Improving Sanitation and Student Health in Schools in Armenia

An Interactive Qualifying Project Report
Submitted to the faculty of
Worcester Polytechnic Institute and
American University of Armenia
in partial fulfillment of the requirements for the
Degree of Bachelor of Science
in cooperation with the My Step Foundation

Submitted By:
Levon Amiryan
Antonia Dinicu
Julia Duffield
Sara Lyons

Project Advisors:
Dr. Aaron Sakulich
Norayr Benohanian

This report represents the work of WPI undergraduate students submitted to the faculty as evidence of completion of a degree requirement. WPI routinely publishes these reports on its website without editorial or peer review. For more information about the projects program at WPI, please see http://www.wpi.edu/academics/ugradstudies/project-learning.html
Abstract

Our goal was to develop a toolkit for bathrooms and gymnasiums in Armenian public schools. Using best practice solutions from around the world, and standards from international organizations, we aimed to create a plan for the My Step Foundation to use in their renovations of these facilities. Our objectives were to provide the toolkit, promotional materials, and a sustainability plan. The use of this plan will improve the school environment for students and assist in future school renovations.
Acknowledgments

Our team would like to take the opportunity to acknowledge the many people who supported us throughout this project and helped us complete our project.

Hovhannes Ghazaryan and the My Step Foundation Staff, *Project Sponsor*
Norayr Benohanian, *Project Co-Advisor*
Aaron Sakulich, *Project Co-Advisor*
Michael Aghajanian, *Project Site Director*
Alexander Moseson, *Interviewee*
Martin Burt, *Interviewee*
Ron Goodin, *Interviewee*
Vasile Dinicu, *Interviewee*
Andre Ohanian, *Interviewee*
Tigran Tovmasyan, *Interviewee*
Authorship

As a collaborative team, each member contributed to our final document. All team members were tasked with working on the background and results sections of the report, including writing and editing. Individually, each team member completed the following:

Levon Amiryan - Levon served as a primary researcher for information regarding sanitation and bathrooms. He led the team in translating important documentation from Armenian and Russian to English for the further use in the report.

Antonia Dinicu - Antonia served as a primary author in our report. She worked collaboratively on the Introduction, Methodology, and Background. Antonia was also heavily involved in writing and editing the Results, Executive Summary, and Recommendations and Conclusion sections. She primarily focused her research on gymnasiums.

Julia Duffield - Julia served as a primary author in our report. She headed the Background section and worked heavily on editing the Introduction and Methodology sections, as well as improving the flow of the entire report. Julia also focused her research on bathrooms and sanitation standards.

Sara Lyons - Sara served as a primary researcher for information regarding gymnasiums. She focused on the formatting of the document, including citations and formatted the final report. Sara edited a number of sections and was a primary author on the Abstract and the Recommendations and Conclusions section.
Table of Contents

Abstract ................................................................................................................................. 2
Acknowledgments .................................................................................................................. 3
Authorship ............................................................................................................................. 4
Table of Contents ................................................................................................................... 5
List of Figures ........................................................................................................................ 6
List of Tables .......................................................................................................................... 7
Chapter 1: Executive Summary ............................................................................................. 8
Chapter 2: Introduction ......................................................................................................... 12
Chapter 3: Background ......................................................................................................... 14
  Armenia ................................................................................................................................. 14
  Public Schools, Sanitation, and Physical Education .............................................................. 16
  Public Health ....................................................................................................................... 17
  Worldwide Sanitation Standards .......................................................................................... 19
  Needs Assessment and Considerations Before Renovation .................................................. 20
  Gymnasiums and Physical Activity ..................................................................................... 21
  Project Statement ............................................................................................................... 23
Chapter 4: Methodology ........................................................................................................ 24
  Define the Target Audience ............................................................................................... 24
  Develop the Toolkit ............................................................................................................. 24
  Promote Sanitation and Physical Activity .......................................................................... 27
  Sustainability ....................................................................................................................... 27
Chapter 5: Results ................................................................................................................... 29
  Objective One: Define the Target Audience ....................................................................... 29
  Objective Two: Develop the Toolkit ................................................................................... 29
  Objective Three: Promote Sanitation and Physical Activity ............................................... 43
  Objective Four: Sustainability ............................................................................................ 51
Chapter 6: Recommendations and Conclusions .................................................................... 54
  Objective One: Define the Target Audience ....................................................................... 54
  Objective Two: Develop the Toolkit ................................................................................... 54
  Objective Three: Promote Sanitation and Physical Activity ............................................... 55
  Objective Four: Sustainability ............................................................................................ 56
  Conclusions ......................................................................................................................... 56
Bibliography .......................................................................................................................... 58
List of Figures

**Figure 1:** ADA Compliance Diagram for Lockers .................................................................36
**Figure 2:** Solar Energy Map of Armenia ...............................................................................41
**Figure 3:** Promotional Handwashing Poster for Younger Students (1) .................................44
**Figure 4:** Promotional Handwashing Poster for Younger Students (2) ...............................45
**Figure 5:** Promotional Handwashing Poster for Older Students ........................................46
**Figure 6:** Promotional Exercise Poster for Younger Students (Translation 1) .........................48
**Figure 7:** Promotional Exercise Poster for Younger Students (Translation 2) .......................49
**Figure 8:** Promotional Exercise Poster for Older Students .................................................50
List of Tables

Table 1: Recommended Bathroom Fixtures by Age Group .................................................................31
Table 2: PEW Chart Comparing Standard Flush Toilets and Compostable Toilets .......................38
Table 3: PEW Chart Comparing Gymnasium Equipment for Different Age Groups ..................39
Table 4: PEW Chart for Multipurposed Room Requirements ..........................................................40
Table 5: PEW Chart Comparing Types of Solar Panels .................................................................42
1. Executive Summary

In Armenia, public health standards are outdated and lacking compared to other countries, especially the standards of school restrooms and gymnasiums. Due to the lack of these standards for schools, it is difficult to address the problems Armenian schools are facing regarding public health and sanitation. Non-standardized, low-quality restrooms affect education because they negatively impact student health and campus safety, making it more difficult for the students to concentrate on learning. Access to proper gymnasiums is another important aspect when it comes to improving public health because the gymnasiums will allow Armenians to get the recommended amount of exercise. Many Armenian public schools do not have proper gymnasiums, facilities, and are not being encouraged to break their sedentary lifestyles. An inactive lifestyle can lead to many health problems down the line and be a strain on the economy as many people will take sick days or be hospitalized.

To address these problems, we worked with the My Step Foundation, an Armenian non-governmental organization that focuses primarily to empower women and children. Our goal was to develop a toolkit to aid in building functional bathrooms and gymnasiums for the public schools in Armenia, based on world health standards for sanitation, physical education (PE), and health programs. We aim to propose potential solutions for schools of varying demographics, from rural to urban, based on the standards of the World Health Organization. Armenian public education will benefit as students will be equipped with the proper resources they need to focus more on learning and less on the current poor conditions of most school facilities, specifically bathrooms and gymnasiums. By giving the My Step Foundation a toolkit for the school renovations, the overall health of the community will improve as students become healthier as a result of improved sanitation and physical activity. To achieve our goal, we accomplished the four objectives.

The first objective was to define the target audience that will benefit from the school renovations and assess current sanitation conditions in public schools in Armenia. To accomplish this, we researched different case studies to get a better understanding of both the sanitation standards and PE standards in Armenia. One study found that public health standards given by the World Health Organization (WHO) aren't being met in the 121 Armenian schools and 80 Armenian kindergartens in urban and rural areas that were randomly selected for the study. Another study found that 78 out of 80 kindergartens and 113 out of 121 schools did not have
handicap accessible restrooms. The PE standards found were also concerning, as the surveys of PE facilities and equipment showed that the equipment and facilities are lacking in schools across the world, including Armenia. Inadequate facilities can have a great impact on the overall experience of the students with their PE programs. According to a study done by the Institute of Child and Adolescent Health of Armenia in 2013-2014, only 49% of Armenian students between the ages of 11-15 and only 20% of 17-year-olds attend PE classes three times a week, and nearly 6% of the students signed up for PE do not attend classes at all. Schools that have poorer conditions should be prioritized, based on the judgment of the My Step Foundation. Furthermore, we also recommend that the My Step Foundation get in touch with UNICEF Armenia. UNICEF Armenia is working on renovating 20 schools, focusing on bathrooms and handicap accessibility. Because of the similarities, we suggest that the two organizations collaborate to share their findings and what schools they plan on renovating as to not renovate the same schools. Having understood the conditions in Armenian schools, we then focused on our second objective.

Next, we accomplished our second objective by developing the toolkit based on the varying conditions and resources available at the schools and identified best solutions for sanitation and gymnasium improvement. To create sanitation standards, we compiled different standards from the WHO, the Russian government, the plumbing code from California, as well as the Americans with Disabilities Act (ADA). Special care should be taken by closely adhering to the guidelines for dimensions and construction when implementing handicap accessible facilities because the dimensions given allow for seamless movement for someone who uses a wheelchair. To develop gymnasium recommendations and the gymnasium toolkit, we compiled standards from previous renovations done by Armenian NGOs, Russian government standards, the Centers for Disease Control and Prevention (CDC), and the Department of Defense Education Activity. In compiling our standards and using different resources, we were able to provide some solutions that were tailored for Armenia by developing toolkits that examine different options for bathrooms, gymnasiums, solar panels and lighting based on several conditions listed and the needs of schools. Schools and the My Step founda
tion can choose what they think will best fit their needs and wants and plan a customized renovation.

