Cost-effectiveness of Water, Sanitation and Hygiene (WASH) promotion approaches used in basic schools in Ghana

April 2020

Authors

Emma Cheurfa, cheurfa@hydroconseil.com ; Camille Salaün, salaun@hydroconseil.com; Thomas Norotte, norotte@hydroconseil.com; Kofi Amegah, aamegah@ucc.edu.gh.

Contributors

Leticia Ackun, leticia.ackun@gmail.com; Niall Boot, nboot@unicef.org, Antoine Delepiere, a.delepiere@gmail.com; Johannes Federkeil, johannes.federkeil@gmail.com, Magali Puech puechm@yahoo.fr, Charlotte Mathieu chamathieu@gmail.com

Abstract

The methods currently used in Ghanaian schools (Traditional and Minimum Standards) need to be improved to make hygiene learning in schools effective. Some newer approaches include practice-based activities and the use of play and sports to raise awareness of hygiene and health. This research sought to measure and compare the effectiveness of different health and hygiene promotion approaches in Ghanaian schools, to estimate their implementation costs and to evaluate and endeavour to optimise their cost-effectiveness. The conclusion of the research is that the cost-effectiveness of hygiene promotion in schools can be improved by implementing the principles of these approaches with government resources.

Abbreviations

AIDS/HIV: Acquired Immune Deficiency Syndrome, Human Immunodeficiency Viruses; **DGIS**: Directorate General for International Cooperation, Netherlands; **FGD**: Focus Group Discussions; **GES**: Ghana Education Service; **HHETPS**: Health and Hygiene Through Play and Sports; **KAP**: Knowledge, Attitude and Practices; **MIT**: Massachusetts Institute of Technology; **MS**: Minimum Standards; **NGO**: Non-Governmental Organisation; **SHC**: School Health Club; **SHEP**: School Health Education Programme; **UNICEF**: United Nations Children's Fund; **US$**: United States Dollar; **WinS**: WASH in Schools; **WASH**: Water, Sanitation and Hygiene

Introduction

In sub-Saharan Africa, diseases associated with inadequate access to water, sanitation and hygiene are the leading cause of mortality among young children (19%), causing more deaths than HIV/AIDS, tuberculosis, and malaria combined (Boschi-Pinto et al, 2008). Poor WASH services also contribute to poor education, under-nutrition, stunting and other poor health outcomes for children (UNICEF, 2016).

Access to proper infrastructure is key. However, the impact of increased WASH coverage on health is being hampered by persistently poor hygiene practices. As countries around the world attempt to tackle the current Covid-19 crisis, good hygiene practices, including handwashing, are essential for limiting the spread of the virus. It is far simpler to encourage people to reinforce or continue to apply these habits when they have been acquired over a longer period than it is to call on people to adopt these good practices overnight. It is therefore vital that infrastructure projects are accompanied by programmes that promote good hygiene practices such as handwashing, the use of latrines and water, and food protection.

Education is an essential part of any sustainable behaviour change, especially during childhood. The acquisition of good hygiene behaviour in school is therefore extremely important for effecting behaviour change among pupils and for addressing WASH-related morbidity and mortality among children.

For these reasons, WinS is receiving increasing attention from WASH cooperation stakeholders, and is also gradually attracting the interest of governments. In many countries, WASH in Schools activities consist of teachers delivering hygiene messages as part of a traditional lesson. However, the results of this method are generally disappointing. In recognition of this situation, NGOs have developed innovative play-based methods to improve the efficiency of pedagogy.

Play-based learning is regarded as an important pedagogical approach for supporting academic and social outcomes (Weisberg, Hirsh-Pasek, & Golinkoff, 2013). Play is effective for learning because, by respecting children's culture, creativity and spontaneity, it encourages emotional, cognitive, social and intellectual development, as well as children's self-regulatory capacities. However, the added value of play-based approaches is not necessarily acknowledged and/or documented in the WASH sector. Moreover, substantial funding is required to implement these types of approach, which hinders their scale-up.

