school value their free playtime outside and the ability to choose from multiple activities. Students would like to have more open field to play sports, and a **playground** (with swings and monkey bars) under a **covered outdoor play area** so they can still play outside when it rains (See Table 1 for overview). Other areas of import for students include:

- **Bubble:** Students feel the bubble is too small, has leaks they want fixed, and is in need of softer ground inside, such as fake grass.
- **Bikes:** On average, only a few students in each class bike to school, and they would like a secure, covered area to lock their bikes.
- **Greenhouse:** Although few students currently use the greenhouse, students expressed interest in using the greenhouse in the future and having a school garden primarily used to grow food.

Table. 1 Priority Needs for the Elementary Students: Outdoor Area

	Play ground	Monkey Bars	Swings	Slides	Play House	Big Field	2 &4-Square	Other
Kindergarten	X	X	X	X	X			Dome w/ fake grass, climbing wall and animals
First	X	X	X	X		X		Sandbox
Second	X	X	X					
Third	X	X	X				X	Volleyball & basketball court, more trees
Fourth	X	X	X					Tree House, football & soccer field, trampoline
Fifth	X						X	Running track, basketball court, and concrete game area

Indoor

Classroom Comfort: Within classrooms, students voiced their desire for individual desks and more comfortable chairs. The following were also expressed by students:

- Cubbies/Lockers:** Grades K-3 would like cubbies, while grades 4 & 5 want lockers for their personal belongings.
- Windows:** Large windows that can be opened.
- Temperature Control:** Students want more temperature control (heaters and AC) in classrooms.

- **Bathroom:** Students want restrooms either inside or near their classrooms so they do not have to walk far or get cold or wet when walking to the bathroom (especially true for third, fourth, and fifth graders).
- **Campus Facilities:** Students expressed interest in having a larger cafeteria, library, and computer room.
- **Science Room:** 70% of kindergarten, first, and fifth graders were interested in a science room.

Figures 1.1 and 1.2 give a breakdown for each pod (grades K-2 and grades 3-5) when specifically asked about certain criteria they would like to see in their new school. Whether prompted or student-initiated, there is major overlap in what they would like: **large playground, cubbies/lockers, and bubble and bathroom improvements**

Fig. 1.1. Indoor and Outdoor Needs: Kindergarten, First & Second Grade (n= 37)

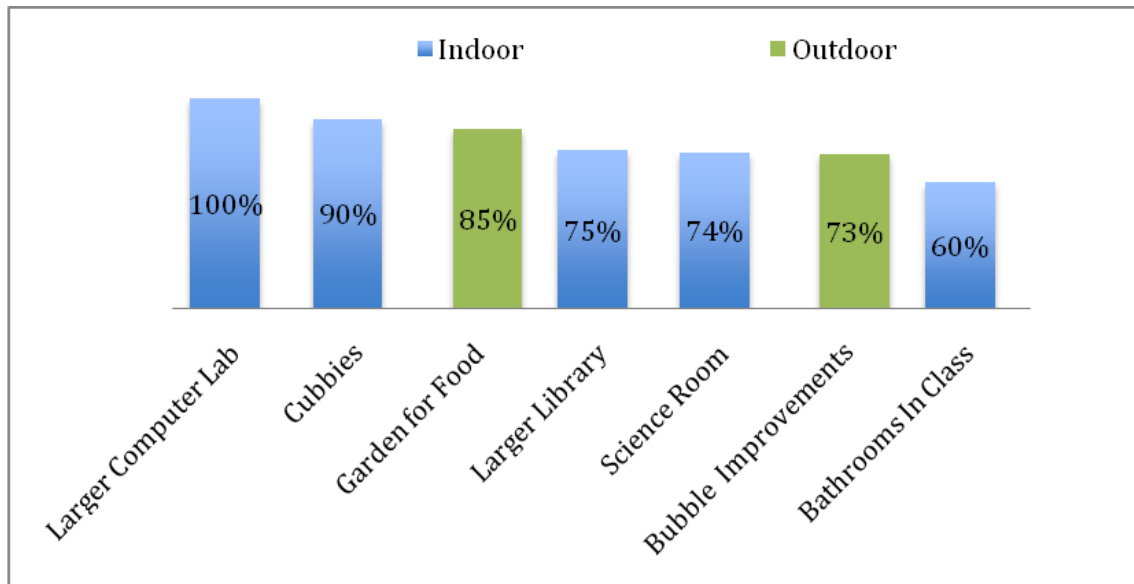
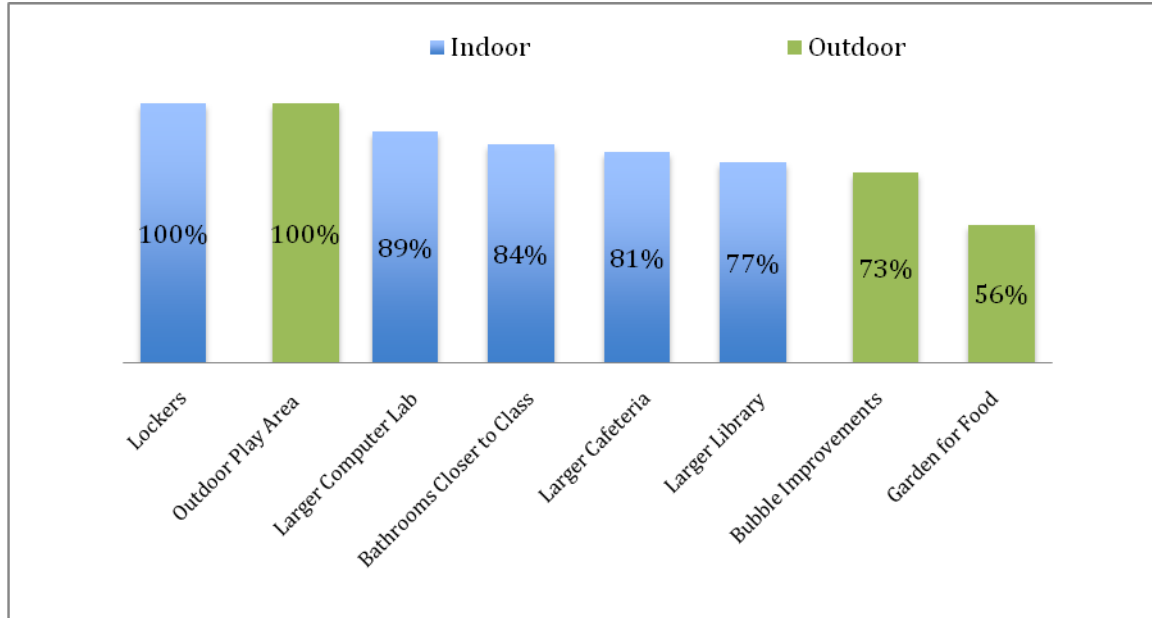


Fig. 1.2. Indoor and Outdoor Needs: Third, Fourth, & Fifth Grade Students (n=53)



Figures 1.3 and 1.4 highlight the combined, written submissions of students in grades 4-5 when asked to write, anonymously, what they would like to see in their new school.