We then had to encourage that the facilities would be used. To do this, we promoted sanitation and physical activity within the school community by giving the My Step Foundation promotional materials to distribute and by instructing schools on how they can set up programs
to encourage the use of the new facilities. After renovating bathrooms and making them suitable for students, handwashing must be encouraged to ensure that they are staying healthy and taking advantage of their new facilities. To encourage handwashing, posters and fact sheets should be put in the bathrooms. For younger students, more colorful graphics should be used to grab their attention. More informative fact sheets should be used for older students that will detail the steps to proper handwashing. The use of posters promoting proper handwashing techniques are recommended for students, as this can assist in the facility being used to its best potential. These promotional posters should be placed in all bathrooms, in a position where they can catch the eyes of students. To promote physical activity, we also found and translated fact sheets that detailed the benefits of regular exercise. There are other ways to promote physical activity. According to the CDC, there are five main components that promote physical activity of students: PE, physical activity during school, physical activity before or after school, staff involvement, and family and community engagement. Posters can also be used to promote PE classes and being physically active in the new gymnasiums. PE classes should have an increased importance in schools in order to help students engage in active lifestyles and get the amount of exercise that is recommended by the World Health Organization. Increasing attendance in PE classes for all ages will, also, assist in helping students stay physically active. Schools can also promote teams and clubs that are physically active, and competitions and games can be a fun way for students to be active. In promoting sanitation and physical activity, the new facilities for the schools will be used.

The final step was to ensure sustainability of the project. Our focuses for ensuring sustainability were to provide a cost estimate of renovations and to provide a maintenance plan for bathrooms and gymnasiums. A cost estimate of bathrooms, gymnasiums, and solar panels was done to get approximate prices of the renovations. With so many schools receiving these facility upgrades, it is understandable that usage differences between models will mean that cost is not the only factor considered when making decisions. The maintenance recommendations for the optimal state of bathrooms and gymnasiums are based on the equipment suggested for use. Upkeep and maintenance of the new facilities will be the responsibility of each individual school. Specifically, for bathrooms the recommended maintenance plan will include information on cleaning them and increasing longevity. Gymnasium maintenance is focused on the type of flooring and the gymnasium equipment. Both factors are highly dependent on the age of the
students in the school. By offering the schools a basic maintenance plan, we will help them get an understanding of the steps they must take to ensure the durability of their equipment. Providing a cost estimate would ensure sustainability because it would allow the My Step Foundation to budget costs for their future renovation & maintenance.

With the implementation of this project and these recommendations, the impacted schools will have an improved environment. The upgraded bathrooms will allow the students to have better sanitation and the gymnasiums will encourage students to have more physical activity. The improved sanitation will allow the students to focus more on their education, instead of worrying about or being impacted by the poor conditions. The new gymnasiums and the increased physical activity will improve overall health of students, which will ensure fewer sick days and allow students to spend more time in school. Overall, both education and health will be positively impacted by the renovation of gymnasiums and bathrooms.
2. Introduction

Public health standards are vital to the overall wellbeing of citizens in any country. Poor sanitation practices have been linked to the transmission of diseases that worsen developmental issues and contribute to malnutrition. In Armenia there are sanitations standards, however, they apply to all the buildings regardless of their purpose. This is an issue to be addressed, especially concerning restrooms and gymnasiums in public schools.¹

Many public schools do not have the proper infrastructure for bathrooms, such as access to sewage, electricity, or hot water. These poor restrooms affect education because they negatively impact student health and campus safety, making it more difficult for students to concentrate on learning.² By having inadequate sanitary conditions, children may refuse to go to the bathroom even if they need to, which can lead to many kinds of health issues that directly influence children's ability to learn, such as stomach pains. Furthermore, the right to sanitation and proper conditions are human rights. Having students use facilities not meeting these standards is a violation of human rights. Due to the lack of public health standards for public schools, and inconsistency of resources such as water and electricity, it is difficult to address the problems Armenian schools are facing regarding public health and sanitation.

Access to proper gymnasiums is another important aspect when it comes to improving public health. Most Armenian students live a sedentary lifestyle and are not getting the amount of physical activity recommended by experts. Not having an active lifestyle can cause serious health problems down the line and can be a strain on the economy and hospitals as people will take more sick days at work and be hospitalized. Part of this problem is that their schools do not have proper or well-maintained gymnasiums or equipment, so students are not able to get physical activity during the day. Another part of the problem is that students are not being actively encouraged to break their sedentary lifestyle, as an emphasis is not placed on physical education classes.

We worked collaboratively with the My Step Foundation to address these problems by proposing potential solutions for schools of varying demographics, from rural to urban, based on the standards of the World Health Organization. Knowing these school demographics allows the

---

solutions to be tailored and implemented to each school specifically based on the school's existing facilities and resources available. Based on the standards we identified, Armenian public education will benefit as students will be equipped with the proper resources, they need to focus more on learning, and less on the current poor conditions of most school facilities, specifically bathrooms and gymnasiums. By improving these standards in schools, the overall health of the community will improve as students become healthier because they will have improved sanitation and physical activity.
3. Background

**Armenia**

Armenia is a small country in the Caucasus region between Asia and Europe, which was previously a member of the Soviet Union. During the Soviet reign, public schools were built in Armenia at an accelerated rate. After the Soviet collapse, Armenians unanimously voted for independence after which they elected the first president, Levon Ter-Petrosyan. During his presidency, government corruption was prevalent. This newly implemented government was neglectful of the people’s needs, with one of the most pressing problems being the state of public schools. Schools built during the Soviet era remained the same since their construction. Many schools lack proper maintenance and are in complete disrepair. The lack of proper learning facilities and maintenance infrastructure is interfering with students’ education. Serious intervention is needed in order to stop hindering public education, because “education is the foundation upon which we build our future”.

The neglect of the population’s needs is attributed to the start of the “Armenian Energy Crisis,” in which Armenians experienced shortages of gas, electricity, and water. The rise of poverty, in part due to corruption, led to the simultaneous rise of deforestation in Armenia. Just like many post-Soviet countries, Armenia experienced difficulties during the first years of independence, particularly with the newly elected government. The Nagorno-Karabakh war made Turkey and Azerbaijan close their borders with Armenia, putting a fuel embargo on the county. Azerbaijan was the supplier of the 90% natural gas supply of Armenia. This forced Armenia to find an alternative supplier which was Georgia. However, from late January to mid-March 1993, Azerbaijani saboteurs blew up the gas pipeline seven times. Other than gas, Azerbaijan also blockaded roads, rail lines and energy supplies, leading to severe energy

---


shortages in Armenia. As citizens needed heating during the cold winter season, they began cutting trees to heat their homes. This is because many did not have access to any other heating sources.

These struggles continued for many years, and although the situation was improving with each new president, corruption remained. Adding to the volatility of civic unrest, in 2016 the Four Day War, or April War, occurred in which the de facto Republic of Artsakh (Armenian allies) and Azerbaijani forces fought over a region that has been long disputed for historical reasons. The Armenian government sent soldiers, while the Armenian people tried to support their troops by gathering funds and supplies. The possible political reasoning behind all of this caused citizens to distrust in the political process.

The combination of the disrepair of public services, the rise in poverty, and the civic distrust of their government led the Armenian people to rebel, thus marking the beginning of the Velvet Revolution. The Velvet Revolution was a series of anti-government protests initiated by members of the National Assembly, led by Nikol Pashinyan. The name ‘Velvet’ symbolizes the smoothness of the revolution, meaning no citizens were injured. As a result of the Velvet Revolution, Armenia’s old government was peacefully overthrown, and later became governed by Prime Minister Nikol Pashinyan. During Pashinyan’s election, he promised to fight poverty and to provide citizens with a better life. However, the damage caused by almost 30 years of government disregard could not be remedied overnight. The government has started to address public works projects, such as building roads and raising wages, but the people expect more rapid development.

To address the people’s desire Anna Hakobyan, the Prime Minister’s wife, has since founded the “My Step” foundation. She focuses primarily on women and children’s issues because she considers women and children to be the most underserved populations in Armenia. The goal of the foundation is to contribute to the empowerment of human capital deriving from the priorities of Armenia’s sustainable development. The foundation hopes to solve problems involving culture, education, healthcare, environment and social security. My Step hopes to

---


accomplish their goals in three steps: 1) Informing potential sponsors of their ideas for improvement; 2) Securing funding and adopting proposed project plans; and 3) Following through with proposed project plans as well as the foundation’s own projects.

My Step currently focuses on five sectors of work: Public health, education, culture, environmental protection, and social welfare. My Step plans to combine the sectors of public health and education by solving problems of sanitation and lack of gymnasium equipment in public schools.9

**Public Schools, Sanitation and Physical Education**

The lack of proper sanitation conditions in Armenian public schools was described by the Human Rights’ Defender’s Office in a 2019 study by physicians and representatives of the Human Rights Defender. The study found that public health standards given by the World Health Organization (WHO) are not being met in the 121 schools and 80 kindergartens in urban and rural areas that were randomly selected for the study. The study found many rural schools had outhouses for bathrooms, often without functioning taps or hot water. Currently, 86% of schools and 56% of kindergartens do not have hot water. The lack of hot water makes it difficult to have proper sanitation as hot water is an important factor in handwashing. Some schools only had one working faucet, which has caused infectious disease outbreaks in some schools and negatively impacted students. Moreover, a clear lack of basic hygiene in schools is seen by the lack of soap, toilet paper, hand dryers, and/or hand towels.10 Having dirty bathrooms with improper conditions can be problematic for students. Furthermore, some students avoid the restrooms altogether as they would rather deal with physical discomfort than use them, which may make it more difficult to concentrate on learning.11

In addition to the lack of sanitation, schools do not provide facilities for disabled people. The study found 78 out of 80 kindergartens and 113 out of 121 schools did not have handicap accessible restrooms.8 These numbers are alarming because of recent reforms the Armenian

---

government has implemented. In 2017, the government planned on removing disabled children from state-run institutions, moving them to their family homes, and into their community schools to receive a better education.\textsuperscript{12} State-run institutions are used to segregate disabled children from other children, but a law was passed providing funding for these students to be integrated into mainstream, community schools.\textsuperscript{13} However, due to the lack of facilities, these students have been isolated and excluded from the resources available to their fellow students. While the government was trying to create a more inclusive environment, they actually created more learning obstacles for the disabled students by moving them to a foreign environment not equipped to handle their learning and physical needs. This misguided law has not only failed to give disabled students access to better education but has actually regressed the current conditions disabled students are experiencing.