Adequate financing and budgeting are key factors for integrating successful and sustainable WASH programmes in schools. An international review of costing and financing WASH in Schools activities conducted in 2017 (Shannon et al., 2017) shows a lack of information around WASH costing, particularly for the software elements.

The aim of this research, financed by UNICEF Ghana, and implemented by Hydroconseil, a French consultancy firm, was to measure and compare the effectiveness of different approaches to hygiene promotion in schools, to estimate their implementation costs and to evaluate and endeavour to optimize their cost-effectiveness, in order to demonstrate to policymakers that the effectiveness of hygiene promotion in schools can be improved with national government resources.

Best Practice

Behaviour Change

The factors shaping our behaviour can be classified into 3 categories. An approach that takes these three categories, or levels, into account is likely to be more effective and efficient in bringing about behaviour change. To make change possible, the action must aim to effect change on all 3 levels and link the tools and stakeholders so that they act simultaneously (Central Office of Information, 2009). These 3 levels are: (1) **Personal or individual**: beliefs, knowledge, attitudes, skills, genetics; (2) **Social:** interactions with others (friends, family and community); (3) **Environmental/material**: the space in which an individual lives, their school, shops and local infrastructure, and broader factors, such as the economy (prices, taxation) and technology.

Research has shown that information is essential but not sufficient to trigger behaviour change. Human beings are not guided solely by reason and do not necessarily act as "homo-medicus" (Pinell, 1992), seeking to optimise their state of health. Knowing that something is bad for our health is not enough to induce us to stop. People continuing to smoke tobacco despite multiple prevention campaigns is a good example. **Therefore, to ensure the effectiveness of a prevention and health education approach, it is essential to supplement information with regular practice**. Learning by doing has been demonstrated to be a fundamental element of the change process.

For behaviour to be sustainable, it is considered essential to associate skill development with individual motivation and reasoning, therefore self-determination. This intrinsic motivation should not be based on external pressure, such as reward/approval or punishment/disapproval. The individual must believe that the

behaviour is pleasant and compatible with his or her "self-esteem", values and life goals. (Llwodraeth Cymru, 2012). Although groups can generate a catalytic effect and thus strengthen individual initiatives, motivation must be generated independently.

Play-Based Learning

There is a wealth of literature documenting the significance of play to children's learning in the early years (Pramling Samuelsson, & Johansson, 2006; Wood, 2004; Lester, & Russell, 2010). Early childhood is commonly defined as the period from birth to eight years of age, which corresponds to the period when a child attends kindergarten and primary school (Shonkoff et al., 2000).

Play-based learning is regarded as an important pedagogical approach for supporting academic and social outcomes (Weisberg, Hirsh-Pasek, & Golinkoff, 2013). It is effective for learning because, by respecting children's culture, creativity and spontaneity, it encourages emotional, cognitive, social and intellectual development, as well as children's self-regulatory capacities.

Pramling Samuelsson and Johansson (2006) also examined learning in play and play in learning. They concluded that **it is important to find alternative ways of perceiving and thinking about play and learning. These two elements must be considered as "indivisible entities" that stimulate each other and are a part of children's experience and understanding.**

Weisberg et al explicitly described the need for a balance between child-directed and adult-directed learning opportunities through games created by reflective and educated adults. This means that different types of play can be more or less productive in terms of pedagogy of learning. For instance, sociodramatic play provides the ideal environment for developing social, emotional, physical and self-regulatory skills, but it is not an ideal environment for school-based learning. This type of activity can be carried out at school but should be extracurricular. Teacher-guided play provides the ideal environment for school-based learning, but is not ideal for the development of social and emotional skills (Pyle, DeLuca, Danniels 2017). Furthermore, while digital play provides an opportunity to play with technology that will be critical to the career success of many children, it does not enable children to develop many of the physical skills that are essential for healthy development. Therefore, **each of these types of play has advantages and disadvantages, but in combination they provide the pedagogy needed for a child's holistic development and learning.**

The Effects of Hygiene Promotion in Schools

According to a review of evidence of the impact on WASH in Schools in Low-Income Countries (McMichael C., 2019), as of the end of 2018, only 38 peer-reviewed articles had examined the impacts of school-based WASH interventions in low-income countries, and only thirteen of these had measured changes in WASH knowledge, attitudes and hygiene behaviours among students. In addition, the majority of these articles had focused on analysing the effects of hardware only or hardware and software WASH interventions. Therefore, the effectiveness of hygiene promotion in schools remains poorly documented.

