

# Barriers and facilitators of Splash's program on student WASH knowledge and behaviors in Addis Ababa, Ethiopia



Splash's school-based water, sanitation, and hygiene (WASH) program uses behaviour centred design (BCD), an evidence-based behavior change framework, as a guideline to ensure the program is implemented efficiently and effectively.<sup>1</sup> Splash conscientiously accounts for complex factors influencing the program implementation and outcomes.

This study seeks to understand which elements of the program activities and infrastructure have the most significant impact on student handwashing behavior.



## Research Question

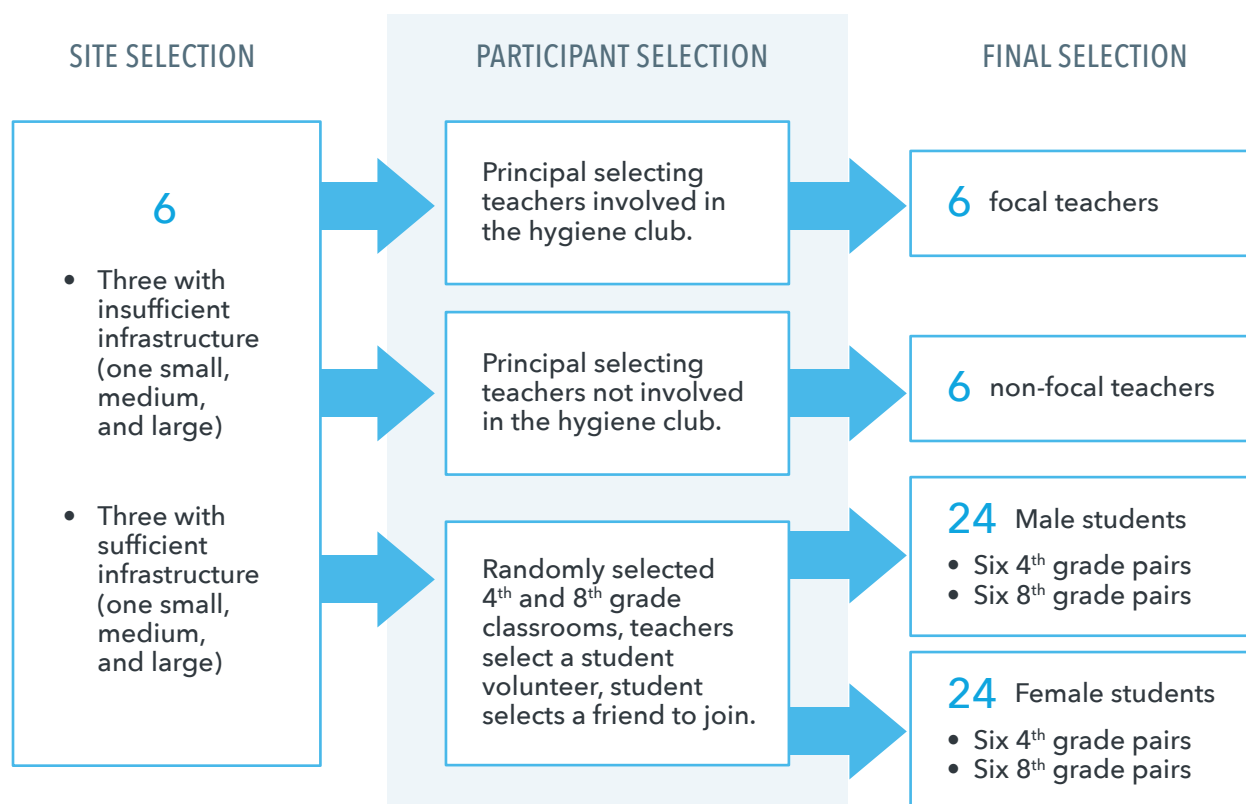
**What are the barriers and facilitators to handwashing among primary school students participating in Splash's program?**

## Design

The study uses a cross-sectional, semi-structured interview design. The data was collected in July 2022 in government schools within multiple sub-cities of Addis Ababa, where Splash had implemented its program. We chose six sites with varying school population: two small, two medium, and two large, using the 25<sup>th</sup>, 50<sup>th</sup>, and 75<sup>th</sup> percentiles of student populations as initial selection criteria. Within each student-population bracket, one school represented an infrastructure-sufficient condition and the other the infrastructure-insufficient condition; where infrastructure sufficiency was based on whether water was available for handwashing observation during pre-implementation.