**Public Health**

Worldwide, poor sanitation is linked to the transmission of a number of diseases and contributes to malnutrition.\textsuperscript{14} “A WHO study in 2012 calculated that for every US$ 1.00 invested in sanitation, there was a return of US$ 5.50 in lower health costs, more productivity, and fewer premature deaths”.\textsuperscript{12} An investment into sanitation improvements could therefore have a large return on investment and improve citizens' health.

According to the WHO, health is the "state of complete physical, mental and social-well-being and not merely the absence of disease or infirmary".\textsuperscript{15} This is a clear distinction, as health is not exclusively the absence of ailments, but the overall welfare of the people. Governmental public health programs are designed to enhance the lives of people by encouraging healthier lifestyles and protect them from injury and disease.\textsuperscript{16}

Poor sanitation also contributes to broader adverse outcomes such as malnutrition and is a major cause of risk of anxiety, especially for women and girls. A study done by the Department of Behavioral Sciences and Health Education at Emory University found that women suffer from high levels of anxiety, depression, and distress when defecating or urinating while experiencing sanitation insecurity. The study also found that women can experience negative physiological impacts related to sanitation issues.

In Armenia, public health officials are concerned with malnutrition, especially for children, and unsafe sanitation practices. The implications of improving the public health in Armenia are clear, so the government has highlighted its importance. Article 36 of the Armenian Constitution states parents are obligated to take care of all aspects of their child’s upbringing including education and health. Through the Armenia Demographic and Health Survey, the government can conclude if educational and health-related needs are being met, but it is not always possible for a parent to provide for those needs. A common effect of malnutrition is stunting of growth, caused by poor nutrition or infection. The lack of sanitation can also contribute to diarrhea, a major concern in public health and a leading cause of disease and death among children under five years old in low- and middle-income countries. In Armenia, diarrheal diseases are the 6th highest cause of death. In the most recent survey, 9% of the children under age five were stunted, 4% were wasted (refers to the children being unproportionally thin for their height), 3% were underweight, and 14% were obese. Stunting is almost twice as common in rural areas than urban ones (13% and 6%, respectively) and directly corresponds to malnutrition in children. Only 25% of children from six to 23 months meet the Armenia Ministry of Health dietary standards, which is likely the cause of malnutrition. Even though malnutrition

is a clear cause of stunting, other issues such as the lack of sanitary practices have also been proven to influence stunting.

Recently, a study found that with each additional time a child washed their hands, they became 14% less likely to have stunting.\(^9\) This study supports the claim poor sanitation causes stunting in children. Environmental Enteric Dysfunction (EED) is a trigger for stunting, and it is a condition caused by a buildup of bacteria. Promoting handwashing in schools and the addition of sanitation services in personal property could help decrease the cases of stunting within Armenia. In rural Armenia, where stunting is more prevalent, approximately 49% of the population uses sanitation services that include handwashing facilities with soap and water.\(^2\) In urban communities, the percentage of the population with access to these resources is 96%. More handwashing in public schools could help equalize the disparity between the number of stunting cases in rural and urban communities and improve overall health of children in rural areas.

**Worldwide Sanitation Standards**

Sanitation is defined as access to and use of facilities and services for the safe disposal of greywater and blackwater. Greywater is wastewater that comes from sinks, washing machines, and bathtubs. Blackwater is wastewater from bathrooms and toilets that contain fecal matter and urine. Currently, Armenia has no legislation, regulations, or standards providing an outline of the minimum safe sanitation needs for bathrooms.\(^3\) As a consequence of this shortcoming in sanitation policy, quality sanitation guidance for public bathrooms are not always available to Armenian citizens, especially those from more rural settings.\(^1\)

A safe sanitation system should separate human excreta from human contact at all steps of the sanitation service chain from toilet capture and containment through emptying, transport, treatment, and end use. Safe sanitation systems must meet these steps, so the system is consistent with the human right to sanitation, while also addressing co-disposal of greywater and blackwater, associated hygiene practices, and essential services required to function.\(^2\)

Access to adequate water supplies is a vital part of ensuring a safe sanitation service chain for operation (e.g. flushing, sewerage), maintenance, and cleaning of facilities. No

---


minimum requirements are prescribed, as these depend upon the context and include aspects such as water availability, type of facilities, number of users, cleansing requirements, and other local factors. These all require consideration when designing and implementing a comprehensive sanitation program. All water supplies for human consumption should follow WHO guidelines on Drinking Water Quality.24

Handwashing with soap after defecation and any potential contact with feces (e.g. child feces) should be promoted and supported by the availability of soap and water close to sanitation facilities. In public facilities, handwashing fixtures should be mandatory and included in routine inspection and monitoring schemes. Some public facilities lack plumbing to all of the bathroom fixtures, which could prohibit handwashing.

Sanitation interventions should be developed considering the full range of relevant transmission pathways of excreta-related diseases. Specific aspects inconsistently addressed through the sanitation service chain include safe disposal of child feces, measures for fly control, and consideration of animals as vectors of human feces. Despite having a higher pathogen load than adult feces, child feces are often considered harmless and therefore not disposed of safely even by those with access to sanitation facilities.25 Disposal of child feces in a toilet connected to a safe sanitation chain is the only safe method, where solid waste (garbage or trash) management systems for disposal of children’s absorbent underclothes (diapers) are not safe. Flies land on or breed in exposed human feces, including on toilet surfaces, and transport fecal matter and pathogens onto surfaces, food, and people. Measures for reducing these transmission pathways should be considered including emptying trash regularly and/or using natural pesticides to reduce flies.

**Needs Assessment and Considerations Before Renovation**

These sanitation standards must be applied to schools in Armenia to better conditions. To determine the public schools most in need of intervention, My Step is currently conducting a needs assessment of all public schools in Armenia. The needs assessment will account for

---


hazards associated with normal operating conditions, along with an assessment of potential exposure and risks to all groups along the chain – users, local communities, workers, and wider communities. The results of the assessment regarding the effectiveness of existing systems will allow the introduction of technical (e.g. improved containment or conveyance infrastructure), management (e.g. appropriate regulations), and behavioral interventions (e.g. to improve service provider practices) to manage risk of contamination. Sanitation interventions must also be coordinated with other water, sanitation, and hygiene measures, and safe disposal of child feces and management of domestic animals and their excreta to address all pathways of fecal pathogen transmission and maximize the health gains of sanitation. The selection of safe sanitation systems should be context specific and respond to local physical, social, and institutional conditions.

Considering these aspects would ensure the effectiveness of minimizing the risk of exposure to excrement. However, all methods of intervention need to be sustainable in terms of sustained functioning of sanitation services, as well as environmental and social sustainability. Social sustainability is only achievable if the intended user and community views the intervention as socially suitable. The design should be culturally appropriate and suitable to locally available materials and physical conditions such as water availability and ground/soil conditions. Taking local custom and traditions into account will affect the adoption, consistent use, functionality and sustainability of sanitation systems, they should be addressed as a fundamental part of sanitation program evaluations and studies, so users are less likely to revert to unsafe sanitation practices such as resorting to open urination and defecation.

Gymnasiums and Physical Activity

People who are physically active can have many benefits. One of these benefits is for their physical health because regular physical activity reduces the risk of the following: Cardiovascular disease, obesity, type 2 diabetes, colon cancer, and breast cancer. Physical activity can reduce risk of bone fracture, stimulate the growth of brain cells, and strengthen muscles and joints. Physical activity has also been found to improve mental health as it can

---

reduce symptoms of stress, anxiety, and depression and will in general improve self-esteem and wellbeing. Furthermore, physical inactivity is found to have a great economic cost. In a country where people are more physically inactive, there are higher health care costs, more absenteeism from work, and less productivity.

Lack of accessible sanitation facilities for students is apparent, and schools are also lacking adequate gymnasiums. Surveys on PE facilities and equipment showed that they are lacking in schools across the world. Inadequate facilities can have a great impact on the overall experience of the students with their PE programs. The facilities were noted to be limited or insufficient in 61% of schools across the world. Distinct differences were noticed in quantity and quality of facilities and equipment in the lower income regions of countries. The resources were not allocated between the different regions within a country, evenly. The maintenance of PE sites was also found to be an issue in 67% of European schools in 2012. Absence of proper facilities and equipment directly impacts the abilities of teachers to instruct students on proper PE curriculum. In a survey done by the Turpanjian Rural Development Program of the American University of Armenia, 38% of the students indicated that they would like a better gym and 35% responded that they would like a better physical appearance of the school.

In 2015, a new school gymnasium was opened in the Arteni School N1 in the Aragatsotn Region. The major renovations to this school included repairing floors and installing a heating system to the gymnasium. The students can now use the gymnasium for various activities such as a sports competition, after-school clubs, and summer school. The new gymnasium and these activities give students more opportunities to get their recommended amount of daily physical activity.