The Costs of WASH Interventions in Schools

A 2017 international review of costing and financing WASH in Schools activities (Shannon, 2017) revealed a lack of information around WASH costing, particularly on the software elements, as well as a lack of overall data for WASH in Schools settings.

The aim of this applied research was therefore to document and compare the effects of different hygiene promotion approaches on the knowledge, attitude and practices of pupils, as well as to assess the implementation costs and calculate a cost-effectiveness ratio of the approaches compared.

Methodology

The research evaluated and compared five hygiene promotion approaches currently being implemented in Ghana:

1. **Traditional approach**, which aims to provide key information to pupils about WASH, generally as part of a lecture-style lesson where the teacher explains good hygiene practices to the pupils and checks their personal hygiene;
2. **Minimum Standards (MS), which is an upgrade of the traditional approach**, as it satisfies all its requirements and includes all its principles, while adding new aspects such as School Health Clubs (SHC);
3. **Health and Hygiene Education Through Play and Sport (HHETPS)** developed by the NGO Right to Play, which focuses on play-based activities and pupil leadership;
4. **HHETPS-optimised,** which is based on the HHETPS approach but was designed specifically for the study and implemented through the SHEP unit of the Ghana Education Service;
5. **Football for WASH (F4W)**, developed by a consortium of six Dutch partners (DGIS, KNBV, Vitens Evides, Aqua for All, World Coaches, Simavi and Akvo) and which uses football as a catalyst for sharing hygiene messages.

The study took the form of a panel study conducted in five regions of Ghana (Greater Accra, Western, Northern, Upper East and Upper West).

A total sample of 20 schools were selected for the study, 4 per approach from the five regions. The schools were selected by respecting the north-south, and urban-rural divide of the country. Ten schools were selected from the north of the country and a further ten were selected from the south. Five of the northern schools were urban schools and five were rural schools. Similarly, five of the southern schools were urban schools and five were rural schools.

At the beginning of the assignment, we conducted a **baseline survey** (in January 2018) of 8 schools implementing the traditional approach, and 12 schools complying with the Minimum Standards approach. The objective was to assess the spontaneous Knowledge, Attitudes and Practices (KAP) of the pupils.

Once the baseline had been established, the sampled schools were provided with support to help them to convert to the new approaches, the aim being to measure the effect of these new approaches:

- 4 Traditional approach schools were converted to the Minimum Standards approach;
- 4 Traditional approach schools remained unchanged and continued to apply the Traditional approach;
- 4 Minimum Standards approach schools were converted to the HHETPS-normal approach;
- 4 Minimum Standards approach schools were converted to the HHETPS cost-optimised approach;
- 4 Minimum Standards approach schools were converted to the F4W approach.

In 2019, these newly converted schools were visited again and **KAP hygiene surveys** were once more carried out, this time through two successive campaigns: a midline in January-February 2019 and a KAP endline in April-May 2019.

The full analysis spectrum considered six categories of behaviour and observations: handwashing with soap (1); sanitation, safe excreta disposal (2); food hygiene and drinking water (3); health & hygiene promotion (4); cleanliness of the school environment (5); pupil empowerment and outreach to the community (6).

The following tools were used for data collection:

- **Pupil questionnaires**[1], mainly used to capture Knowledge and Attitude data.
- Observation checklists to assess:
    - hygiene behaviours and the enabling environment at the handwashing stations;
    - hygiene behaviours and the enabling environment at the sanitation facilities;
    - the environmental cleanliness of the school compound.
- **Focus group discussions (FGD) with pupils' parents** to gain an understanding of the outreach of the school's hygiene promotion to the communities; thus, these FGD were also used to capture Knowledge and Attitudes.
- **Focus group discussions (FGD) with school health clubs** to build a picture of the role and effectiveness of each specific health club in their school's hygiene promotion efforts.
- **Interviews with the head teachers** to collect general information on the school, the availability of cleaning materials, to assess school's provisions, staff dynamism and practices.