At each site, we interviewed students, hygiene club focal teachers, and teachers not involved in their school's hygiene club. All sites included at least two boys and two girls in grades 4 and 8. Students were recruited by randomly selecting a grade 4 class and a grade 8 class from the list of classrooms for each site. Within each class, the teacher asked for a student volunteer, and they chose a friend of the same sex, and together they made up a single unit of analysis that we defined as a "friendship pair."<sup>1</sup> School principals assisted in the recruitment of focal and non-focal teachers. The following figure depicts the selection process of study participants.

**Figure 1. Selection process for study sites and participants**



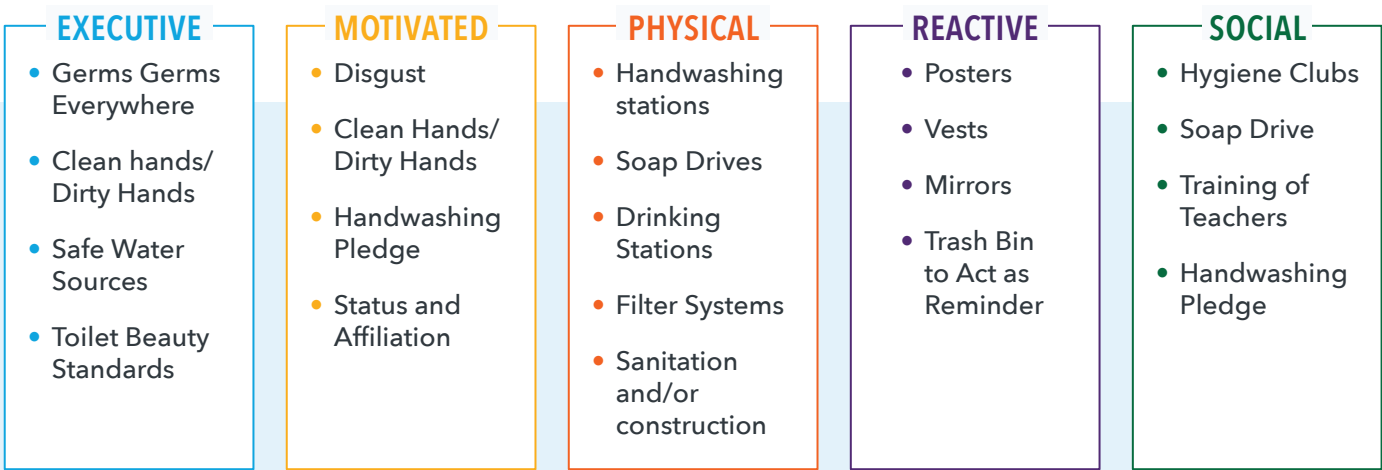




# Qualitative Analysis

The data were analyzed using a deductive thematic analysis.<sup>2-4</sup> The BCD framework published by Auger, R. & Curtis, V. was used to inform the analysis. Splash's program uses five determinants of the BCD framework: physical, social, executive, motivated, and reactive. Figure 2 shows Splash's streamlined BCD framework and examples of how the framework maps to its program design.

Figure 2. BCD Framework in Splash's program



# Results and Discussion

Table 1 summarizes the program's common barriers and facilitators found in qualitative coding for each BCD framework determinant.<sup>2</sup> Barriers are the components of Splash's program that prevent or impede the success of Splash's program, while facilitators enable and support Splash's program. Barriers and facilitators were coded into five different determinants as represented in the BCD framework. Themes were identified based on the frequency of coded responses in both the teacher and student interviews.



**Table 1.** Common facilitators and barriers for each framework theme as reported by focal teachers, non-focal teachers, and students.