Fig. 1.3. Outdoor Needs for Fourth & Fifth Grade (n=37)

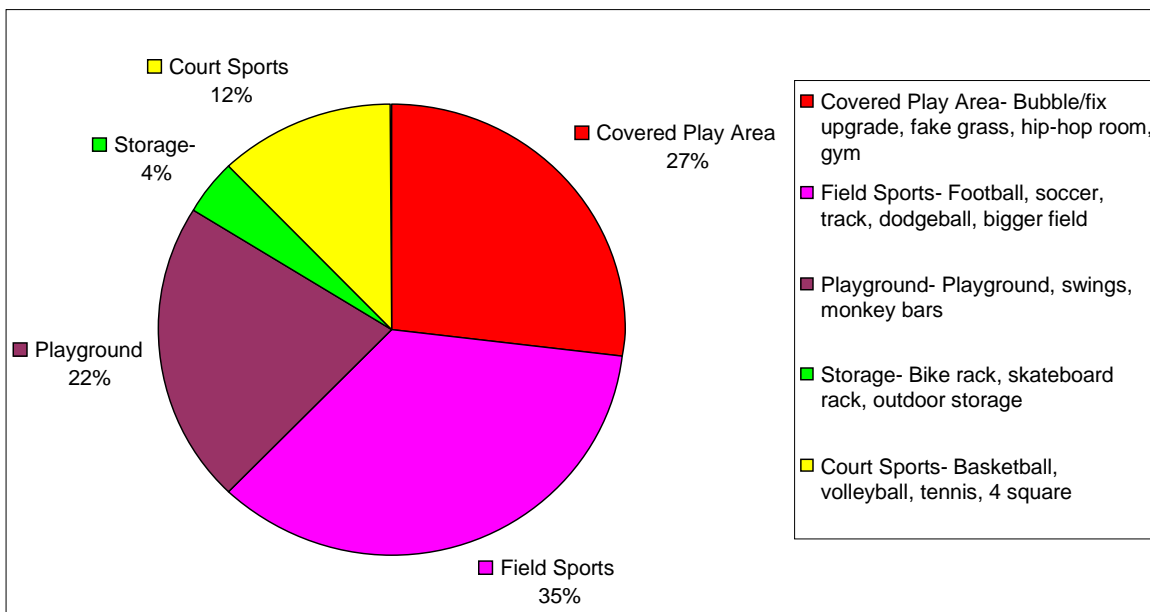
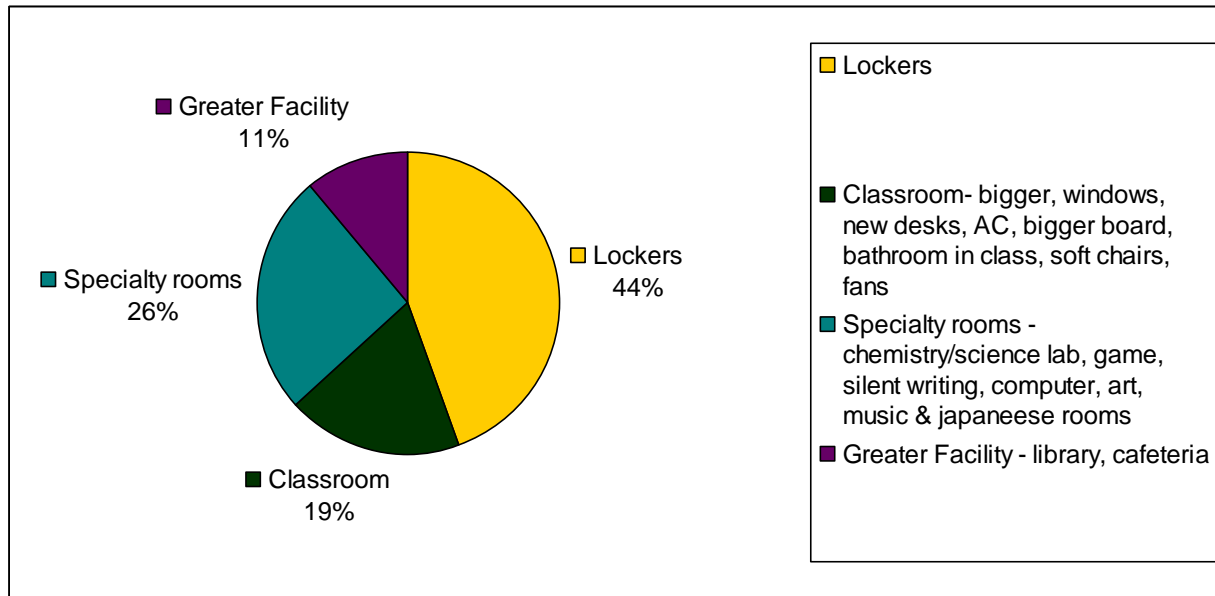


Fig. 1.4. Indoor Needs for Fourth & Fifth Grade (n=37)



SUMMARY OF RESULTS FOR MIDDLE SCHOOL: SIXTH - EIGHTH GRADE

Outdoor

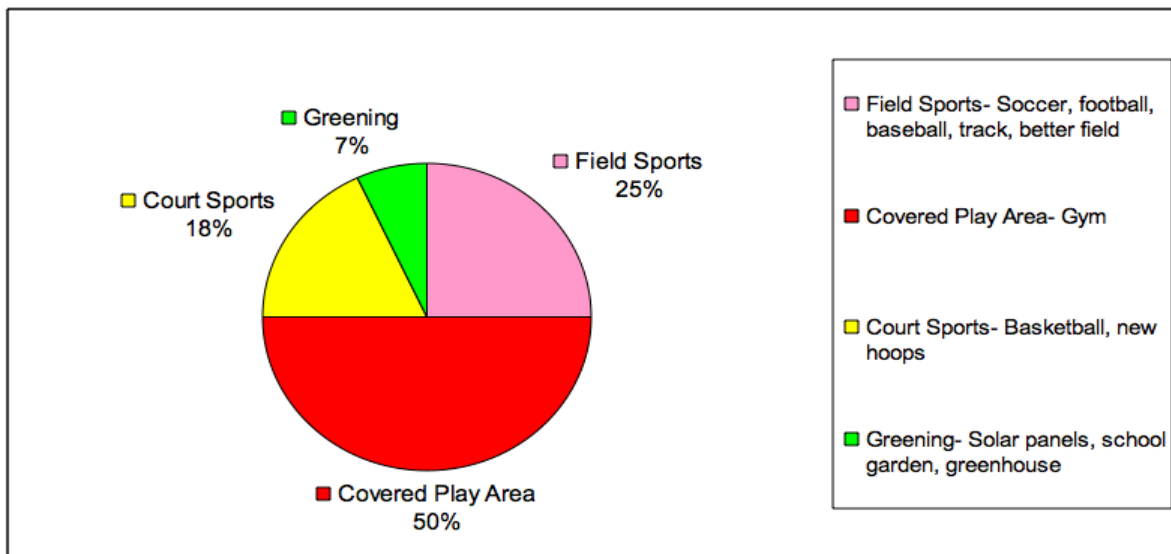
Outdoor Play Area: Middle school students value the available space on their **open field to play sports**, and want to preserve as much of the field as possible. Students strongly support the building of a **covered outdoor play area** or gym. Students like to play basketball and want their **basketball area repaved**, or to have a basketball court inside a gym. Other areas we inquired about that were important to students include:

- Security:** Middle school students would like increased security on campus.
- Bikes:** Only a few students bike to school, but more are interested in biking if there is a secure area to lock their bikes.
- Greenhouse:** Although most students are not involved with the greenhouse or garden, the majority of students expressed interest in planting a school garden for food.

- **After School Use:** Students were concerned about the use of their field as a dog park after school hours.

At the end of the focus groups, students were given a piece of paper and asked to write the 3 most important things they would like to see in their new school. Figure 2.1 illustrates their response for outdoor needs.

Fig. 2.1. Outdoor Needs for Middle School Students (n=45)



Indoor

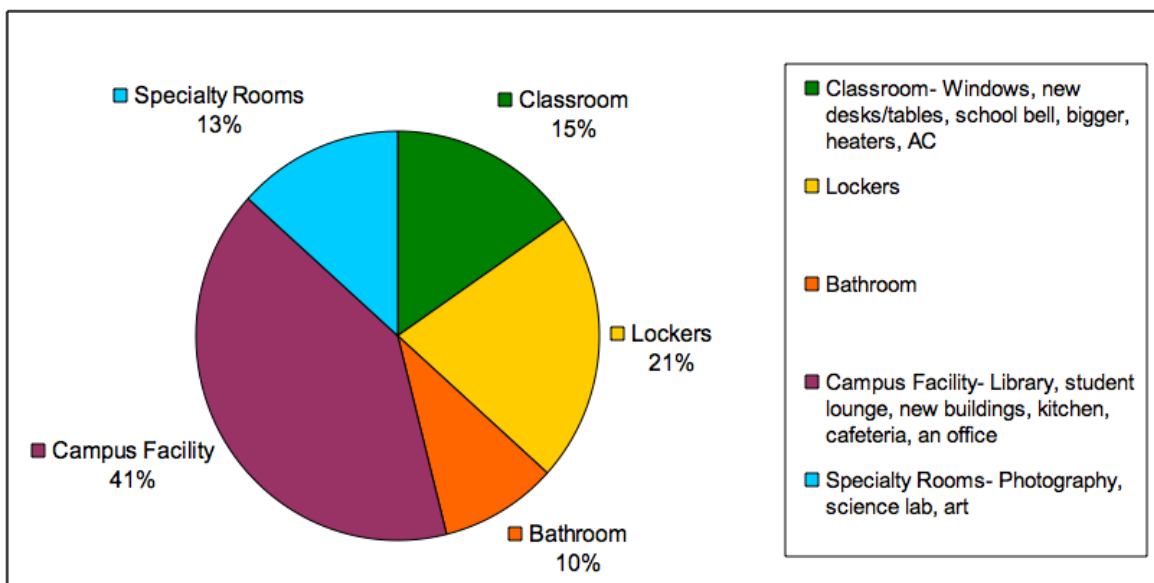
Middle school students are supportive of having an energy efficient school. Similar to the elementary students, middle school students also felt that a level of comfort is important in class, wanting more. Other indoor matters we inquired about that were important to students include:

- **Classrooms:** Comfortable chairs, and individual desks or better tables
- **Lockers:** Students would like to have lockers for personal belongings
- **Windows:** Large windows that open and have an unobstructed view were asked for.

- **Temperature Control:** Students would like to have more temperature control (heaters and AC) in classrooms.
- **Bathroom:** All students strongly feel the restrooms need improvement by adding more stalls and sinks.
- **Campus Facilities:** Students would like a cafeteria, library, and a central gathering area for students, such as a student lounge.
- **Electives/Specialty Rooms:** Students enjoy their current electives and would like more electives and specialty rooms on campus.

Figure 2.2 illustrates the indoor needs based on written student submissions at the end of the focus group.

Fig. 2.2. Indoor Needs for Middle School Students (n=45)



Again, whether prompted or student-initiated, students clearly want a suitable outdoor area for sports, a covered play area for our frequent rain, improved bathrooms, and the establishment of other necessities, such as a cafeteria and other specialty rooms.

Sharing the Campus

Middle school students enjoy attending VSAS and would like VSAS to add a high school, but students did not want to share their campus with the elementary students. Some of their concerns being that the campus would become too noisy and crowded, and the addition of new buildings would result in their field becoming smaller. Elementary students in favor of sharing a campus believe it will be fun to play with the older students and see siblings, while those not in favor are scared of being bullied by the older students (see Figures 2.3 & 2.4). Students had solid suggestions if integration of the two campuses were to happen like having buddies in the upper grades or other venues in which to get to know each other. It is worth considering having these suggestions implemented *before* moving to one campus.

Fig. 2.3. Elementary Students Willing to Share Campus

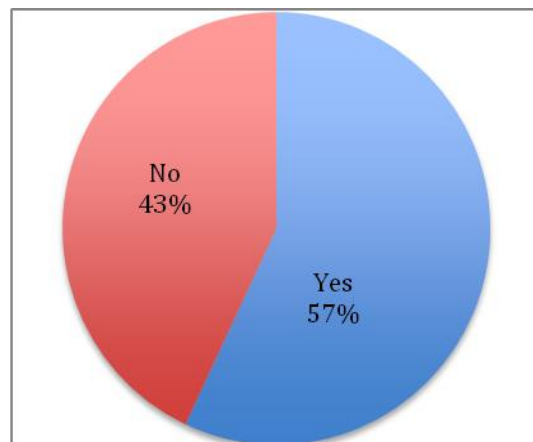
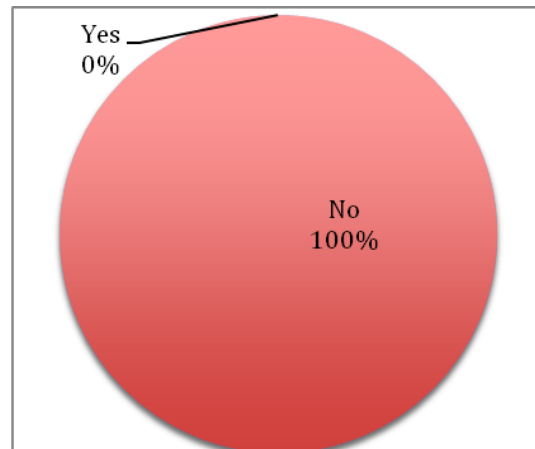


Fig. 2.4. Middle School Students Willing to Share Campus



OVERALL RECOMMENDATIONS

Students support their school's effort in becoming more energy efficient, and have specific requests in the building of their future campus. Our findings from the literature review on energy efficient school building initiatives and VSAS student focus groups show that the construction of "green" schools can adequately address the concerns of students while supporting the mission of VSAS. LEED is the suggested guide for "green" school design and building, with the end goal being that VSAS is LEED equivalent, bypassing the extra costs of formal LEED certification. The middle school students, though not in favor of sharing their campus, may feel differently if their need for preserving field space is incorporated into the design of the new campus.

Fig. 3.1. Overall Needs for Elementary Students

- A larger covered outdoor play area with a playground and concrete area for games (2-square and 4-square)**
- Cubbies for younger students and lockers for fourth and fifth graders**
- Larger computer lab with more computers**
- Larger library and cafeteria**

Fig. 3.2. Overall Needs for Middle School Students

- A gym or a covered outdoor play area for sports**
- Lockers**
- Facilities: cafeteria, library, and student lounge**
- Bathrooms with more stalls and sinks**

Appendices B and C provide data for each grade as well as more in-depth explanations for student requests. Further research is needed to determine the important qualities and criteria from the perspective of staff, parents, and the community at large. The timing of this new building for VSAS allows for careful consideration of ‘green’ school guidelines. We are uniquely positioned to incorporate many of the ‘green’ characteristics, most of which were voiced by the students of VSAS.

We would like to conclude by acknowledging the support and readiness of all the teachers and teaching assistants in scheduling these focus groups. The students were a pleasure to work with. Their answers were thoughtful and creative, providing us with solid guidelines.

APPENDIX A

Collated Notes from Previous Materials: Minutes of Meetings, Flip Chart, and Emails from 2010 to Present

Parking

- additional driveway? / land use
- Bike racks-50? = 5 parking stalls
- No parking on street - how many stalls wanted?
- automatic gate

Play field/Land

- Playing field- 100 x 250 + Parking
- Landscaping – trees to remove? Space needed?
- Fire pit stays?
- Play field size – small?
- Regulation size soccer field?
- innovated use of space to preserve Keakealani land
- covered play/ grass area
- public walkway/ track around site?
- native flora & fauna
- fence
- additional land behind property
- founders grove

Building/ facilities

- Buildings in pods – look like old buildings?
Classrooms all in a row
- Bathrooms- locations? How many?
 - Restrooms built in to k-1 grade rooms
- number of flights of stairs per grade
- covered walkways
- extra storage buildings
 - storage in each room?
- Use of historic buildings – will classes be held inside?
- new buildings over portables?
- Classrooms size – 24 x 24
- building materials- roof/truss: metal? What kind of materials are wanted?
- A workshop?
- green house?
- water in the elementary classrooms
- resource rooms
- School-wide intimate feel + volcano village image
- Gathering hall for whole school
- chalk/white boards
- pre-school complex
- Swimming pool?

- Private conference rooms
- library
- publishing facilities
- Community kitchen?