The data analysis included a KAP effectiveness analysis, cost assessment and cost-effectiveness calculation.

To analyse KAP **effectiveness**, the data collected was cleaned through reshaping and coherence tests. The scores were calculated using rating scales of between 0 and 100 for the baseline, midline and endline surveys. Scores were further calculated at school level for observations, interviews and FGD, and at pupil and at school level for pupil questionnaires. The KAP grid was then completed to include the average scores for the six themes and the Knowledge, Attitude and Practices for each school and geographical and approach category. Finally, the indicators at baseline, midline and endline were compared, and the t-test was processed to determine the significance of the variation.

The **costs** associated with implementing hygiene promotion activities were determined using the 'Ingredient Method' developed by the MIT Abdul Latif Jameel Poverty Action Lab (J-PAL) in 2012. This involved two steps. First, we specified all the ingredients required to implement the programme over one academic year (type and quantity of use, including manpower and equipment). Secondly, we collected unit cost information for each input to build an overall picture of the programme's cost and ensure comparability with the other programmes.

As a result, the total cost of an intervention is equal to the sum of all resources used, multiplied by their unit cost.

Cost-effectiveness is defined as the cost, in monetary terms, of producing a unit of effect through an intervention. Therefore, costs were presented in terms of marginal costs, and benefits in terms of marginal effectiveness (Torgerson et al., 1996). Thus, in our research, the cost-effectiveness of a programme is calculated as the marginal change in costs as a result of programme implementation, divided by the marginal change in KAP scores as a result of the programme.

$$Cost\ effectiveness\ ratio = \frac{Cost\ with\ approach - Cost\ without\ approach}{Effectiveness\ with\ approach - Effectiveness\ score\ without\ approach}$$

or

[1] Ethical considerations: parental approval, signed by the parents or other family member, was a prerequisite for interviewing pupils. This involved sending consent forms to all pupils prior to the campaigns before proceeding with random selection. We also applied for ethical clearance from Ghana Health Service, which we obtained in December 2017.

$$Cost\ effectiveness\ ratio = \frac{Marginal\ cost}{Marginal\ effectiveness\ through\ approach\ implementation}$$

The marginal costs and marginal effectiveness have been calculated using the Traditional approach as a 'comparator case', because this is the basic level of hygiene promotion in Ghana, when there is no specific intervention.

Results

Play-based approaches proved more effective than the classic approaches

On average, the theme that improved the most is Theme 4 (health and hygiene promotion). Theme 1 (handwashing) had improved at midline, but subsequently dropped between midline and endline meaning that its final level of improvement was low. **F4W** schools made great progress for Theme 1 and Theme 4 (this progress was mostly achieved at midline, and then sustained at endline). Improvements can also be observed for Theme 5 and 6, while there was no improvement for Theme 3 and a small drop for Theme 2. **HHETPS-normal** schools recorded great improvements in Themes 4 and 6, but little progress was made on Themes 1, 3 and 5 and the scores for Theme 2 fell. We can see that progress was greater for Theme 1 at midline, while it was more pronounced at endline for Themes 5 and 6. **HHETPS-optimised** schools also made substantial improvements for Themes 4 and 6, as well as improvements for Themes 1, 2 and 5, but there was a drop in the scores for Theme 3. **Minimum Standards** schools made a few small improvements for Theme 1; however, scores stagnated for Themes 3, 4 and 5 and fell for Theme 6, and there was a significant drop in the scores for Theme 2. **Traditional approach** schools made a few improvements for Themes 4, 5 and 6, but the scores fell for Themes 1, 2 and 3.

Different levels of statistical significance for effectiveness

F4W is the only approach where the significance of and improvement in the score is comparable for baseline-midline and for baseline-endline for the same indicators. Most of this significance is associated with the change observed between the baseline and midline, and this is sustained between midline and endline. **HHETPS-normal and HHETPS-optimised** approaches have the greatest number of indicators that are both significant and show a large or moderate improvement between baseline and endline (10 out of 15 indicators for HHETPS-normal, and 8 out of 15 for HHETPS-optimised). For all approaches, there is at least one indicator whose score fell significantly between baseline and endline. These indicators differ depending on the approach.