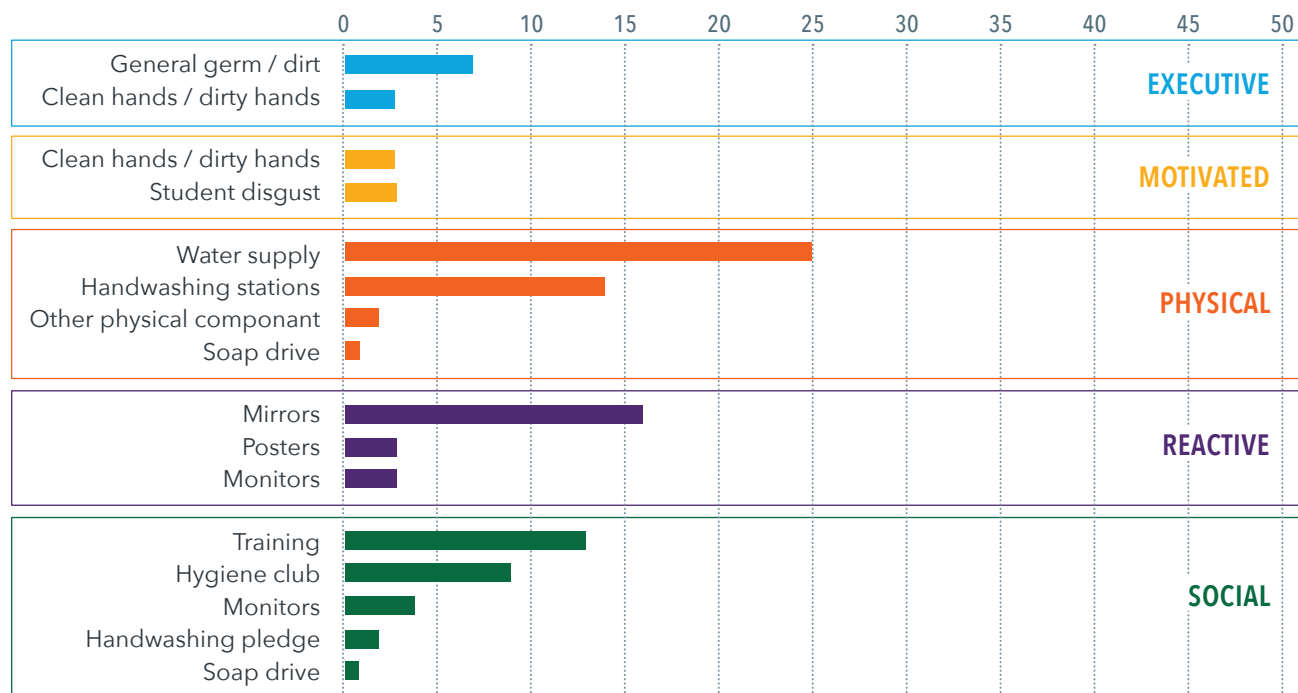
DETERMINANT	FACILITATORS	BARRIERS
<b>PHYSICAL</b>	<ul style="list-style-type: none"> <li>• The handwashing stations are well designed</li> <li>• The separation of handwashing stations and drinking stations has positive health impacts.</li> <li>• The water tankers have increased water supply.</li> </ul>	<ul style="list-style-type: none"> <li>• There is overcrowding at handwashing stations</li> <li>• Schools are unable to keep a constant supply of soap (students often steal it)</li> <li>• There still needs to be an adequate supply of water.</li> <li>• Concerns of sustainability/maintenance of new WASH structures - non-focal teachers</li> <li>• Students dislike that the soap is watered down.</li> <li>• Students often damage infrastructure and soap.</li> </ul>
<b>REACTIVE</b>	<ul style="list-style-type: none"> <li>• The addition of mirrors influences students to wash their hands and faces.</li> <li>• Students often recall posters as being present and helpful handwashing reminders.</li> </ul>	
<b>SOCIAL</b>	<ul style="list-style-type: none"> <li>• Teacher trainings allow teachers to feel knowledgeable and comfortable teaching students about hygiene.</li> <li>• Mini-media is a compelling reminder for handwashing</li> <li>• The hygiene club is an effective way of communicating education and getting students involved.</li> </ul>	<ul style="list-style-type: none"> <li>• It is difficult for focal teachers to carry out all their duties due to competing time.</li> <li>• Schools are unable to keep a constant supply of soap (students often steal it)</li> </ul>
<b>MOTIVATED</b>	<ul style="list-style-type: none"> <li>• Students find it important to be perceived as clean.</li> </ul>	
<b>EXECUTIVE</b>	<ul style="list-style-type: none"> <li>• Students understand that handwashing leads to fewer germs and better health.</li> <li>• Many students care about protecting the health of their friends and family through handwashing.</li> <li>• Many students remember and can explain the difference/importance of washing your hands with water vs. with water and soap.</li> </ul>	