According to a study done by the Institute of Child and Adolescent Health of Armenia in 2013-2014, lack of physical activity in general is a sizable issue for students. This study was conducted among four groups: 11-, 13-, 15-, and 17-year-olds, to identify health, educational,

---

and social solutions to the current problems in Armenia.\textsuperscript{30} The WHO recommends children aged 5-17 “…should be engaged in moderate-to-vigorous physical activity for at least 60 minutes per day”.\textsuperscript{28} The study found many students in both urban and rural schools were not getting the recommended amount of exercise. It also found that although 60\% of students are signed up for PE classes three times a week, only 49\% of students between the ages of 11-15 and only 20\% of 17-year-olds attend PE classes three times a week, and nearly 6\% of the students signed up for PE do not attend classes at all.\textsuperscript{28} Based on these statistics, it is clear that most Armenian students are not receiving the proper amount of physical activity based on the standards of the WHO. In order to address this problem, the Armenian schooling system should provide their students with the time and resources to meet this standard and provide the necessary encouragement.

\textbf{Project Statement}

The goal of this project is to produce a toolkit that will aid schools in building functional bathrooms and gymnasiums for the public schools in Armenia, based on world health standards for sanitation, physical education, and health programs.

This project is sponsored by My Step Foundation. In completing the project, we aimed to improve sanitary and educational conditions for the children of Armenia. We designed cost effective and energy efficient solutions such as using solar panels or toilets with minimal waste of water. Our goal is not simply to renovate the facilities, but to use durable materials from local vendors, allowing the facilities to be easily maintainable and sustainable. We will be producing cost effective, scalable solutions that will remain available for possible future renovation projects.

We applied and implemented international best practices to Armenian bathrooms and gymnasiums. The schools in Armenia differ by geographic location, layout of pre-existing restrooms and gymnasiums, and by size of student population. So, we designed universal layouts of both gymnasiums and restrooms to be easily mass implemented in the public schools in Armenia most in need of intervention.

4. Methodology

The goal of this project was to develop a toolkit to aid in building functional bathrooms and gymnasiums for the public schools in Armenia, based on world health standards for sanitation, PE, and health programs. We aimed to prioritize sustainable, locally sourced, and environmentally friendly solutions. To achieve the goal, we accomplished the following objectives:

1. Define the target audience that will benefit from the school renovations and assess current sanitation conditions in public schools in Armenia.
2. Develop the toolkit based on the varying conditions and resources available at the schools and identify the best solutions for sanitation and gymnasium improvement.
3. Promote sanitation and physical activity within the school community.
4. Ensure sustainability of the project.

Define the Target Audience

Our initial step was to research Armenian schools’ demographics to better understand the audience and their perceived ‘normal’ regarding public health and sanitation. We also researched the current state of bathrooms and gymnasiums in schools by reading various studies that detailed the conditions at some of the schools. Then, the sponsor supplied rough data on the schools such as: The physical condition of the schools, if there was a water supply, access to hot water, and if a sewage system was present. The sponsor collected these data based on the electric grid in Armenia. We were given a rough estimate of these numbers. Obtaining these data gave us a rough estimate of the current conditions of schools and a starting point to begin research because we knew we would have to look into varying types of solutions based on the physical conditions of the school.

Develop the Toolkit

We designed the toolkit based on the initial research shown in the introduction and background, and the requirement that we meet the best basic standards for bathrooms and gymnasiums. The toolkit is intended to be a resource for our sponsor that has all of the possible conditions that a school might have we investigated, and our recommendations based on these conditions.
We identified sanitation standards around the world based on the recommendations of our sponsor and what they suggested. The standards used by the WHO were referenced because the WHO considers the basic standards needed to achieve acceptable conditions in regard to sanitation. Our sponsor had recommended we use the minimum standards to achieve acceptable conditions.

Then, we focused on different designs of public bathrooms and gymnasiums. Using the information that was gathered, as well as further background research into what a standard bathroom entails (sink hand dryers, sprinklers, etc.), recommendations were compiled for implementation of various sanitation systems, dependent on the schools’ demographic and environment by looking at other recommendations and by interviewing experts on the topic.

When examining possible solutions for bathrooms, research was conducted on the best materials, for each school condition, depending on climate, solar energy (if applicable), lighting and access to water and sewage lines. We looked into these factors as they were recommended to us by our sponsor.

We considered climate to see if solar panels should be implemented as places that are often sunny should use solar panels. To determine this, a solar map was used, and regions that received a certain amount of sunlight, between 5 and 4.76 Global Horizontal Irradiance (GHI), would be practical for solar panels. To get this information, we interviewed Mr. Norayr Benohanian, the Energy Efficiency and Renewable Energy Projects Coordinator at the AUA Acopian Center for the Environment, via Zoom. We prepared several questions about solar panels, and he showed us different solar maps and different kinds of solar panels and their uses.

Lighting and paint were other things that were also considered when providing recommendations. To get more information on this, we interviewed Ron Goodin, an architect with experience in building public schools. We interviewed him through Zoom and asked him questions we had prepared beforehand.

Access to water lines and different city sewers were important factors to consider when designing the toolkit because a lack of access to water and sewage lines impacts the feasibility of implementing a standard flush toilet system. If a school does not have access to either of these things, then a compostable toilet will be recommended.

The toolkit for gymnasiums was based on the building requirements of other countries. We used a combination of building requirements from America and Russia that were listed
online, and gymnasium renovations done by other Armenian organizations for public schools. America was chosen because school sports are very important in American education, so there is a large amount of information on locker space and requirements for gymnasiums. Russian school gymnasiums were also chosen because they had specific requirements for dimensions that would be more applicable to gymnasiums that are solely used for educational purposes rather than American gymnasiums that are also used for school sports training. Finally, renovations of Armenian public-school gymnasiums were also considered because they have had successful results for the students.

When constructing or renovating a gymnasium for students several factors were considered: The type of equipment that should be in the gymnasium, the number of students attending the school, how the school is planning to use the facility, and if there is room for a gymnasium. Other things that must be considered are dimensions of locker and shower rooms, and the number of lockers based on the number of students who will attend that class at a time. The available space in the school will be used to determine if the facility will be used as a multipurpose space, or if it will be used only as a gymnasium. Based on these conditions, we determined the best standards for a gymnasium.

Options were identified for bathrooms and gymnasiums that would be best suited to the specific school demographics based on school population, access to water and electricity, climate, and budget. Bathroom options were found by basing standards on case studies and standards from the World Health Organization. For example, the provision of light and a door lockable from the inside are particularly important when the bathroom is shared. Gymnasium options were identified by basing our standards on renovations done by other Armenian organizations and by finding requirements based on Russian and American standards. In doing this, a solution could be found for different school demographics. The aim was to keep materials and labor local so Armenia’s economy could benefit, and research was done to determine which solutions could be locally sourced. By completing this objective, we were able to finalize the design of the toolkit of the prototypes by considering all of the conditions of the schools and the materials and labor available. The end result for the toolkit was to include a cost estimate.

To develop the toolkit, we interviewed Alex Moseson, who had experience in working with farmers in rural Thailand. We spoke to him over Zoom and came with questions that we prepared beforehand. He encouraged us to use a PEW chart, which is a type of chart that lays out
all the options, the materials needed, and pros and cons. The options listed different solutions needed. For example, the toolkit for gymnasium equipment had different options for equipment based on price and age of students. Then, materials were listed as the type of equipment needed to fulfill that category. Pros and cons of each type of equipment were then listed. We decided to adapt this type of chart for different categories.

**Promote Sanitation and Physical Activity**

We understood what can be done to facilitate use of the newly renovated bathrooms and gymnasiums. To do this, we researched promotional materials for handwashing and physical activity and ways to get students to be more physically active.

Sanitation will be promoted in bathrooms by encouraging students to wash their hands. There are existing promotional materials provided by the Centers for Disease Control and Prevention (CDC). We translated them to Armenian so the schools could use them.

To promote gymnasiums and an active lifestyle, we used information from the CDC. The information broke down promoting physical activity in five components and gave a guide on how to achieve all of the components listed. We also used fact sheets, posters, and social media posts from the CDC. Although the promotional materials were written in English, they were translated to Armenian because they provided information that was applicable to all students.

**Sustainability**

A cost estimate of building a new structure must also be considered to produce the least costly option while still providing an appropriate solution. This must be accounted for in the toolkit to ensure that My Step has sufficient budgeting to renovate a school. Because schools will be paying for the operating and maintenance costs, we did not provide a cost estimate of this. To provide an initial cost estimate, we got several quotes from companies to get a range of costs.

We developed a maintenance plan for the recently renovated bathrooms and gymnasiums that will be based on maintenance for the bathroom and gymnasium designs that we have chosen. The My Step Foundation can then use our maintenance plan as a template for similar projects that are implemented in the future with other schools. The plan was created with the intention of teaching staff and faculty of the school about proper disposal of waste and care of the new facilities. It also focused on educating facility users on how to best care for the facilities and use
them properly. The gymnasiums will also need a maintenance plan for taking care of the floor, equipment, and locker rooms. Finally, we provided a maintenance plan for the solar panels by conducting online research and through our interview with Mr. Norayr Benohanian.
5. Results

In this section, we will discuss the bathroom and gymnasium solutions that we defined based on the objectives discussed in the methodology. All public-school conditions across Armenia and the best basic standards were researched to create a toolkit to define the best solutions.

Objective One: Define the Target Audience

The target audience of this project is the school students, the staff, and the Armenian community at large. The conditions of the school facilities available to the target audience are very different depending on the type of school. For example, primary and secondary schools will have different requirements such as toilet and sink heights or gymnasium equipment. Toilets and sinks must be shorter for primary school students than the heights for secondary students. Gymnasium equipment for primary school and secondary school students will also differ as primary school students can have playground equipment, while secondary school students will probably not use it.