Different average rates of progress for each approach

The graph below shows the changes recorded in the approaches' scores across the KAP campaigns. From this, it can be seen that the Minimum Standards approach is the only approach with an average score that does not improve over time and even falls slightly (-2). Conversely, the largest improvement is recorded for HHETPS-optimised schools, which achieved steadily increasing total progress of +8 (+4 between baseline and endline, and +4 between midline and endline). **HHETPS-normal** schools also show a significant improvement (+7), but recorded a slowdown after midline (+5 from baseline to midline, and +2 from midline to endline). Although they had a lower baseline score than **HHETPS-optimised** schools, the HHETPS-normal schools made less progress than those schools using the optimised approach. **F4W** schools also recorded good progress (+6), most of which was made between baseline and midline (+6, with no significant progress thereafter). The final score achieved by F4W schools is comparable to that of HHETPS-optimised schools. It is also worth bearing in mind that, for both approaches, the schools had a very similar starting level (overall baseline scores are also very comparable).

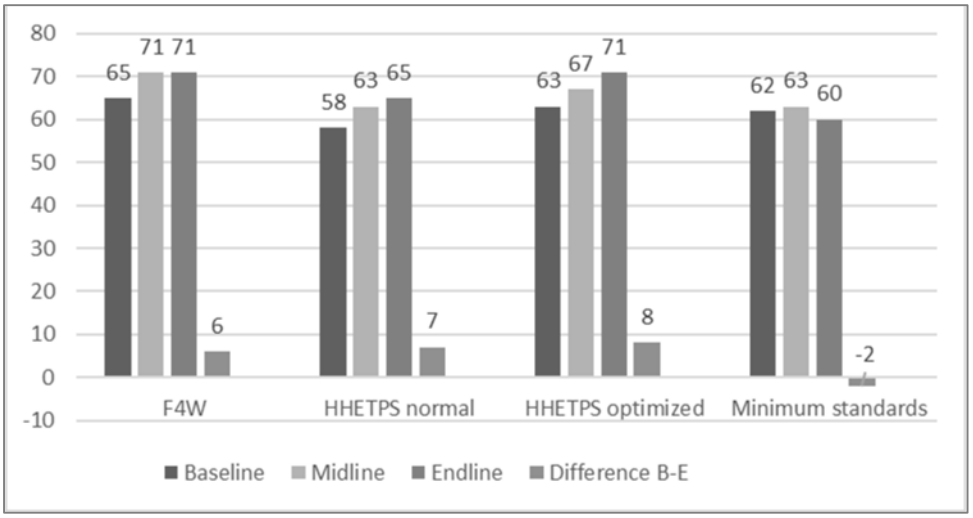

Figure 1: Changes recorded in the approaches' scores across the KAP campaigns

From the previous paragraphs, we can conclude that, with regard to effectiveness:

(1) HHETPS-optimised is as effective as the F4W (same endline score, and similar progression) and HHETPS-normal approaches.

(2) The scores recorded for the HHETPS-optimised approach are at least as good as or better than HHETPS-normal (higher starting level during the research due to the sampling, but a very comparable rate of progress thereafter). Both approaches rely on the same principles and philosophy, and have the same basis. The HHETPS-optimised approach is a more cost-effective version as it relies more on GES/SHEP for delivering training and monitoring, with minimum involvement by the NGO Right to Play. It is therefore possible to maintain good hygiene effectiveness with the optimised version of the HHETPS approach.

Implementation costs vary considerably between approaches

As indicated in Figure 3, the HHETPS cost of US$8.5 per capita per year is the highest, and this approach costs 2.5 times more to implement than the Traditional approach (US$3.4). The implementation method used for HHETPS-optimised makes it possible to significantly reduce its costs (17.6%) compared to approaches implemented by NGOs. However, to improve the approach in schools, the understanding and teaching of hygiene at all levels needs to be improved through cascade training. Thus, implementation of an approach such as HHETPS-optimised costs 84% more per capita than the Minimum Standards approach.