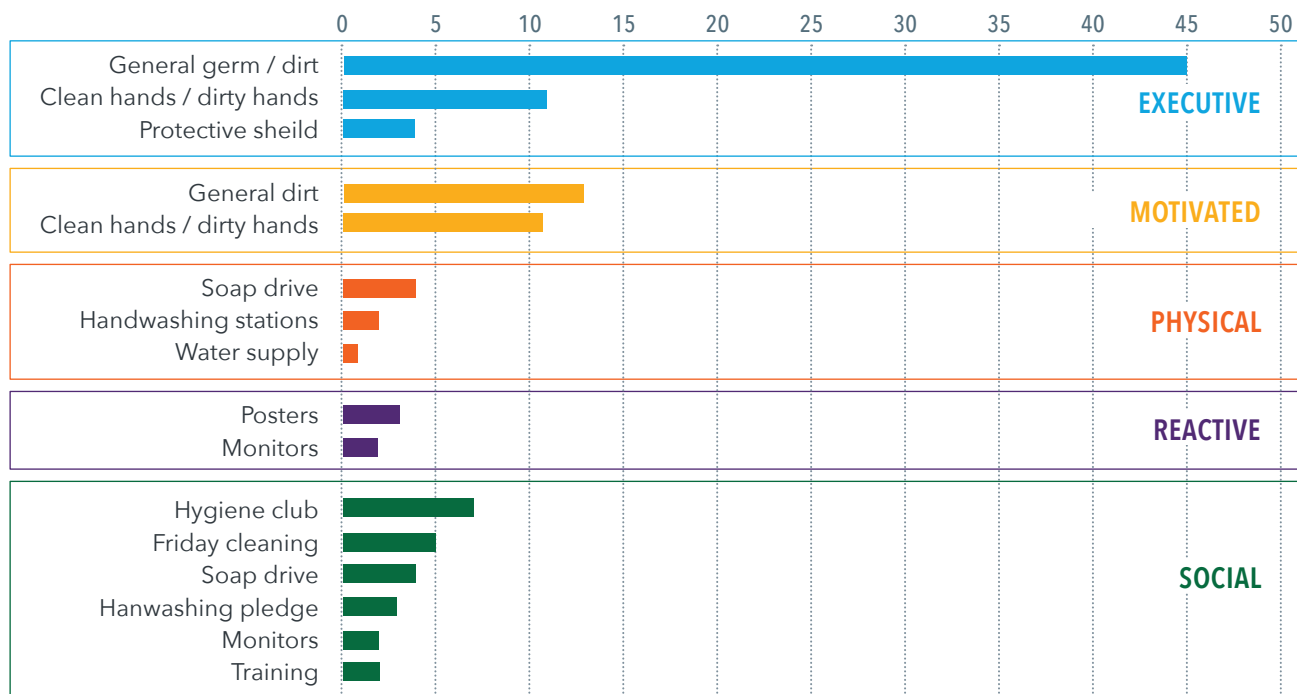
## FACILITATORS

Figures 3 and 4 show the frequency teachers and students discuss each theme that is a facilitator to Splash's program. Results show teachers perceive physical, reactive, and social factors as the greatest facilitators, while students discussed executive, motivated, and social factors as the greatest facilitators.

**Figure 3. Frequency of facilitators to Splash's program reported by teachers**



**Figure 4. Frequency of facilitators of Splash's program reported by students**





Due to schools' inconsistent water supply, Splash provided schools with new water tanks increasing their water availability. Both teachers and students perceived the increase in the water supply as a facilitator of students' handwashing in school. Some schools previously had damaged or limited tanks, and so the new storage tanks increased the water supply allowing teachers and students to wash their hands and drink water more frequently. One focal teacher explained:

**“ Prior to Splash, there was only one tanker and the school water supply comes once or twice per week. When this tanker is finished, there was no other option for handwashing. But when Splash fixed the water stations, it has provided the school six big tankers. There is also a generator that pumps water up. But before that, there was time water could not be filled. Now, all tankers could be filled with water due to the generator. Thus, it is perceived that problem of water shortage is minimized.”**

Teachers also expressed the teacher trainings were helpful to their knowledge about handwashing, drinking water, and other health issues. As one teacher explained:

**“ Thus, I have gained a lot of knowledge during the training which is a huge input for me; because we were washing with only water; but now, when we wash with soap, the things that come off our hands, even the water we drink, the foods we eat, could cause different health problems. Due to this knowledge, I have got good change in my life.”**

Focal teachers were able to use knowledge from these trainings to help train students and continue to reiterate lessons given by Splash. Another focal teacher discussed the trainings for both teachers and their students:

**“ The training that we received use practical demonstration on the importance of washing hand that it showed us how a hand which looks neat when it is seen by naked eye can be a contaminated hand. We also did the same while we train students.”**

Both teachers and students believed Splash's new handwashing stations helped to promote handwashing. The handwashing stations were designed to separate drinking and handwashing behaviors and were placed in locations conducive to handwashing. The separation of stations was perceived to benefit the school community's health. Mirrors, a reactive facilitator, were also included in Splash's handwashing stations and cited as positively influencing students' handwashing behavior.