Another very important consideration for the My Step Foundation is the current resources of each school. For example, some schools need major renovations as they have unreliable electricity or no access to hot water. Because of these conditions, it would make more sense to implement solar panels and non-flush toilets. Other schools might be in a relatively good condition and might not need new bathrooms or gymnasiums, just new equipment for gymnasiums. Therefore, these conditions will need to be considered when making our recommendations and schools will have the option to choose what they need as several options will be given.

Objective Two: Develop the Toolkit

Before developing the toolkit, sanitation standards and gymnasium standards were compiled. When the schools and our sponsor, the My Step Foundation, use the toolkits they should implement the standards listed below to ensure that the best possible renovations are done in the schools. Each toolkit will examine different topics such as bathrooms, gymnasiums, and solar panels.
Standards specify that a proper bathroom must be available, accessible, and acceptable. With regards to availability, there should be enough facilities, which would limit waiting times to an acceptable length while not discouraging their use or causing inconvenience. The bathrooms should be accessible for everyone, taking into consideration their age, gender, and the disabilities of the users. Where toilets are sex separated, offering a male and female bathroom, users should have access to toilets matching their gender identity.

With regards to acceptability, the structure surrounding the toilets should provide privacy and safety for the user. For example, the provision of lighting and a door that can be locked from the inside are particularly important when the bathroom is shared. Facilities for safe menstrual hygiene management should also be provided, such as a covered container for the disposal of menstrual hygiene products. A container should be sized according to the expected usage, with a safe disposal arrangement and schedule. Used menstrual hygiene products should not be flushed down or disposed into the toilet because they clog plumbing. These products are unable to break down quickly and would cause system backflow, which, in turn, may cause health hazards. Where plumbing systems lack acceptability at any point, leakage of excreta may occur, providing opportunities for human exposure and potential infection. These aspects are important to consider to ensure that the facility is satisfactory for the users with suitable operations and maintenance.

Concerning the table below, several notes need to be made. First, surrounding materials, wall and floor space to a point 0.6 meters (two feet) in front of the urinal lip and 1.2 meters (four feet) above the floor, and at least 0.6 meters (two feet) to each side of the urinal shall be lined with non-absorbent materials. Another thing to consider is that trough urinals are prohibited in schools. The number of toilets in each bathroom should be the same for females and males. The final consideration to make when renovating the toilets is that the area should be calculated based on at least 0.1 square meters (1.1 square feet).

Table 1: Recommended Bathroom Fixtures by Age Group (blue indicates males, pink indicates females)

<table>
<thead>
<tr>
<th>Grade/Staff</th>
<th>Toilet</th>
<th>Urinals</th>
<th>Sinks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten</td>
<td>1 toilet serves 1-20 people;</td>
<td>None</td>
<td>1 sink serves 1-25 people; 2 sinks serves</td>
</tr>
<tr>
<td></td>
<td>2 toilets serve 21-50 people;</td>
<td></td>
<td>26-50 people; Over 50 people, add 1 toilet</td>
</tr>
<tr>
<td></td>
<td>Over 50 people, add 1 toilet</td>
<td></td>
<td>for every 50 people</td>
</tr>
<tr>
<td></td>
<td>for every 50 people</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 toilet serves 1-20 people;</td>
<td>None</td>
<td>1 sink serves 1-25 people; 2 sinks serves</td>
</tr>
<tr>
<td></td>
<td>2 toilets serve 21-50 people;</td>
<td></td>
<td>26-50 people; Over 50 people, +1 sink for</td>
</tr>
<tr>
<td></td>
<td>Over 50 people, add 1 toilet</td>
<td></td>
<td>each additional 50 persons</td>
</tr>
<tr>
<td></td>
<td>for every 50 people</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary</td>
<td>1 toilet per 30 people</td>
<td>1 urinal per 75</td>
<td>1 sink per 35 people</td>
</tr>
<tr>
<td></td>
<td>people</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 toilet per 25 people</td>
<td>none</td>
<td>1 sink per 35 people</td>
</tr>
<tr>
<td>Secondary</td>
<td>1 toilet per 40 people</td>
<td>1 urinal per 35</td>
<td>1 sink per 40 people</td>
</tr>
<tr>
<td></td>
<td>people</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 toilet per 30 people</td>
<td>none</td>
<td>1 sink per 40 people</td>
</tr>
<tr>
<td>Staff</td>
<td>1 toilet serves 1-15 people;</td>
<td>1 urinal per 50</td>
<td>1 sink per 40 people</td>
</tr>
<tr>
<td></td>
<td>2 toilets serve 16-35 people;</td>
<td>people</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 toilets serve 36-55 people;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Over 55 people, add 1 fixture</td>
<td>1 sink per 40</td>
<td></td>
</tr>
<tr>
<td></td>
<td>for each additional 40 persons</td>
<td>people</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 toilet serves 1-15 people;</td>
<td>none</td>
<td>1 sink per 40 people</td>
</tr>
<tr>
<td></td>
<td>2 toilets serve 16-35 people;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 toilets serve 36-55 people;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Over 55 people, add 1 fixture</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>for each additional 40 persons</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The use of urinals equipped with a flush valve is recommended for use in new facilities because less water is wasted when flushing a urinal.\textsuperscript{33} A feature of urinals is that they allow for dual flush, a minimum of 3.4 liters (0.9 gallons) to a maximum of 6 liters (1.58 gallons), which is less than a regular toilet. The urinals are easier to maintain as well, since the surface is dry and there is less bacteria growth. Each individual unit that is hung on the wall should be more than 30 centimeters (11.8 inches) wide and the lip of the urine collection area should extend from the wall by at least 30 centimeters (11.8 inches). They should also be separated by modesty boards of no fewer than 30 centimeters by 80 centimeters (11.8 inches by 31.5 inches). To be handicap accessible, the rim of a urinal should be at a maximum of 178 centimeters (70 inches) above the floor, fewer than 76 centimeters (30 inches) wide, and 9 centimeters (3.5 inches) from the rim.

Another important factor to consider when renovating a bathroom is air quality. Proper air quality can be achieved by maintaining good air circulation, humidity control, room temperature, and air fresheners. An adequate ventilation system should be implemented as it will minimize smells and maintain an adequate temperature inside the toilet premise. It is one of the most important requirements for a well-maintained, dry, odor-free, hygienic toilet.\textsuperscript{33}

The equipment should be functional, without cracks or other defects. Entrances should not be located in front of the educational rooms, to avoid congestion. Sanitary facilities should be equipped with foot operated waste bins, toilet paper holders, hand dryers or paper towel dispensers next to the washbasins, toilet bowls should be equipped with seats compatible with cleaning and disinfecting chemicals. Installation of sinks should be done based on the age of the students: 0.5 meters (1.64 feet) for grades 1-4, and 0.7-0.8 meters (2.30-2.62 feet) for grades 5-11.

In addition to the standards listed above, schools should also have handicap accessible bathrooms. To ensure that schools do this, the following information is based on the Americans with Disability Act (ADA) standards. There needs to be seamless access into the handicap accessible stall.\textsuperscript{34} In any shared bathroom with more than three stalls, at least one has to be handicap accessible, with the handicap accessible stall being closest to the door. If there is only one stall in the bathroom, it must be handicap accessible. The stall needs to be able to be

\textsuperscript{34} Dinicu, V. (2020, April 12). Phone interview.
maneuvered by a wheelchair, which means a circle has to be drawn with a 1.5 meter (5 foot)
radius. The stall itself should be a maximum of 178 centimeters (70 inches) from the floor. The
toilet should also follow ADA recommendations. The toilet should be 43 to 48 centimeters (17 to
19 inches) from the floor. The flush valve should be easy to use, which means it should not
require a tight grip or twisting.33 There has to be a grab bar or handrail around the inside of the
stall. Grab bars around the wall should be 91 centimeters (36 inches) long or 107 centimeters (42
inches) long if they are on the sidewall.35 They should also be 84 to 92 centimeters (33 to 36
inches) from the floor, 3 centimeters (1.25 inches) around, and 4 centimeters (1.5 inches) from
the wall. Bars should be able to carry at least 113 kilograms of pressure (250 pounds of
pressure).

The sink should offer a minimum of knee and toe clearance.35 The faucet should be
relatively easy to turn on and off, which means they should not require a significant amount of
handling pressure. The lever handle should be turned on and off using one hand. The soap
dispenser and faucet can be no taller than 122 centimeters (48 inches).

The trash can should be recessed, which is a combination paper towel dispenser and trash
receptacle. The toilet paper dispenser should be 18 to 23 centimeters (seven to nine inches) in
front of the toilet, in front of the sidebar, and should be 122 centimeters (48 inches) above the
floor. The restroom should also have an ADA compliant menstrual hygiene product dispenser,
which should allow individuals to get feminine products without having to reach or grab tightly.
Doors should be easy to open and grab with one hand and should also be 81 centimeters (32
inches) wide at a minimum.35

While there are no worldwide standards for gymnasiums, there have been other
organizations, the Children of Armenia Fund and the Paros Foundation, that have renovated
schools in Armenia and found that the students greatly benefited from these renovations. There
are also some standards from America and Russia on which we will base our recommendations.