Green

- Solar panels? – School wide, or just building dependent?
- Solar hot water to heat rooms
- Natural lighting
- Catchment over county water?Above ground or below?- fire truck access?
- automatic light and water turn off
- electrical generating side walks
- Solar bathroom - - no composting toilets?
- bamboo building materials

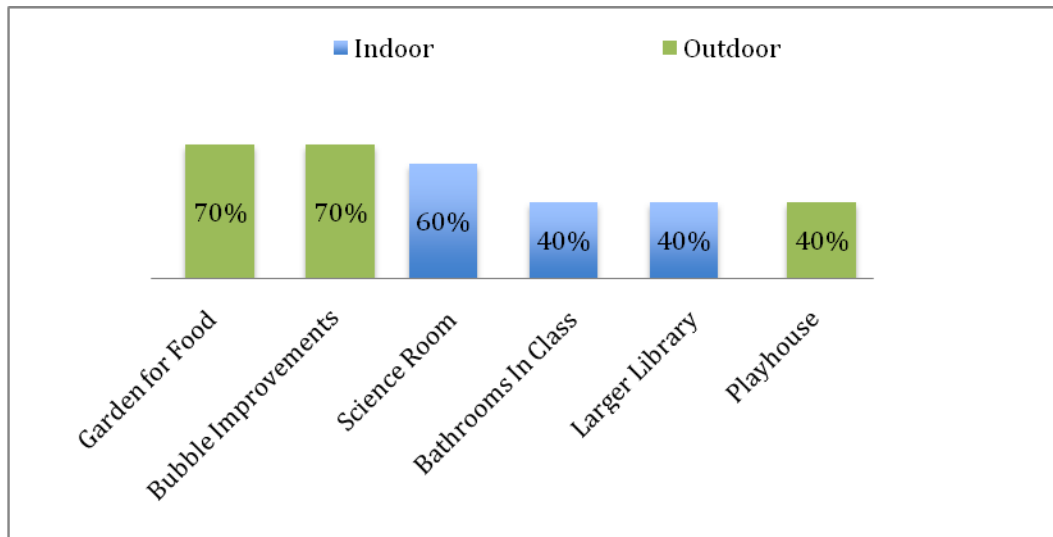
APPENDIX B

Specific Results by Grade Level for Elementary School: Kindergarten—Fifth Grade

Kindergarten (16 students):

Kindergarteners stated that some of their favorite things in the classroom were the student whiteboards and chalkboards. Fourteen students liked their class couch, while only half the class liked their tables and chairs. When asked what they would change about their classroom, their answers conveyed interest in having a more whimsical appearance, as well as having a water fountain and pets. Fig. B.1. shows what percentage of kindergarteners raised their hands in approval of various features on campus.

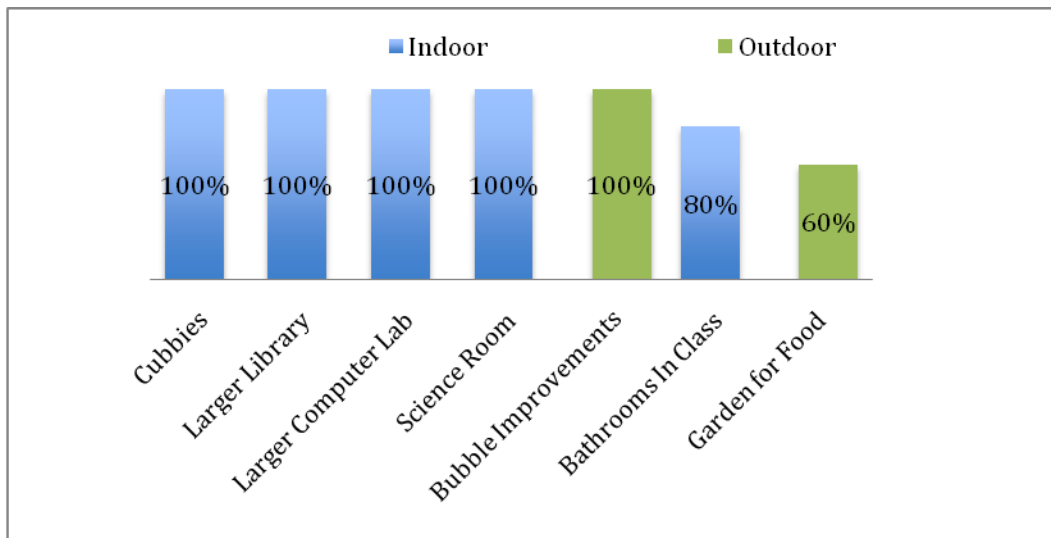
Fig. B.1. Indoor and Outdoor Needs: Kindergarten (n=16)



First Grade (11 students):

First graders enjoy their current electives (especially art), computer lab, and recess. Some of their favorite things about their classroom include hanging artwork on the wall, the projector, having tables that fit their size, and being able to sit on the rug. If they had the opportunity to have a brand new classroom, a couple of students would like computers or tablets, more books, and new supplies (scissors). A few students want different chairs, a rug, and a couch. Fig. B.2. shows the percentage of first grade students that raised their hands in approval of various features on campus.

Fig. B.2. Indoor and Outdoor Needs: First Grade (n=11)

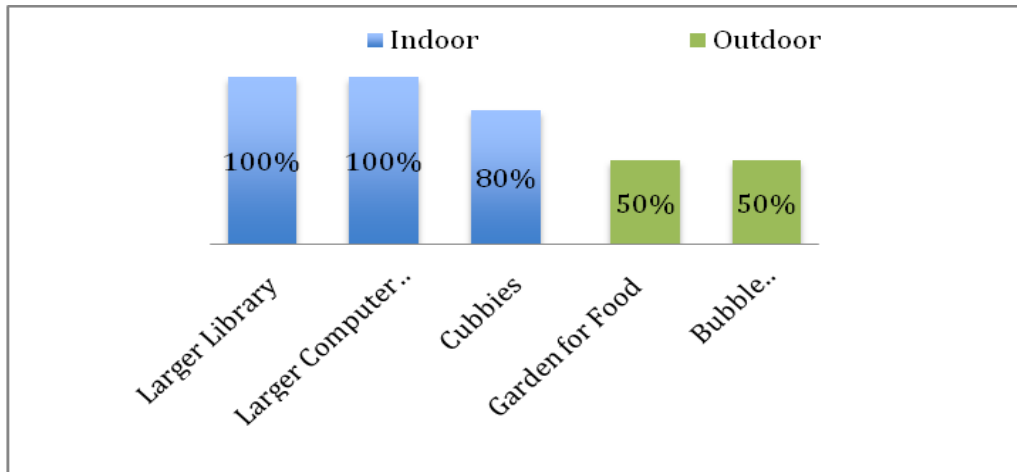


Second Grade (10 students):

Students liked the personal touches of their classroom, as well as the projector and having cubbies in their desks. When asked what they would put in a new classroom they could design, students said more toys, a workout area, T.V., fish tank or class pet, and for everyone to have

their own workspace. Larger classrooms were also mentioned. Fig. B.3. shows what percentage of second grade students raised their hands in approval of various features on campus.

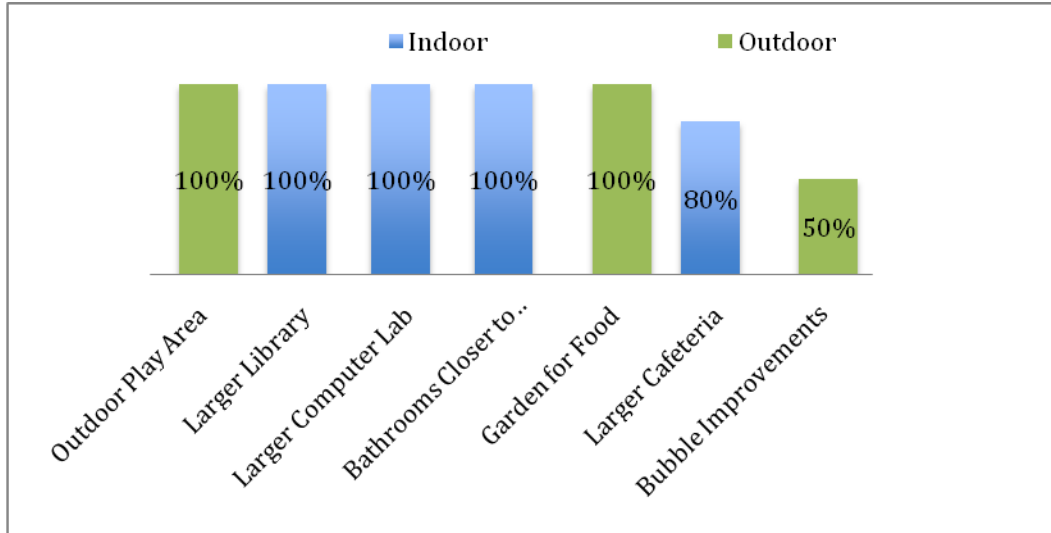
Fig. B.3. Indoor and Outdoor Needs: Second Grade Students (n=10)



Third Grade (16 students):

If the students designed a new classroom, they would have individual desks so they could focus on their work. They would also like more heaters and a thermostat, a bigger classroom, more computers, a bigger whiteboard, and huge windows. When asked if there was anything important they wanted to share with us, students replied that they want more after school activities, lengthier recess time, and more P.E. Fig. B.4. shows the percentage of third grade students that raised their hands in approval of various features on campus.