When asked if the handwashing station influences student handwashing, one focal teacher explained that their locations and mirrors reminded students to wash their hands:

**“ Generally, yes. For example, the handwashing facility located near the school main gate, this has mirrors, is easily accessible when students come into the school. It also acts as a reminder to wash hands for they may have touched many things on their way to the school. The other is near latrine; this too has mirrors. It is right in front of the latrine, hence, reminds you to wash hands when you come out of latrine. In general, handwashing stations are placed in very good places. Especially, the mirrors, have influenced student's handwashing behavior.”**

Fifty percent of teachers (focal and non-focal combined) noticed that the newly installed mirrors influenced students to wash their hands and faces. One focal teacher discussed how the students interact with the mirrors:

**“ After the children washed their hands and their face in the fixed basin, they look at their face through the mirror to make sure they are clean and good-looking. But it is not permitted to touch the mirror by hand. There are six cleaners in the school who make sure that the students don't put their hands in contact with the mirror. I feel happy when I observe the children looking at their image through a mirror.”**

Students also provided insight to effective programming which led to increased handwashing. Eighty-eight percent of students understood the differences between washing their hands with only water versus washing their hands with soap and water. Forty-six percent of students explicitly referenced that they learned how soap removes germs compared to only water in school, as highlighted in this quotation:

**“ We wash our hands with only water our hands will not be cleaned that different viruses may remain in our hands. But if we wash with soap the viruses in our hands will be cleaned and removed to some percent. Thus, washing hands with only water will be disadvantageous while washing hands with soap will be advantageous.”**

When comparing motivation (disgust, status, etc.) and executive (knowledge of germs and health, etc.) factors, students recalled executive factors and lessons more than motivated ones. While six students discussed feeling disgusted or judged by other students regarding handwashing, 51 students discussed germs and health as primary reasons to wash their hands. Many students expressed concerns about keeping themselves, their families, and their friends healthy through handwashing. An 8<sup>th</sup>-grade boy provided his understanding of handwashing's impact on germs:

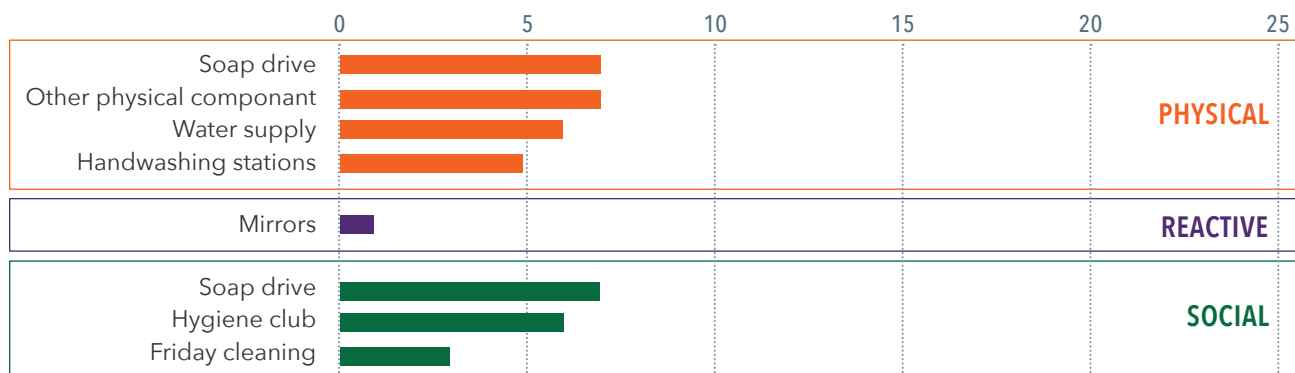
**“ Washing with water only will not remove the germs from our hands to completely clean our hands and we use soap to remove germs from our hands and clean them. Thus, washing with only water will not clean your hands but washing your hands with water and soap will do.”**