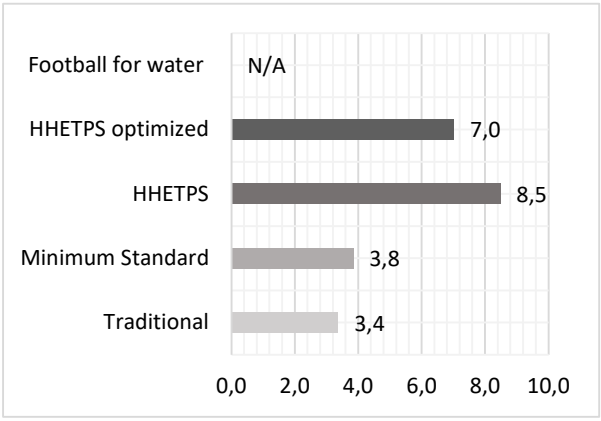

Figure 2: Cost of hygiene promotion approaches (US$ per pupil per year)

Cost-effectiveness is key for selecting the best value for money approach

The difference in scores between the approaches and the annual cost per pupil for each approach are presented below:

Table 1: Effectiveness scores and annual cost per pupil and cost-effectiveness ratio

Approach	Overall Effectiveness Score	Marginal Change in Effectiveness compared to Comparison Case	Annual Average Cost per Capita (US$)	Marginal Change in Costs (US$)	Cost-Effectiveness Ratio (US$)
F4W	68	8	N/A	N/A	N/A
HHETPS-normal	69	9	8.5	5.1	0.6
HHETPS-optimised	70	10	7	3.6	0.4
Minimum Standards	60	0	3.8	0.4	0
Traditional	60	0	3.4	0	0

The HHETPS-optimised approach has the best cost-efficiency ratio, followed by HHETPS-normal. This means that each Cedis spent is more efficient under the HHETPS-optimised approach than under the other approaches. A change in effectiveness of 1 point will cost an additional 2 GHC per pupil per year for HHETPS-optimised, and 3.2 GHC for the normal approach (US$0.4 and 0.6 respectively). Thus, to move from 'basic effectiveness', such as that achieved using the Traditional approach, to 'improved effectiveness', effectiveness needs to increase by 10 points, which will require +20 GHC per pupil per year for HHETPS-optimised.

For the Minimum Standards approach, the ratio is 0 because the effectiveness scores did not show a great improvement compared to the initial Traditional approach. The marginal effectiveness for this approach is negligible. **Thus, this approach cannot be considered effective as it stands, particularly when compared to the HHETPS approaches, for example**. In fact, Minimum Standards is slightly more expensive than the Traditional approach, yet does not achieve any significantly improved outcomes. This reveals that, compared to the Traditional approach, investing too little (US$3.8 per capita per year) does not produce additional results.

The cost-effectiveness ratio could not be calculated for the F4W approach due to insufficient data on F4W costs.

These results allow us to assume that there is a positive correlation between the amount invested per capita and the level of hygiene effectiveness in the schools where play-based hygiene promotion is being implemented.

Discussions

The play-based approaches have demonstrated greater average effectiveness; however, all of the approaches have improved effectiveness with regard to knowledge, leading to comparable scores at endline. This shows that the curricular activities are effective at improving the WASH knowledge of pupils. However, the highest endline score at school level is 85/100, with most schools scoring between 70 and 85. For all

schools, the scores for barriers against diarrhoeal diseases and food hygiene are particularly low. It would appear, therefore, that these themes are being insufficiently covered in current curricular activities.

With regard to attitudes, the score between baseline and midline improved for the play-based approaches only, especially attitudes towards handwashing stations, the friendliness of hygiene promotion, the importance of the cleanliness of the school, and the WASH role pupils think they can play in the school. The Traditional approach and Minimum Standards schools even registered a small drop in attitudes scores, which is not easy to explain.