Fig. B.4. Indoor and Outdoor Needs: Third Grade (n=16)



Fourth Grade (21 students):

Fourth graders appreciate playing sports, recess time, and lunch. Students voiced that they would like to have a ball shed, better heaters, more chapter books in the library, and a place to hang out. Fig. B.5. shows the percentage of fourth grade students that raised their hands in approval of various features on campus. Fourth graders were each asked to write a list of the top three things they wanted on a new campus; the two pie charts (Fig. B.6 and B.7) below represent the percentage of indoor and outdoor features submitted in writing by students.

Fig. B.5. Indoor and Outdoor Needs: Fourth Grade (n=21)

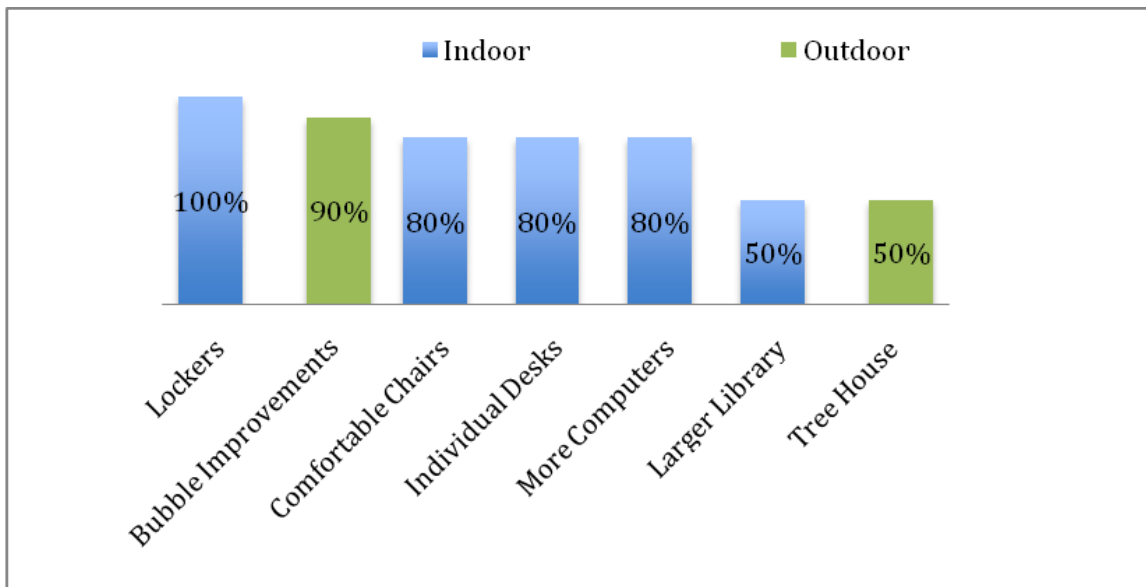


Fig. B.6. Outdoor Needs for Fourth Grade Students (n=21)

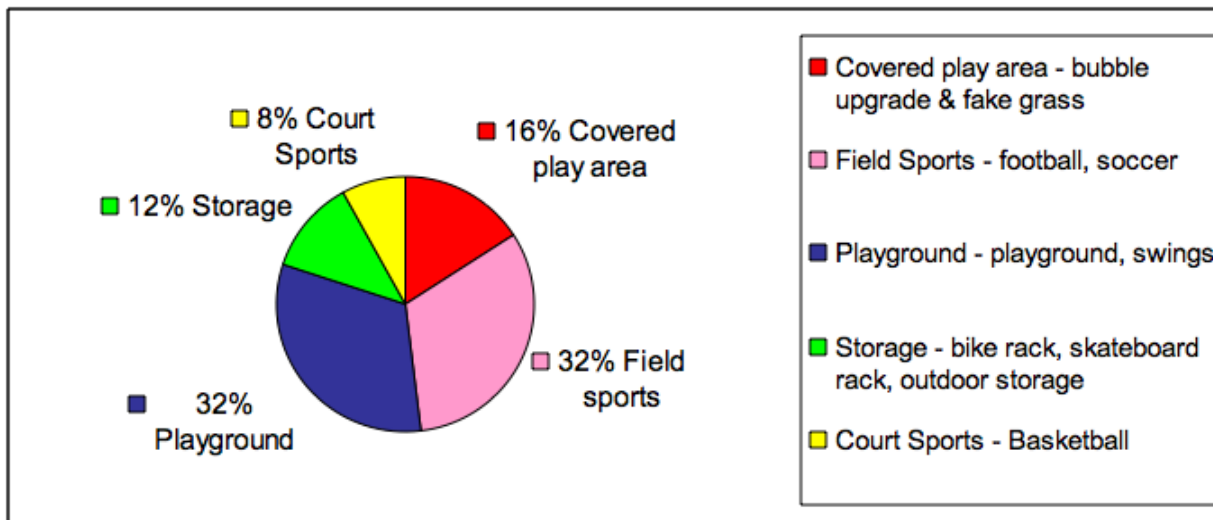
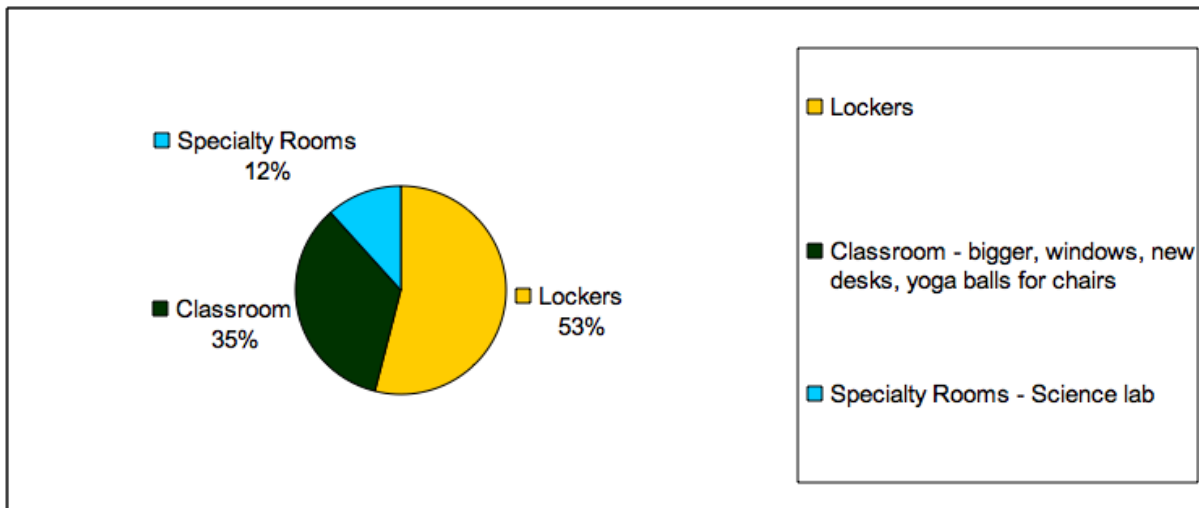


Fig. B.7. Indoor Needs for Fourth Grade Students (n=21)



Fifth Grade (16 students):

Fifth graders value their school electives, recess, and the fact that they have enough space in their classroom. Their favorite classroom items include the computers, a projector, art, a heater, and various class projects. If they could design a new classroom, students would want more computers, heaters, white board/bulletin board, supplies (glue, scissors, markers, colored pencils), T.V., bigger desks, and more room for their personal belongings.

Many want more electives in school, a bell to help them change classes. Students would also like to be able to utilize the field for more than one sport, and have more water fountains. All expressed interest in a gym, more play equipment, and a separate concrete area to play games (basketball, 4-square, tennis, Ping-Pong).