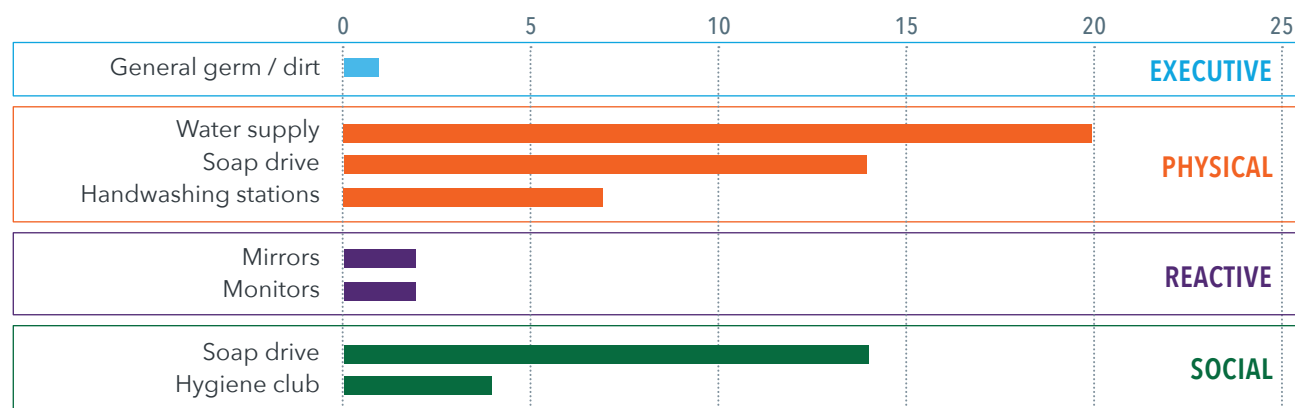
## BARRIERS

Figures 5 and 6 show the frequency teachers and students discussed each theme that was a barrier to handwashing. Overall, the results show that the physical and social aspects of the program had the highest frequency, which may suggest their importance as barriers to Splash's programmatic success.

**Figure 5. Frequency of barriers to Splash's program reported by teachers**



**Figure 6. Frequency of barriers to Splash's program reported by students**



Physical and social features of Splash's program were the most frequently discussed barriers by teachers and students. Fifty-eight percent of students complained of either no or poor-quality soap, overcrowding at handwashing facilities, and inconsistent water. Splash's program includes a school soap drive, but soap access can be inconsistent due to the soap being stolen by students. A focal teacher explains the difficulty in maintaining soap access:

**“Regarding soap, we could not manage to place at every handwashing station every day. We place soap, and it is stolen. Guards could not stop it. We have tried to tie it with string. However, we did not find that to be effective as the string becomes detached, lose, when the soap becomes very wet. What we do is, we cut the soap and place them. Even this are taken by some students.”**





When the soap drive is successful at providing soap at handwashing stations, students still complained about poor quality soap, sometimes causing them not to use it. One 8<sup>th</sup> grade girl complained about the soap quality:

**“ I used water only to wash my hands because the quality of the soap was not good. The soap was made available in liquid form. The soap will make color of our skin white. I am allergic to a soap that has a bad quality.”**

A non-focal teacher describes issues in both the quality and quantity of the soap supply:

**“ Less focus is given to the supply of soap that not only the quality but also the sustainable availability of soap at the facility that the soap is not made available all the time. The problem might be some students may take the soap from the facility to their home but this should be controlled that currently soap is sometimes not available for elongated time. The interest of the students to effectively wash their hands is the other problem observed, which in fact, depends on the quality of the soap availed by the school, which the students prefer to wash their hands with only water even if the soap is available.”**

Another main concern causing students not to wash their hands is overcrowding at handwashing stations and students improperly using the stations by damaging mirrors and sinks or stealing or wasting soap. Fifty percent of the teachers (focal and non-focal combined) explained that some students are asked to use old handwashing infrastructure or do not wash their hands because of overcrowding at Splash stations. One non-focal teacher noted that only half the school uses Splash handwashing stations while the other half uses old facilities to avoid overcrowding. Students also referenced other students not handwashing because they were rushing to get their lunch first and did not want to wait in lines at the handwashing stations. A 4<sup>th</sup> grade boy explained:

**“ Sometimes there are crowding at the handwashing station, so students might leave without washing.”**

While the city's water supply is outside Splash's control, they provided schools with new water tanks, improving schools' water access. Although water access increased because of these tanks, interviewees still expressed that it is difficult for students to handwash because of the lack of continuous water supply. These physical aspects are necessary for handwashing but are only sometimes available. Without a consistent water supply, soap, hygiene clubs, and trainings cannot be put to use. Although physical infrastructure alone is insufficient to trigger handwashing, respondents say that lacking physical infrastructure is still the key problem. As one focal teacher explained:

**“ For example, inputs, like water: The school gets water supply (from municipality) for not more than two times per week. Of course, the school has water tankers; but when their capacity is compared with the number of students, it is very small. There are around 1490 students. The number of tankers is seven, each with capacity of 10,000 litres. As water supply comes only twice a week, all tankers don't get filled; and even there are times water supply fails to come (i.e., when it is supposed to come); this is the first factor.”**



Students also expressed the impact of the need for more consistent water supply on their ability to handwash. As explained by an 8<sup>th</sup>-grade girl:

**“ To begin with there is severe scarcity of water in our school. Water is available here for a maximum of three days a week only. That could be a reason for not washing our hands. Everybody likes to wash his/her hands if adequate water is available.”**

Splash's hygiene club was formed to function as a club that uses students as leaders to promote handwashing at schools. While the hygiene club helped train students in the club, some students outside of the club did not know what the hygiene club was. This demonstrates that they may have little presence in some schools. Many non-hygiene club students seemed not to see or feel the impact of the hygiene club. Splash may want to consider expanding the training or visibility of the hygiene club so that non-hygiene club students are more aware of it. A non-focal teacher describes their view of the hygiene club:

**“ Honestly speaking it can be said the club is not functional that they only rarely coordinate students who hold brooms to clean the compound. They even do this rarely and irregularly when they hear something from the government. Otherwise, mostly the brooms are sat idle that there is no effective implementation and though the club is established, the members do not do that much effective work. In fact, there are times that the club tries to function well when the club is led by effective teachers and students. The club's activity is dependent on both the teacher and the student, who is assigned as focal that the activity of the club become fruitful only when both students focal and teacher focal are effective and committed. Otherwise, if the student focal is committed and the teacher focal is negligent then the club will be dead even if it is led by effective student. In general, in our school the club is not as functional as it was expected.”**

## STUDENTS DISCUSSING HANDWASHING AT HOME

Many students discussed sharing their knowledge about handwashing with their families and seeing a change in handwashing behavior in their homes. One 8<sup>th</sup>-grade girl discussed bringing handwashing knowledge home:

**“ Yes. I told them about how to hands that we were told by the mini-media. I told this to my younger brother, and brothers. Before I told them, it was not always they wash hands but sometimes, when they are about to eat food; and they wash hand at that time, just to meet an obligation. But now, they are washing (their hand), not only before they eat but also when they feel that their hand is not clean.” - 8<sup>th</sup> grade girl**

Some students noted that they mostly shared knowledge with their younger siblings. This was often reported to be either because their parents or older siblings already wash their hands or their family structure is not set up for children to advise their elders. One 8<sup>th</sup>-grade girl explained her family dynamic:

**“ There was no change that resulted from the education I gave them. [Why?] Children at home are less heard, their influence is low because they are considered a child.”**



## SPLASH'S OVERALL IMPACT

Although there are barriers to Splash's programs, many teachers and students felt that the program positively impacted handwashing and overall school health. Teachers noted fewer students going home sick, and students understood the importance of handwashing for their health. Several focal teachers explained the impact on the schools' health:

*“Some three years ago our students were just falling to the ground because of what they claimed to be a heart attack. But we are seeing nobody falling to the ground after Splash's intervention. Every student feels energetic and active. There were school dropouts before the intervention. They even used to buy water stored in bottles from outside. But, after Splash's intervention everything has changed for the better. We managed to produce a healthy generation. Everybody is washing his/her hands before and after meal. Children are accustomed to washing their hands with water and a soap after they comeback from a toilet room. I think 90% of our students have developed a positive attitude toward handwashing. We will keep on giving information to school children.”*

*“Before Splash, there was only one handwashing station. Students were drinking unsafe water. At that time, students were coming to the clinic complaining abdominal problem. But now, this has decreased; which is a good thing. Expects that this situation will continue; because, Splash staffs are currently coming and providing support.”*

*“Yes, it is related to the topics mentioned that we have provided the training effectively. Earlier, more students used to miss classes due to sicknesses, which is related to abdominal pain, that the students mostly tell as a reason for their absence from classes. They usually tell us they were absent because they went to health facility as they get sick. But now, as the students started to wash their hands and drink cleaned water, the number of students who miss their classes has decreased significantly that I can say now they don't miss classes. This is a significant improvement brought by the splash that not only the students but also the staffs of the school are beneficiary of Splash.”*





## Key takeaways

### EXECUTIVE

#### FACILITATORS:

Eighty-eight percent of students understand that they wash their hands with soap to eliminate germs, and 46% of students explicitly mentioned the difference between handwashing with only water and handwashing with soap.