A proper school gymnasium should have even flooring, painted walls, locker rooms for
students to change clothing, equipment storage closets, shower rooms, and be heated during the
winters.36 During renovation, the basic necessities of the gymnasium must be the first focus. For

https://parosfoundation.org/project/knights-of-vartan-school-106-gym-renovation/
example, if the flooring is uneven before the renovations, the floor should be removed, and concrete should be poured for new floors. If the paint on the walls starts to crack, they should be stripped and repainted. Heating is a very important feature that should be included in a gymnasium because winters in Armenia get very cold, as in the coldest parts of the country it can be -46 °C (-50.8 degrees Fahrenheit) and it would be difficult to exercise while wearing winter clothes.\footnote{37}

Locker rooms should have changing areas for men and women. They should be near supervised corridors, where the physical education teacher can supervise their students.\footnote{38} The number of lockers depends on the enrollment in a gym class. If there are fewer than 100 students enrolled in a class, there should be 60 single male or female lockers or 30 double-tiered lockers. If there are between 100-199 students enrolled in a gym class, there should be 120 single male or female lockers or 60 double tiered lockers. The locker rooms should have enough space to change. Each changing area, one for men and one for women, should be at least 14 meters squared (150 square feet).\footnote{39} The shower rooms should be no smaller than 12 meters squared each (129.167 square feet). The bathrooms should be at least eight square meters each.

The gymnasium flooring should provide students with a space where they can safely participate in PE activities.\footnote{40} Wood flooring and synthetic flooring are the two best options to provide students with this opportunity. Wood flooring is the more traditional surface used in gymnasiums. With a good maintenance plan, these floors can last about 40 years, making them a reliable choice. The use of quality wood impacts the performance of the material and improves the aesthetic of the gymnasium. Wood floors are far less durable than synthetic floors, as wood is greatly impacted by the moisture content in the air. Schools that have fluctuating moisture contents throughout the year should consider the use of a synthetic floor. Synthetic flooring is a more cost effective and resilient flooring option, with performance similar to wood. In schools where concrete must be poured before the floor is installed, synthetic flooring is highly

\footnote{37}{(n.d.). Climate of the World: Armenia | weatheronline.co.uk. Retrieved May 5, 2020, from \url{https://www.weatheronline.co.uk/reports/climate/Armenia.htm}}
\footnote{39}{(n.d.). СанПиН 2.4.2.2821-10 Санитарно-эпидемиологические .... Retrieved May 6, 2020, from \url{http://docs.cntd.ru/document/902256369}}
Concrete will have a high moisture content after being poured, so it would have to dry and be sealed before placing a wooden floor. Synthetic flooring can be placed sooner and is less impacted by the moisture in the concrete. It is also designed to be water- and damage resistant, making it well suited for multipurpose rooms. The main drawback of the synthetic flooring is the less appealing aesthetic, but it is a practical alternative to traditional wood flooring.

The gymnasiums, like the bathrooms, must also be ADA compliant. One important part of this is the entryway. There needs to be at least one entrance that is accessible, which means that there must be a ramp if there are stairs and there has to be a 82 centimeters (32 inches) clearing between the face of the door and the opposite stop. The door should also be able to be opened easily, with no twisting or great force.

When addressing handicap accessibility for lockers, there are three important factors to consider: The forward reaching requirement, the side reaching requirement, and the turning radius recommendation. Both the forward reaching requirement and the side reaching requirement state that the maximum forward and side reach should be 122 centimeters (48 inches) and the minimum forward and side reach should be 38 centimeters (15 inches) off the ground. Front reaching means standing in front of something and reaching forward, while side reaching means standing in front of something and reaching sideways. The turning radius has several requirements. The lockers should be placed so the door can fully swing open and so the wheelchair has full turning ability. Lockers should be at least 61 centimeters (24 inches) away from walls or obstacles and a floor space of at least 76 centimeters (30 inches) by 122 centimeters (48 inches), 25 centimeters (10 inches) for the door to swing. The front of the lockers should have a 152 centimeter (60 inch) turning radius for the wheelchair.

If schools decide to have a shower room, they should have one ADA compliant shower. Schools can use a transfer-type shower compartment. This must have a 92 centimeter by 92 centimeters (36 inches by 36 inches) shower compartment. The valve, faucet, and shower spray

---

41 Goodin, R. (2020, April 28). Phone interview.
unit must be between 97 centimeters (38 inches) and 122 centimeters (48 inches) from the floor must be across from the seat.

Figure 1: ADA Compliance Diagram for Lockers

When building the shower room, silicone caulk should be avoided. If it can fit in the bathroom, a one-piece fiberglass shower stall is probably the easiest of all types of shower surrounds to clean. Acrylic sheets are a poor substitute for an important reason – the edges must be finished with silicone caulk, and mold tends to grow on those surfaces over time. Once it develops on the edges of the caulk or behind it, the blackening is virtually impossible to remove without replacing the caulk, and it mars the appearance of the stall, no matter how clean the walls are kept. Granite, marble and other types of stone are porous and quickly become streaked with mineral deposits. A composite material should be chosen instead.33
There are no global or Armenian standards for sports equipment used by students so these standards will also be based on the type of physical activity in which children and adolescents should be engaging.\textsuperscript{45} In total, they should do at least one hour of physical activity. The three different kinds of activity are aerobic, muscle-strengthening, and bone-strengthening activities. The majority of the physical activity should be aerobic, with three days a week of vigorous-intensity physical activity. Examples of moderate-intensity aerobic activity include hiking, skateboarding, rollerblading, bicycle riding, and brisk walking. Some examples of vigorous-intensity physical aerobic activity include active games involving running and chasing, jumping rope, and sports such as soccer. Muscle-strengthening physical activity should be incorporated three times a week. Some examples of this include games like tug-of-war, push-ups, resistance exercises using resistance bands, rope or tree climbing, sit-ups, and swinging on playground equipment or bars. Bone-strengthening activities are especially important for children and adolescents as they gain the most bone mass before and during puberty. Bone-strengthening activities should be done three times a week and include activities like hopscotch, hopping, skipping, jumping, jumping rope, running, and sports such as basketball, volleyball, and tennis.

Based on these requirements from the CDC, schools can choose different equipment based on their budgets that will allow their students to have all of the necessary physical activity.

The toolkits have different options for bathrooms, gymnasiums, and solar panels based on several conditions listed and the needs of schools. Schools and the My Step foundation can choose what they think will best fit their needs and wants and plan a customized renovation using the charts below.

The first toolkit, Table 2, compares standard flush toilets to compostable toilets. In this chart, the following categories were explored: Access to water and/or sewage pipes, access to power, cost estimate, cold sensitivity, recommended number of users, and maintenance frequency. Schools should use the chart by considering the factors listed and decide what type of toilet they would like to install based on these factors.

Table 2: PEW Chart Comparing Standard Flush Toilets and Compostable Toilets

<table>
<thead>
<tr>
<th>Toilet Option</th>
<th>Standard Flush Toilet</th>
<th>Compostable Toilet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requires access to water and/or sewage pipes?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Requires access to power?</td>
<td>No</td>
<td>Most models no, but some models yes</td>
</tr>
<tr>
<td>Cost Estimate (per toilet)</td>
<td>Conventional toilets range from $100 to $2,000</td>
<td>Commercial composting toilets cost from $1,500 to $8,000 depending on the complexity of the system.</td>
</tr>
<tr>
<td>Cold Sensitivity</td>
<td>Functions above freezing</td>
<td>Does not compost efficiently in cold climates (temperatures less than ~65 °F, ~18 °C)</td>
</tr>
<tr>
<td>Recommended number of users per toilet</td>
<td>1-15 people (better suited for larger schools)</td>
<td>1-4 people</td>
</tr>
<tr>
<td>Maintenance frequency (not including regular cleanings)</td>
<td>4-5 years</td>
<td>Biweekly-bimonthly depending on frequency of use</td>
</tr>
</tbody>
</table>

Table 3 represents a chart that shows several options for gymnasium equipment based on different costs, the ages of students, and options for a multipurpose room based on pricing. The equipment marked by an asterisk should only be used outdoors. All other equipment can be used both indoors and outdoors, depending on the preference of the school.

Some schools might choose to use the gymnasiums for things other than PE classes. The multipurpose room can be used for whatever the school wishes but should have the materials listed in the inexpensive multipurpose room. Multipurpose rooms can be used to host clubs after school, to hold community events such as award ceremonies, to have an auditorium or cafeteria. Multipurpose rooms differ from gymnasiums because gymnasiums are only used to have PE classes, while multipurpose rooms should be used for both PE classes and whatever the school desires. These requirements are outlined in Table 4.

---

The purpose of Tables 3 and 4 is to present options for schools to choose. For example, if a school doesn’t have much outdoor space, faculty can choose to select a certain equipment set without the equipment that should be outdoors.