Fig. B.8 shows the percentage of fifth grade students that raised their hands in approval of various features on campus. Fifth graders were each asked to write a list of the top three things they wanted on a new campus; the two pie charts (Fig. B.9 and B.10) below represent the prevalence of indoor and outdoor features listed by students.

Fig. B.8. Indoor and Outdoor Needs: Fifth Grade (n=16)

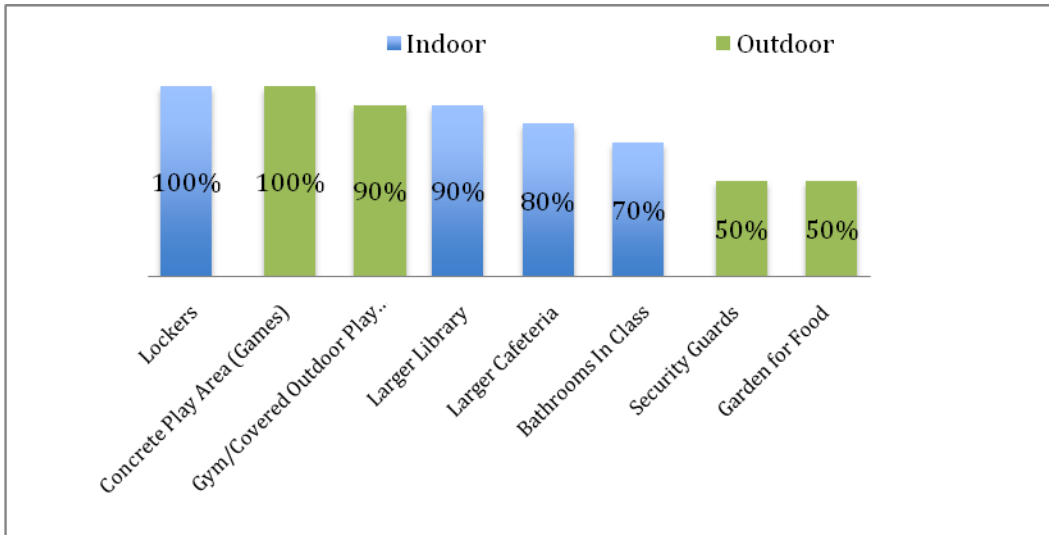


Fig. B.9. Outdoor Needs for Fifth Grade Students (n=16)

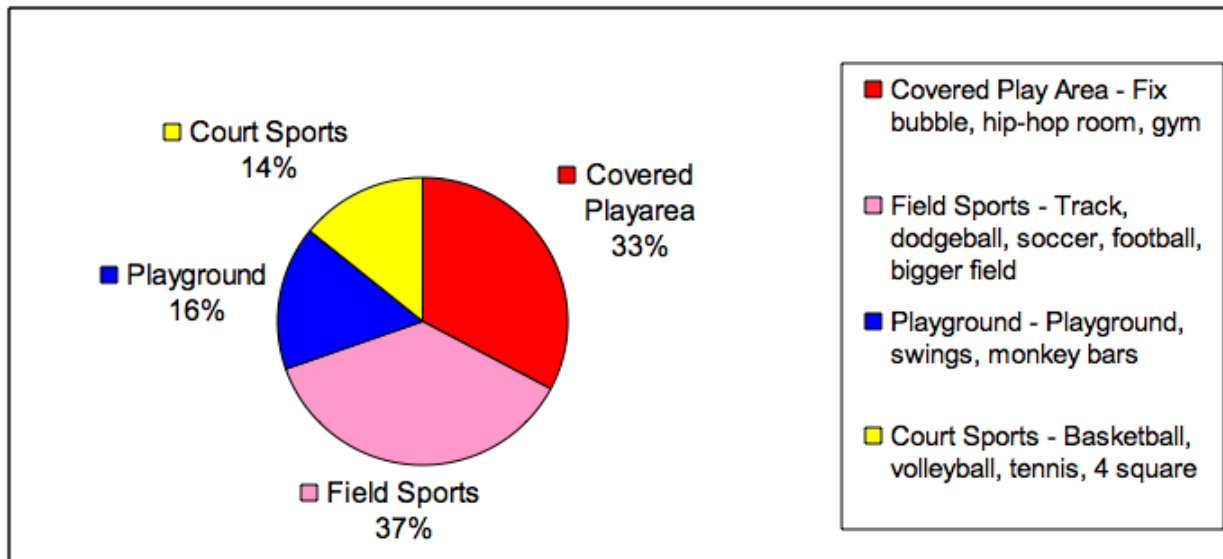
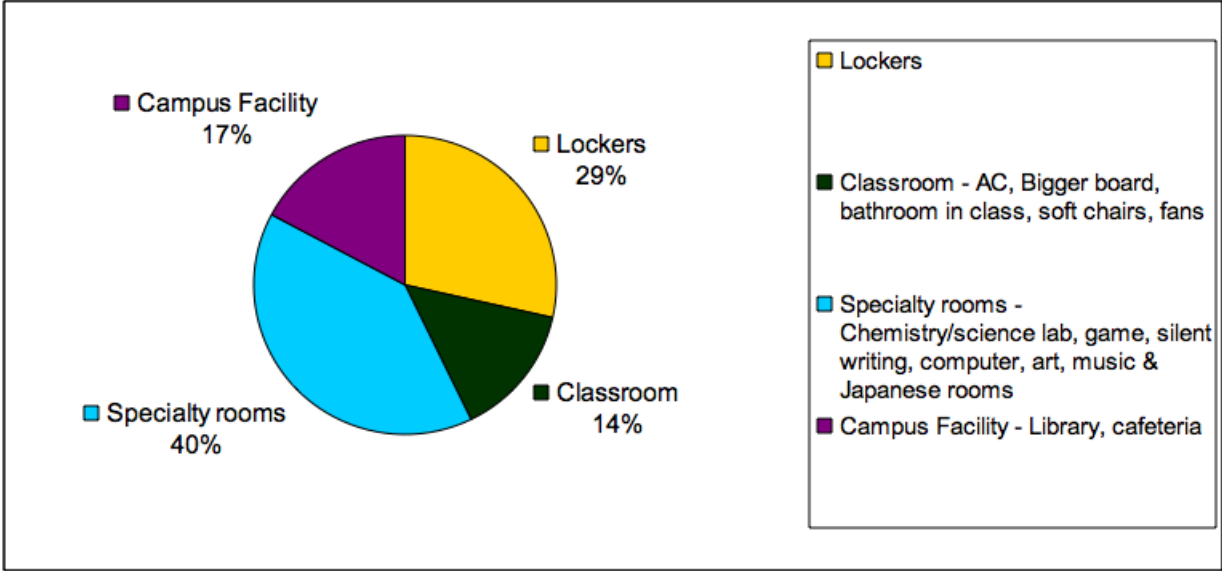


Fig. B.10. Indoor Needs for Fifth Grade Students (n=16)



APPENDIX C

Specific Results by Grade Level for Middle School: Sixth—Eighth Grade

Sixth Grade (9 students):

When asked what they loved about their school and wanted to keep, sixth graders responded that they liked their field, using MacBook's, cooking class, the size of their room, their two-story building (because it saves space), the fire pit (disappointed they do not use it more), and the greenhouse (would like to use it more). They also like their large windows and the option of opening the windows for airflow, although they want the windows to look less like prison bars. In their classrooms, students would like better heaters and softer chairs to sit on.

When asked what they would change about their school, it became apparent that bathroom improvements are their number one priority. Students would like the sink fixed, and for bathrooms to have more than one stall. They also want the restrooms appearance to be “less scary” (lighter colors and tiled). Besides restrooms, the sixth graders also want separate desks (most feel it would be easier to work in their own space), larger T.V. screens for better viewing, more computer related activities, lockers, a gym, and P.E. class. Sixth graders would like to learn about agriculture and use their greenhouse/garden more. Eight students want the garden to be used to plant food.