#### BARRIERS:

It is difficult to know whether students are learning about germs from Splash's program or from other sources as they do not remember the actual names of the lessons, only their takeaways. For future research projects, finding ways to differentiate the sources of students' knowledge will be important.

### MOTIVATED

#### FACILITATORS:

Thirteen students mentioned disgust or judgment as a handwashing motivator showing that some students benefit from motivated behavior change lessons.

#### BARRIERS:

Students discussed motivated themes less than executive themes. When they did discuss them, it was usually about general disgust instead of a specific lesson.

### PHYSICAL

#### FACILITATORS:

Splash's water tanks have improved the consistency and quality of water supply in schools. The design, location, and availability of handwashing stations may increase handwashing in schools.

#### BARRIERS:

Although Splash's water tanks reportedly improve school water supply, they sometimes do not make up for the city's lack of consistent water supply. Handwashing stations are overcrowded and sometimes misused by students. The soap drive supplies poor-quality soap, which is often stolen from handwashing stations. We recommend that sufficient water and soap availability remain priorities for Splash.

### REACTIVE

#### FACILITATORS:

Mirrors were shown to be an effective way for students to use the handwashing facilities and even led some students to wash their faces. Students also mentioned posters showing handwashing steps as helpful reminders.

#### BARRIERS:

Some students and teachers do not see mirrors as initiating handwashing, but they may not know the behavior change theory behind mirrors at handwashing stations.

### SOCIAL

#### FACILITATORS:

Many students bring home handwashing knowledge to their families, mostly to their younger siblings. Students in the hygiene club benefit greatly from being in the club and have a better understanding of handwashing.

#### BARRIERS:

Some schools need to increase student awareness of the hygiene club, given that students outside the club do not have an adequate understanding of what they do. How can Splash increase hygiene club visibility for non-hygiene club students post-implementation?





## Study limitations

There is no causal impact in this study because the study is qualitative with no control group. Also, we do not have a baseline for each site about what WASH education, specifically handwashing lessons, was done before program implementation.

We asked students what handwashing lessons they had learned. Some of them brought up germ lessons that seem to be from Splash's study, but none of them explicitly used Splash's lessons by name. The students may not know the difference between Splash's lessons and other germ-related or handwashing lessons their teachers gave. Themes coded about understanding germ-related lessons have been assumed to be influenced by Splash's program.

Physical components of Splash's program were brought up most frequently by teachers and students. This may be because they are the most important or obvious components. The interview questions did not skew toward physical themes.

Both new and experienced teachers were supposed to be chosen by the interviewers, but only experienced teachers were interviewed. This may skew the samples towards the experiences and views of teachers who have worked at the schools for a long time.

The students interviewed were supposed to all be non-hygiene club students, but instead, a combination of hygiene club and non-hygiene club students were interviewed. Not expecting this, we did not ask whether students were in the hygiene club, so we only know whether they are in the club if they explicitly mention it. Hygiene clubs seem to have a great impact on the students involved. Some of the students interviewed were in the hygiene club, and they understood Splash's program and handwashing more than the non-hygiene club students interviewed.

## The so-what, now-what

### WHAT DO THESE TAKEAWAYS MEAN FOR SPLASH?

Based on our results, Splash's behavior change models are an effective way for students to understand the importance of handwashing and seem to increase handwashing and overall health in schools. Physical infrastructure like water and soap supply are major barriers to handwashing.

### WHY IS PHYSICAL INFRASTRUCTURE THE KEY BARRIER?

Although Splash's program implements water tanks and treatment systems, infrastructure remains a serious physical barrier because of intermittent water supply and poor quality and supply of soap at handwashing stations. Without physical components and infrastructure, respondents cannot wash their hands even with sufficient handwashing knowledge. While infrastructure alone may not trigger handwashing, many respondents believe the lack of physical infrastructure is still the key problem.



## NOW WHAT?

Because students could recall handwashing knowledge and teachers perceived handwashing increased, Splash should continue to teach their lessons to teachers and students. Splash may want to further improve schools' water infrastructure and soap drives. This could be done by increasing tank sizes or working with the city to improve the water supply. Splash's soap drive may be improved by improving the quality of soap sent to schools or installing soap dispensers, making it harder for soap to be stolen.



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