Table 3: PEW Chart Comparing Gymnasium Equipment for Different Age Groups

<table>
<thead>
<tr>
<th>Options</th>
<th>Materials Needed</th>
<th>Suggestions for Teachers</th>
<th>Pros and Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Gymnasium Equipment Kit</td>
<td>Jump Ropes, and Large Ropes</td>
<td>To ensure that students get the proper amount of activity, teachers should implement the following activities: walking, tug of war, pushups, sit-ups, running, skipping, jumping, and jumping rope.</td>
<td>Pros: Cost effective, students can still get the proper physical activity.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Con: Students will not have a lot of variety.</td>
</tr>
<tr>
<td>Mid-Range Gymnasium Equipment Kit for Younger Students</td>
<td>Jump Ropes, Large Ropes, Soccer Nets and Balls, Monkey Bars*, Chalk, and Volleyball Nets and Balls</td>
<td>To ensure that students get the proper amount of activity, the following activities listed above should be implemented. Teachers should encourage playing volleyball and soccer. They should also use the chalk to set up hopscotch. Teachers can also use the monkey bars during their physical education classes.</td>
<td>Pros: Students will have some variety in their routines, students will have some playground equipment by having monkey bars, students will be able to participate in team sports.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Con: More expensive than the basic gymnasium equipment kit.</td>
</tr>
<tr>
<td>Mid-Range Gymnasium Equipment Kit for Older Students</td>
<td>Jump Ropes, Large Ropes, Soccer Nets and Balls, Pullup Bars, and Volleyball Nets and Balls</td>
<td>To ensure that students get the proper amount of activity, the following activities listed above should be implemented. Teachers should also have their students play soccer and volleyball and have their students use the pullup bars.</td>
<td>Pros: Students will have some variety in their routines, students will be able to participate in team sports.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Con: More expensive than the basic gymnasium equipment kit.</td>
</tr>
<tr>
<td>Expensive Gymnasium Equipment</td>
<td>Jump Ropes, Large Ropes, Soccer Nets and Balls, Monkey</td>
<td>To ensure that students get the proper amount of activity, the following</td>
<td>Pros: Students will have all of the equipment suggested to get the</td>
</tr>
</tbody>
</table>
for Younger Students | Bars*, Chalk, Volleyball Nets and Balls, Playground Equipment*, Swings*, Skateboards, Tennis Nets, Tennis Balls, and Tennis Rackets | activities listed above should be implemented and use the new equipment. | proper physical activity, students will have a lot of variety in their routine, students will have a large amount of playground equipment |
---|---|---|---|
Expensive Gymnasium Equipment for Older Students | Jump Ropes, Large Ropes, Soccer Nets and Balls, Pullup Bars, Volleyball Nets and Balls, Resistance Bands, Skateboards, Rollerblades, Tennis Nets, Tennis Balls, and Tennis Rackets | To ensure that students get the proper amount of activity, the following activities listed above should be implemented and use the new equipment. | Pros: Students will have all of the equipment suggested to get the proper physical activity, students will have a lot of variety in their routine |

Table 4: PEW Chart for Multipurpose Room Requirements

<table>
<thead>
<tr>
<th>Type of Multipurpose Room</th>
<th>Materials Needed</th>
<th>Uses for this Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inexpensive Multipurpose Room</td>
<td>Insulation, heating, flooring that won’t scratch, tables and chairs</td>
<td>Clubs, before or after school activities, eating room</td>
</tr>
<tr>
<td>Expensive Multipurpose Room</td>
<td>Insulation, heating, flooring that won’t scratch, tables and chairs, speaker, stage</td>
<td>Clubs, before or after school activities, eating room, ceremonies, school plays</td>
</tr>
</tbody>
</table>

Solar panels can be especially helpful for schools that do not have continuous access to electricity or hot water, as solar panels can be used as an alternative for conventional methods. A combination of solar panels can be used depending on the school’s needs.

There are several considerations that influence if solar panels should be installed for both bathrooms and gymnasiums. One of these considerations is the amount of sunlight that a region gets. A solar map is one way to determine the amount of sunlight in a region and is shown in Figure 2. Areas that are red and yellow receive the most sunlight annually and would be more

---

preferable locations for installing solar panels, whereas areas in blue would not receive as much sunlight annually. While a certain region might score high on the solar map, it is important to make sure that the solar panels have direct access to sunlight. For example, if a school is surrounded by tall trees and a lot of shade, a solar panel would not operate as effectively.

Figure 2: Solar Energy Map of Armenia

As shown in Table 5, there are two different kinds of solar panels that would be useful for the needs of the schools. The table details the type of solar panels, their purpose, and the pros and cons of each of them.

---

Table 5: PEW Chart Comparing Types of Solar Panels

<table>
<thead>
<tr>
<th>Type of Solar Panel and Purpose</th>
<th>Pros and Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar Photovoltaic Panels: 49</td>
<td>Pros: Provides emissions-free electricity, cost is projected to lessen in the next years, operating and maintenance costs are low compared to costs of other sources of renewable energy, are more durable than other sources of renewable energy.</td>
</tr>
<tr>
<td>The purpose of these panels is to produce electricity.</td>
<td>Cons: Unpredictability of weather can cause lack of energy generation, investment in these panels is relatively high and have a relatively low efficiency compared to other solar panels.</td>
</tr>
<tr>
<td>Evacuated Tube Solar Collectors: 50</td>
<td>Pros: Produce more heat compared to other systems, can save money on gas, can produce hot water throughout the year.</td>
</tr>
<tr>
<td>The main purpose of these panels is to convert solar energy to provide hot water.</td>
<td>Cons: Unpredictability of weather can cause lack of hot water, might need a backup heater, not compatible with combination boilers, which are commonly used to heat water in schools.</td>
</tr>
</tbody>
</table>

Lighting is another important factor when renovating both bathrooms and gymnasiums. LED lights are recommended for both. Bathrooms should use regular LED bulbs, while gymnasiums should use standard “hixaby” fixtures with replaceable LED tubes. 51 There are many advantages and few disadvantages for LED lights. The pros of LED lighting include energy efficiency, a long lifespan, affordable, and directional lighting. 52 LED lights are more energy efficient compared to other lighting options such as fluorescent bulbs. Some LED bulbs are reported to have a lifespan of up to ten years. LED lights are becoming cheaper every year as they become more common. They also offer spotlight lighting or more omnipresent lighting depending on the type of bulb.

The cons of this type of lighting are their depreciation in brightness and their blue light. LED lights are reported to work at their peak for about 80% of their lifetime, which leads to their brightness decreasing. Blue light can be concerning as it is linked to health issues such as sleep deprivation.

Paint must also be considered for both bathrooms and gymnasiums. Both of these areas are considered to have high humidity so the paint must be able to handle that. The best kind of finish for this would be satin. This kind of finish is less likely to trap mold and is easier to clean compared to other finishes.

Objective Three: Promote Sanitation and Physical Activity

Promoting sanitation and physical activity can be done by giving schools promotional materials to distribute and by instructing schools on how they can set up programs to encourage the use of the new facilities.

After renovating bathrooms and making them suitable for students, handwashing must be encouraged to ensure that they are staying healthy and taking advantage of their new facilities. To encourage handwashing, posters and fact sheets should be put in the bathrooms. For younger students, more colorful graphics should be used to grab their attention. More informative fact sheets should be used for older students that will detail the steps to proper handwashing.

---


Figure 3: Promotional Handwashing Poster for Younger Students (1)\textsuperscript{55}

Figure 4: Promotional Handwashing Poster for Younger Students (2)
Figure 5: Promotional Handwashing Poster for Older Students
The example above can be used to promote handwashing for younger students because it will make handwashing seem more fun. It needs to be translated and we can give the translated graphic to our sponsor so schools can use them.

The figure above would be useful to put in bathrooms of older students. Some of their points might not be useful in schools because they are not applicable to students in schools. However, the format should be useful, especially the part about how to wash hands.

According to the CDC, there are five main components that promote physical activity of students: PE, physical activity during school, physical activity before or after school, staff involvement, and family and community engagement. PE is an academic subject in schools that should provide students with skills such as physical activity, physical fitness, and motor skills. By providing students with these skills, it will be easier for them to remain physically active.

Physical activity during school is another important factor when promoting physical activity for students. At an early age, schools should have recess. Recess is a period where students are encouraged to engage in physical activity and are monitored by trained staff and/or volunteers.

Physical activity before or after school should also be encouraged to ensure students have the proper amount of physical activity. Faculty should encourage students to walk or bike to school when possible. Schools can also provide opportunities for this by implementing physical activity clubs, intramural programs, and interscholastic competitions.

Staff involvement is an important component when promoting physical activity. Staff should serve as role models for their students by encouraging physical activity. They should also support any physical activity programs the school is trying to implement. The final component to promoting physical activity using CDC regulations is community and family involvement. This step is especially important because the family and community can encourage continued physical activity outside of school.

Another way of promoting physical activity is by using promotional materials such as fact sheets to advertise for parents and students. Below is an example of what that would look like when translated to Armenian. It can be used to encourage students, teachers and parents to engage in physical activities.

---

Figure 6: Promotional Exercise Poster for Younger Students (Translation 1) 57

Figure 7: Promotional Exercise Poster for Younger Students (Translation 2)
Figure 8: Promotional Exercise Poster for Older Students.
**Objective Four: Sustainability**

Our focus for ensuring sustainability was to provide a cost estimate of renovations and to provide a maintenance plan for bathrooms and gymnasiums. We did a cost estimate of bathrooms, gymnasiums, and solar panels to get approximate prices of the renovations. Providing this will ensure sustainability because it would allow the My Step Foundation to budget costs for their future renovation and maintenance.

When looking into the cost of solar panels, the solar panel company of choice should be able to give an accurate pricing model for installation and methods. Domestic manufacturers and importers offer monocrystalline and polycrystalline panels with power output from 250W to 335W per panel and are priced from 58,200 AMD ($121) to 109,000 AMD ($227) per panel.\(^{58}\) However, the approximate price can be calculated before choosing a company. There are several factors that need to be considered when calculating the number of solar panels needed, which can be used to calculate cost. To calculate this, how much energy the school uses, the roof’s usable surface area, and the climate and peak sunlight in the area need to be known.

There are several steps when calculating the cost of solar panels. The amount of energy must be converted to daily and hourly average energy usage. However, because solar panels don’t always operate at maximum efficiency due to weather conditions, it is recommended to add 25% to the daily energy use. To find the amount of energy needed per hour, the equation must be used: \( \frac{\text{hourly wattage} \times 1000}{\text{peak sunlight}} \). To find the total cost the following equation must be used: \( \frac{\text{hourly wattage}}{\text{solar panel wattage}} \times \text{cost of one panel} \). The cost of maintaining the solar panels depends on the company and how often they need to be maintained so this is something that cannot be calculated.