Sixth graders want a gym on campus so they can still play when it rains and hold assemblies. They like playing soccer and football but often do not have any balls, or have to bring their own equipment to play sports, and would like field goals. A playground was also mentioned (with monkey bars and slides), a regular cafeteria, as well as a weight room. If

students could add to their campus, they would have some type of snack/drink dispenser or bar, a student lounge where they can hang out, paved walkways, and a fence around the campus, as well as security (concerned about homeless). Students strongly dislike the field being used as a public park after school hours because of dog poop on the ground. Six students want a library, and all students want a building for music and art. Some students commented that they like going over to the other campus because the elementary campus looks nicer, is bigger, has cleaner bathrooms, and brighter lights. Fig. C.1 and C.2 show the results for their written submissions.

Sixth graders do not want to share a campus with the elementary students because many find them loud and irritating, and feel like the older students may not be able to play as many sports with younger kids around.

Fig. C.1. Outdoor Needs for Sixth Grade Students (n=9)

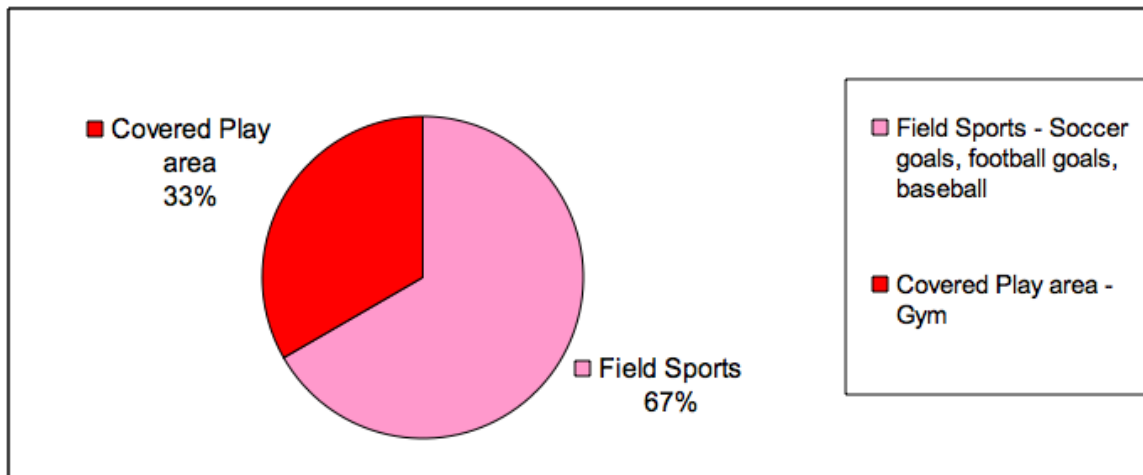
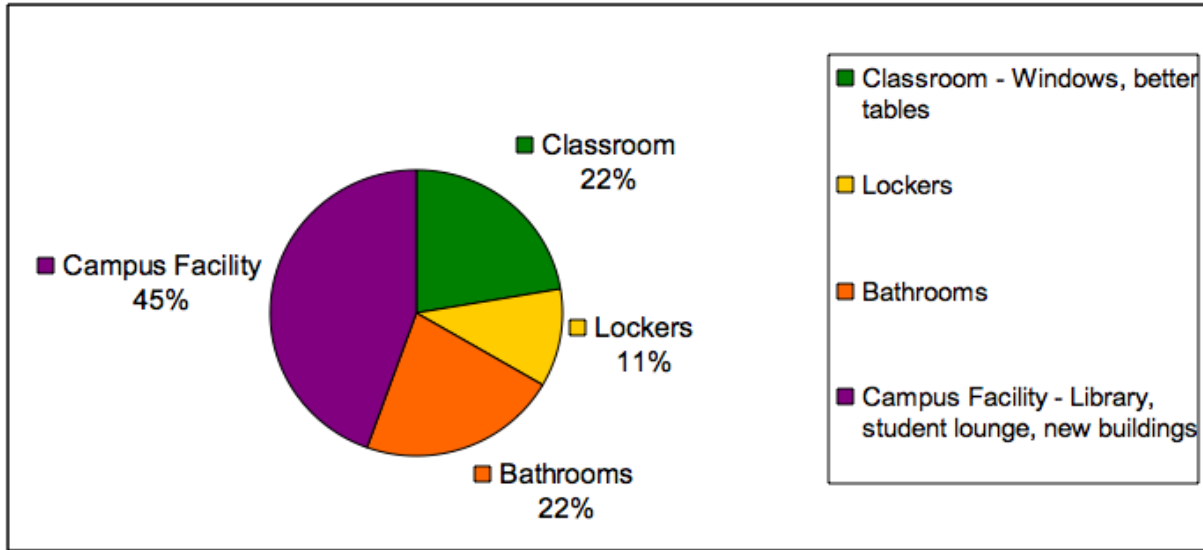


Fig. C.2. Indoor Needs for Sixth Grade Students (n=9)



Seventh Grade (18 students):

Seventh graders said some of their favorite things about their school were the electives (French and theatre), sports activities, and their big field. More than half the class plays basketball and kickball. Students would like to improve their basketball court by making it bigger and repaving the concrete so they do not trip. The entire class would like a covered outdoor play area.

If they were to design a new classroom, students would like more comfortable chairs, better desks, bigger tables, and lockers. The class likes windows and the view of the trees outside but say their view is blocked by the back walkway.

Students would like to have a bigger field to play football or soccer on, and a kickball court. Better game equipment, a skate ramp, a pool, better bathrooms, and a real cafeteria were mentioned as well. All students want a library, three students want a science room, and one student wants a garden. Students expressed concern about having good airflow on days with a lot of vog.

Seventh graders do not want to share a campus with elementary students. Their reasons include: not wanting to be near siblings, currently enjoying a small campus, worry that their campus would become too crowded, new buildings taking up space on their field, and different recess times distracting those in class. The results from their written submissions are shown in Fig. C.3 and C.4.

Fig. C.3. Outdoor Needs for Seventh Grade Students (n=18)

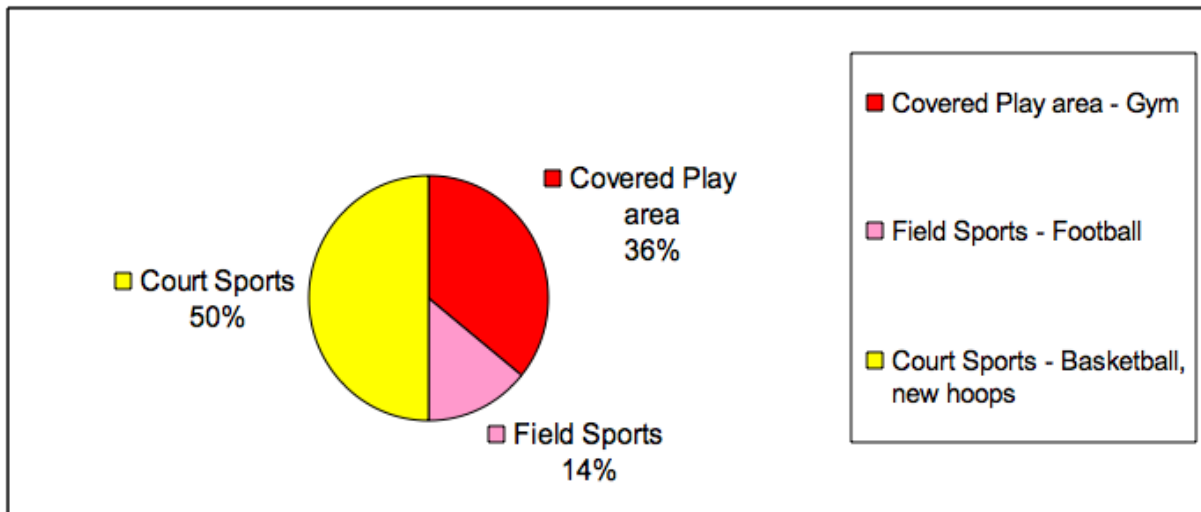
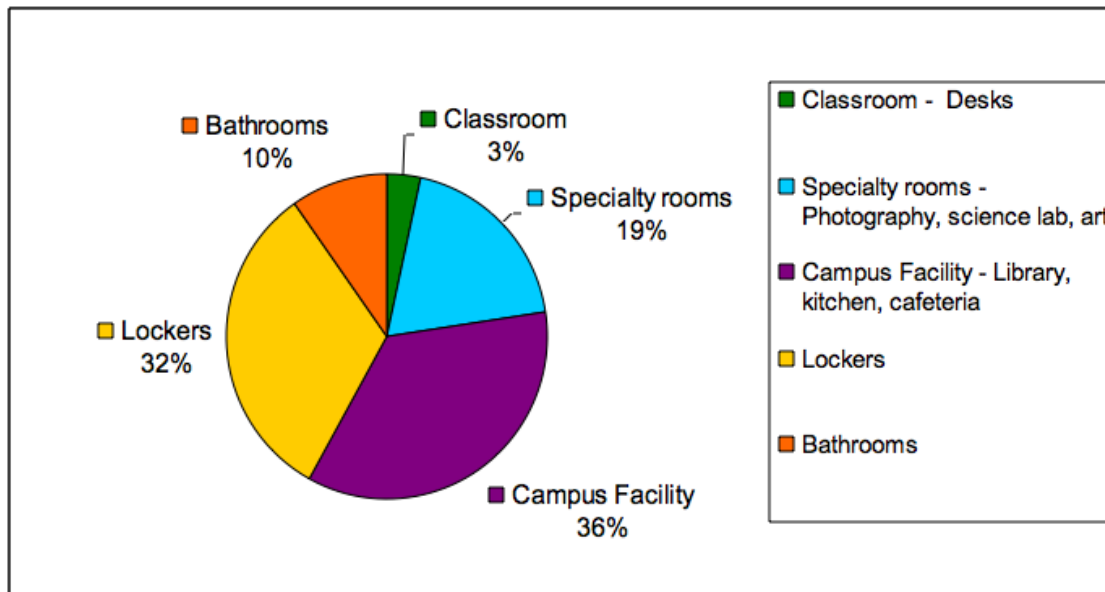