An improvement in practices was seen in HHETPS-optimised and F4W schools, with a constant increase in scores between baseline, midline and endline. An improvement in practices between baseline and midline was also recorded in HHETPS-normal schools; however, scores fell between midline and endline, which can be explained by the fact that, as the NGO Right to Play was no longer active in schools from midline onwards, the teachers perhaps did not take full ownership of the approach. Practices in Traditional approach schools remained at a constant low level, while Minimum Standards schools experienced an improvement at the beginning of the study, then a small drop between baseline and endline. The NGO F4W continued to be active in schools between the midline and endline, so it is not surprising that progress was maintained. Thus, it would appear that the method that enables the best sustainable improvements in practices is HHETPS-optimised. It would be interesting to verify this result over the longer term.

Proceeding with correlation analysis, we identified factors that influence practices. The first of these is the amount of equipment available, particularly handwashing stations for handwashing practices. Although, as part of the sampling, we selected schools that had a minimum hardware requirement, the standard and amount of this hardware varied from one school to the next. It was possible to identify a correlation between the number of handwashing stations and the score for Theme 1, handwashing. These handwashing stations also included tippy-taps, which means that this type of low-cost and locally available facility is effective.

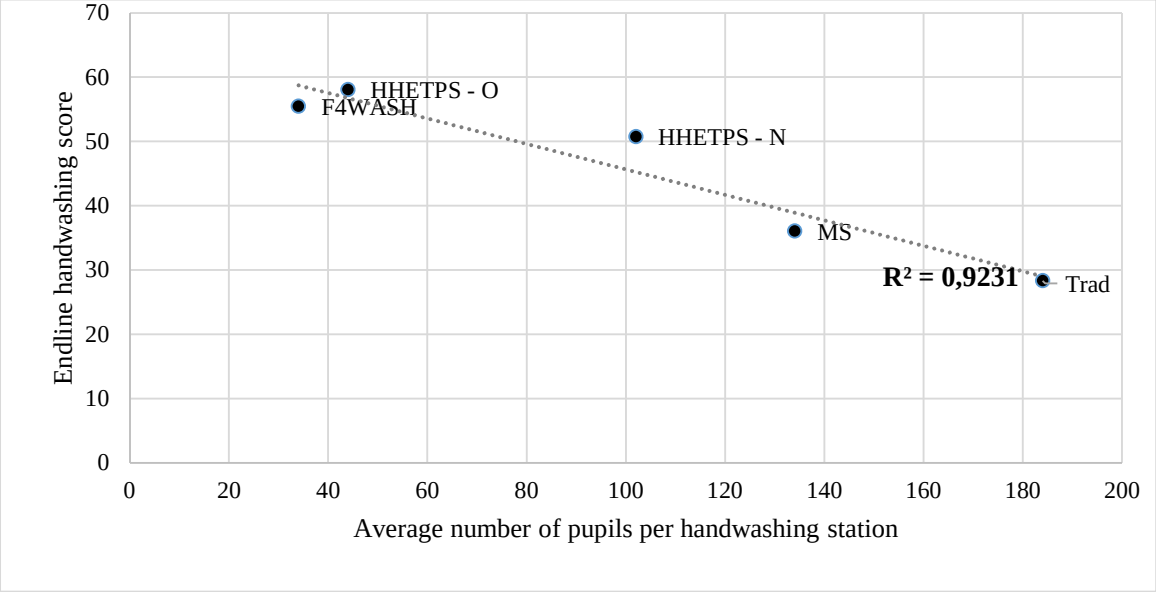

Figure 3: Correlation between the average number of pupils per handwashing station and the endline handwashing score

We have also found that the dynamism of teachers is a key factor that influences practices. The teachers dynamism score was calculated for each school based on factual information collected, including: the regular provision of soap; attention paid to pupil handwashing by teachers; cleanliness of the compound; existence of a school cleaning plan and division of responsibilities; activities undertaken in the communities in the past year; pupils' assessment of the friendliness of hygiene education, as well as whether or not tippy

taps were put in place to offset a lack of handwashing stations. The correlation with the endline practice score shows the importance of this dynamism from teachers for fostering good practices among the pupils in their schools.