A maintenance plan of bathrooms and gymnasiums will ensure sustainability because it will keep the facilities in the best possible conditions for the longest period of time. It involves how to use the new facilities, how to clean them, and how often to clean them.

Daily cleaning should be done by cleaning the entire toilet, at least once a day, to properly sanitize it from use.\(^{33}\) It is suggested that toilet flush handles, door handles, latches, panels and edges, faucet handles, soap dispenser levers, and countertops should be carefully

---

cleaned daily. Additional cleaning and disinfecting should follow disinfectant product instructions for use in other areas within the bathrooms like toilet bowls, seats, and area surrounding. Areas that require less attention are mirrors, walls, and floors in common areas. These can be cleaned with a general cleaner or hot water, without the use of disinfectant (unless a bodily fluid is present). Good quality microfiber cloths and mops can be effective at removing germs from surfaces, and they work best when they are allowed to dry between uses. A fixed schedule should be used to clean areas with accumulated stains or are hard-to-reach. These areas do not require cleaning every day, but it is important to sanitize them. Monthly, cleaning should occur to solve odor and stain problems, which cannot be removed during the more routine cleaning. Schools must decide their own schedule for cleaning based on their own individual needs. This process allows schools to keep the toilet facility in a safe, dry, and sanitized condition at all times.

To monitor the cleaning process, schools should use inspection cards inside of the bathrooms. This will ensure that the bathrooms are being maintained properly and routinely. The school staff members that are cleaning the bathrooms should be professionally trained, so they have the necessary skills to maintain the cleanliness and functionality of the bathrooms.

A maintenance plan for the gymnasiums has many aspects, but mainly focused on the two types of flooring. The wood flooring and synthetic flooring vary greatly in durability, making their maintenance plans different. It is also important to discuss a maintenance plan for the gymnasium equipment.

The wood flooring should be swept daily with a large dust mop to ensure that there is not a buildup of dust in the gymnasium. Schools are encouraged to use floor mats at the doorways to prevent excess dirt from entering the facility. Floor mats can also prevent water from damaging the wood, moisture on the wood floor causes many issues. Immediately cleaning any water spills or leaks off the floor is also a crucial part of the care. Proper maintenance also includes keeping the humidity in the gym relatively constant. High humidity will cause the floor to expand, and low humidity causes the wood to contract. This behavior will cause issues with the floor including voids and buckling. Wood gymnasium floors also require long term care.

---


Each year, the floor will need a new coat of finish that will continue to protect the wood underneath. Every eight to ten years, the floor will have to be sanded down to a layer with no finish coat. After sealing to this bare layer, it can be refinished again.

The synthetic floor system should also be swept daily with a dust mop. It can also be cleaned by mopping with a cleaning solution when dirty. Damage to this kind of floor is rare, the most common kind of damage being scuff marks, which can be removed by scrubbing the area with scuff mark cleaner. Synthetic floors are specifically designed for durability, so they need very little maintenance.

Gym equipment should be properly stored in an indoor storage closet located within the gymnasium or multipurpose room. This storage space should have double doors and enough space to allow people to access the equipment with ease. Equipment located in the closet should be stored and marked in an orderly fashion.

Solar panels do not require too much maintenance as they should last 25-30 years with no maintenance other than regular cleaning. The only maintenance needed is a cleaning and dusting about two to four times a year, which can be cleaned with a garden hose and clearing snow off of the panel. Photovoltaic panels and solar thermal heaters require different kinds of maintenance, but both require regular cleaning and clearing off snow. Photovoltaic panels will need to have inverters or batteries replaced in their lifetime. Solar thermal heaters need to have the antifreeze replaced occasionally, as long as the tubes and valves are still working.

---


6. Recommendations and Conclusion

The guidelines in the Results section can be used by the My Step Foundation, and the recommendations below can be used to assist in their bathroom and gymnasium renovations.

**Objective One: Define the Target Audience**

When renovating bathrooms and gymnasiums for public school bathrooms, schools that need renovations more should be prioritized. There are some schools who do not have access to hot water, heat, unstable electricity, or proper facilities. Schools that have any of these conditions or a combination of these conditions should be prioritized because the renovations will cause students and faculty to be more positively impacted than students and faculty that have access to better conditions. The My Step Foundation can decide on this on a case by case basis.

We also recommend that the My Step Foundation get in touch with UNICEF Armenia. UNICEF is working on renovating 20 schools, focusing on bathrooms and handicap accessibility. Because of the similarities, we suggest that the two organizations share their findings and what schools they plan on renovating as to not renovate the same schools.

**Objective Two: Develop the Toolkit**

Regarding the standards, all of the sanitation and gymnasium standards should be implemented because they are the best basic standards considering WHO and international standards. There should be special care taken in closely adhering to the guidelines for dimensions and construction when implementing handicap accessible facilities because the dimensions given allow for seamless movement for someone who uses a wheelchair.

Considering bathrooms for younger students, all of the facilities such as toilets, sinks, and toilet paper should be lower than the recommended heights because the students are shorter.

When deciding between compostable toilets and flush toilets, several things need to be considered.\(^64\) The ideal temperature for compostable toilets should be between 60 °F (15.5 °C) and 100 °F (38 °C) for optimal performance. If these temperatures cannot be maintained, then the toilet can be prepared for the colder extremes. Compostable toilets should be installed when

---

septic tanks cannot be installed, when plumbing cannot be installed, or if water is scarce in the area. If a school needs to install a septic tank or plumbing, a compostable toilet should be considered as it will be more cost effective to install as the initial cost of installing a septic tank and plumbing will greatly outweigh the cost of installing a compostable toilet. 

Multipurpose rooms should be implemented if a school does not already have designated space that will serve as space for clubs, before or after school activities, cafeterias, ceremonies, or school plays, and if the school can afford to implement the materials required for the multipurpose.

Solar panels are another important thing to consider. They should not be implemented if the schools do not get much sunlight because they will not be able to provide enough energy. For schools that do not have hot water, evacuated tube solar collectors should be implemented so the students and faculty can have hot water for proper handwashing. For schools that do not have stable electricity, solar photovoltaic panels should be installed to give the school stable electricity. If schools feel the need for solar power, then they should contact specialists who would give them an assessment on if solar power is ideal for their situation.

Objective Three: Promote Sanitation and Physical Activity

Students will get the best use of the new facilities in schools if there are promotional materials in the schools supporting sanitation and physical activity. The use of posters promoting proper handwashing techniques are recommended for students, as this can assist in the facility being used to its best potential. These promotional posters should be placed in all bathrooms, in a position where they can catch the eyes of students. Two different types of posters are recommended, one for younger students and one for older students.

Posters can also be used to promote PE classes and being physically active in the new gymnasiums. PE classes should have an increased importance in schools in order to help students engage in active lifestyles and get the amount of exercise that is recommended by the World Health Organization. Increasing attendance in PE classes for all ages will also assist in helping students stay physically active. Schools can also promote teams and clubs that are physically active, and competitions and games can be a fun way for students to be active. By promoting physical activity in students, it is more likely that they will exercise in their own time. Instilling
these habits in young students is more advantageous than trying to promote a lifestyle change for adults.

**Objective Four: Sustainability**

The project sustainability is reliant on a maintenance plan and cost estimates. The cost estimate is recommended to be used for school budgeting for future projects. The estimate is based on general pricings for types of products rather than specific models and will provide a comparison between the products. With so many schools receiving these facility upgrades, it is understandable that usage differences between models will mean that cost is not the only factor considered when making decisions.

The maintenance recommendations for the optimal state of bathrooms and gymnasiums are based on the equipment suggested for use. Upkeep and maintenance of the new facilities will be the responsibility of each individual school. Specifically, for bathrooms the recommended maintenance plan will include information on cleaning them and increasing longevity. Gymnasium maintenance is focused on the type of flooring and the gymnasium equipment. Both factors are highly dependent on the age of the students in the school. By offering the schools a basic maintenance plan, we will help them get an understanding of the steps they must take to ensure the durability of their equipment. With proper maintenance the lifespan of all the equipment will be extended, decreasing the overall costs.

In order to determine the success of implementation, a feedback survey should be sent, by the My Step Foundation, to schools who received a new bathroom or gymnasium. The survey will measure healthy lifestyle habits and WASH behavior, which is a safe hygiene practice. Although the survey might not be able to be distributed during the duration of this project, the results will help My Step learn about what went right in these renovations and what can be improved on in the future.

**Conclusion**

With the implementation of this project and these recommendations, the impacted schools will have an improved environment. The upgraded bathrooms will allow the students to have better sanitation and the gymnasiums will encourage students to have more physical activity. The improved sanitation will allow the students to focus more on their education,
instead of worrying about or being impacted by the poor conditions. The new gymnasiums and the increased physical activity will improve overall health of students, which will ensure fewer sick days and allow students to spend more time in school. Overall, both education and health will be positively impacted by the renovation of gymnasiums and bathrooms.
Bibliography

Christine Gregoire Quotes. Retrieved from https://www.brainyquote.com/authors/christine-gregoire-quotes


Diniciu, V. (2020, April 12). Phone interview.


Goodin, R. (2020, April 28). Phone interview.

guidelines-4-including-1st-addendum/en/


In Armenia, Life is Getting Better for Thousands of Marginalized Students. Retrieved from https://www.opensocietyfoundations.org/voices/slowly-surely-armenia-s-schools-embrace-students-all-stripes


Sanitary, Safe and Green School Restrooms. (2011, September 1). American School and