Fig. C.4. Indoor Needs for Seventh Grade Students (n=18)



Eighth Grade (18 students, 5 arrived late):

Eighth graders said their favorite thing about VSAS is the fact that it is small and everyone knows each other. Students enjoy their large field and like the fire pit. If they could design a new classroom they would like shelves, individual desks, a bigger classroom, more heaters, a flat screen T.V., flowers, and the ability to see the view outside (windows blocked). To improve their school campus they suggested heaters/AC, solar panels, a vending machine, pool, and redoing the bathrooms. In regard to the bathrooms, students want more stalls and sinks, curtains for the windows in the girls’ restroom, and Febreeze.

The eighth graders stated that a gym is very important to them, because they would like a basketball court, a volleyball net, and weight room inside. Nearly all students like to play field sports but mentioned that they no longer play as much on the field since the incident with a “crazy man”. Half the class said they would like a fence around the campus. Sixteen students do not like the cameras on campus because they do not want to be watched, yet most agree that

there is not very good security on campus, and would like security guards. Students also did not like their field being used as a public park because of dog poop being left on the field. They suggested specific areas on the field for pets, and want dog owners to be more responsible, as well as have ample garbage and recycling bins available.

Nearly every student would like a health room. They also believe that it is important for their school to strive to be energy efficient. All students would like to have lockers on campus, and some would like a cafeteria. Eight want a library on campus, while some mentioned a music room and running track. Four students would like a school garden, and everyone stated they wanted a garden for food. Nine students would like to bike to school if there were bike racks. Fig. C.5 and C.6 show the submitted responses.

Eighth graders did not want to share their campus with the elementary students. Reasons for not sharing were: younger kids are annoying and might get hurt playing games with older students, younger kids spread germs, there would be too many people on campus, and it would make for a noisy environment.

Fig. C.5. Outdoor Needs for Eighth Grade Students (n=18)

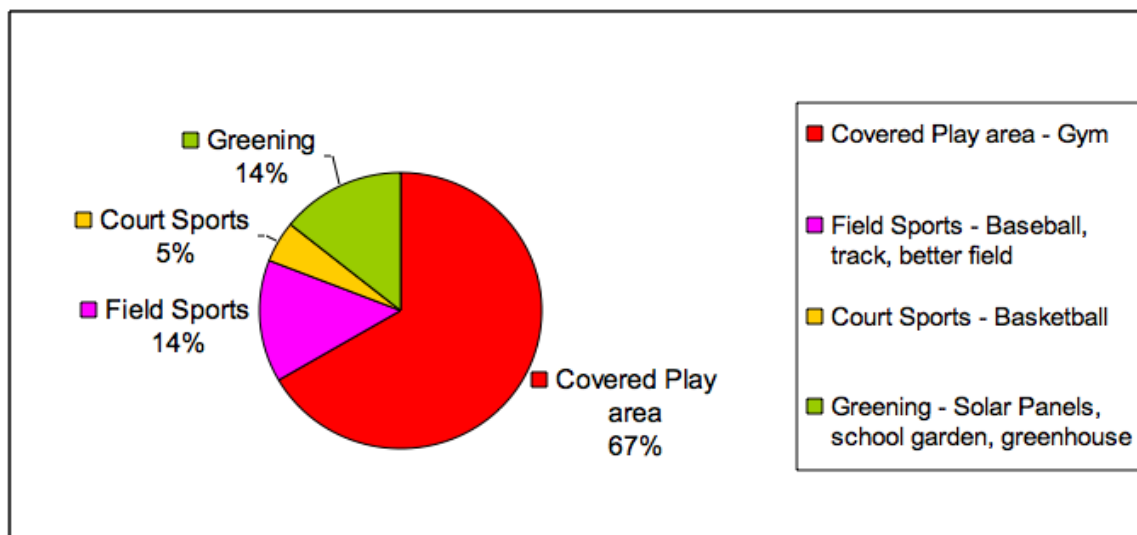
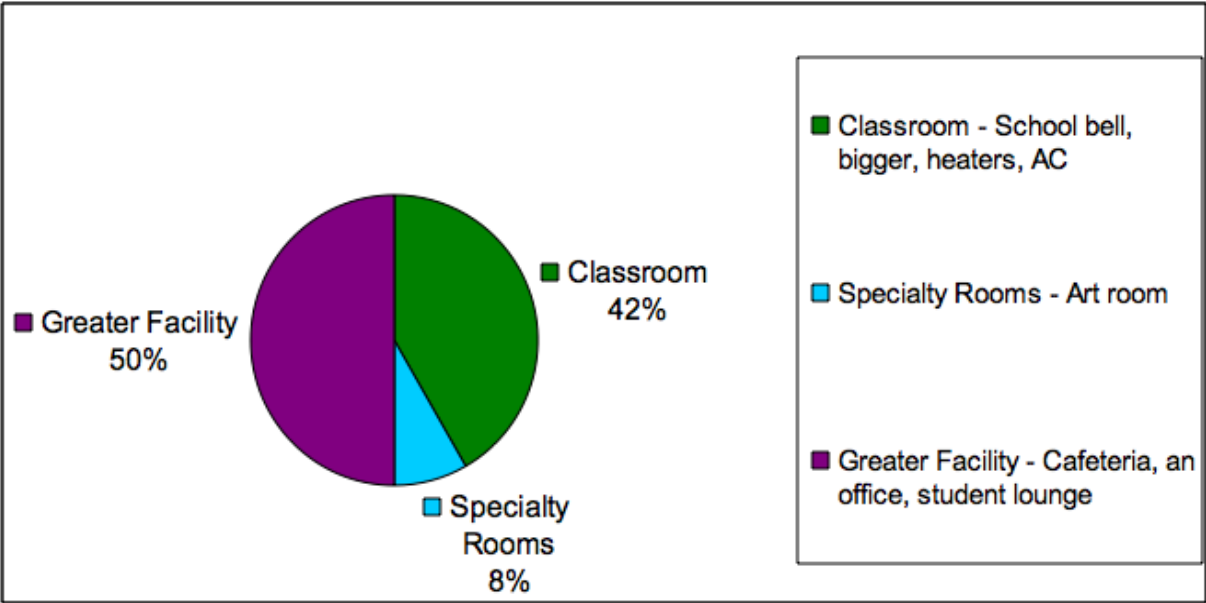


Fig. C.6. Indoor Needs for Eighth Grade Students (n=18)



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