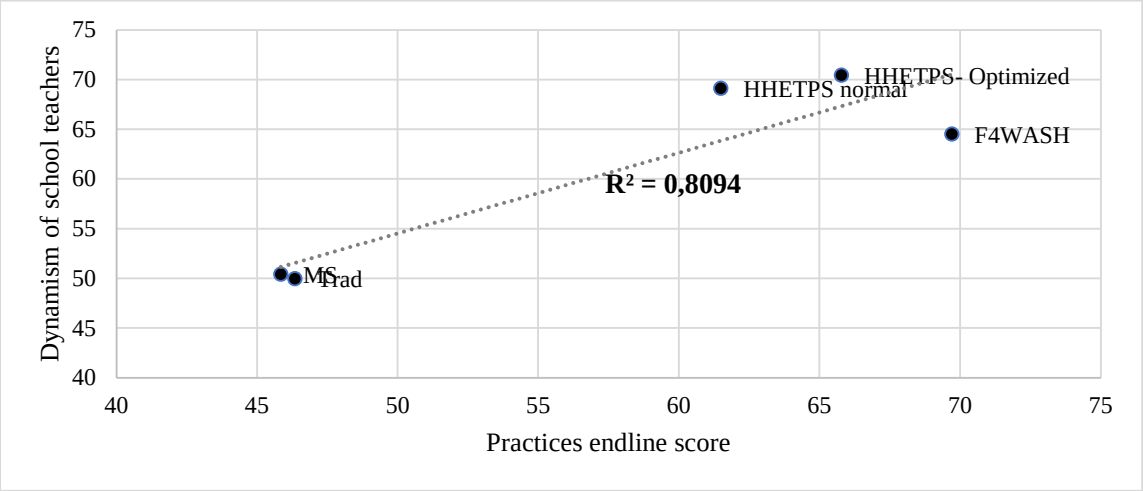

Figure 4: Correlation between the practice endline score and the dynamism of teachers

For teachers to truly become the promoters and developers of hygiene in their schools, five fundamental factors must be in place. Specifically, teachers need to have: sound knowledge of the relationship between water, sanitation, hygiene and health behaviours; an awareness of their importance as role models, leading to exemplary hygiene behaviour; the ability to foster active student participation and interaction; the willingness to create change themselves and to get involved; and the ability to repeat information/gestures because students need regular encouragement to ensure good practices become habits (several times a week and throughout the year). This is why the dynamism of teachers is such a strong driver for behaviour change.

Strengths and limitations of the study

Some of the strengths and limitations of the research are linked to the data available while others, by their very nature, are linked to the research methodology and the hypotheses made.

A wide variety of data acquisition tools was deployed for the 'effectiveness' assessment, enabling different collection and analysis methods to be used: field observation, interviews with individuals, group discussions, literature review, etc. Data obtained through self-reporting can be subject to interpretation, therefore this information was cross-checked to reduce the risk of bias.

The time between baseline and midline was relatively long - 1 year - due to constraints in implementing the activities in the schools, whereas it was expected that both would have taken place in the same school year. Some external factors may have had time to influence the situation in the schools between the baseline and midline. Since implementation took place a few weeks before midline and a few months before endline, the effects measured are short- and medium-term effects. The long-term effects would have required a return to schools the following school year.

The research approach sought to isolate the effect of hygiene promotion approaches from the other parameters influencing school hygiene (infrastructure provided, location, etc.) by using a school sampling plan. However, given the small size of the sample and the Client's wish to highlight differences between urban/rural schools, northern/southern schools, and 5 different approaches, application of the sampling plan was very constrained. Schools were thus selected based on a set of minimum requirements in terms of infrastructure and number of pupils, but even then, it was not realistic and possible to select schools with

the exact same baseline conditions. Additionally, the small size of the sample also increased the weight of other factors, especially those not related to the hygiene promotion approach (infrastructure and equipment installed during the research, dynamism of teaching staff, etc.).

It was agreed that, in order to keep the same infrastructure as identified in the baseline and avoid any bias in the research, only software interventions would be carried out and no hardware provision would be included. However, through the subsequent KAP campaigns (KAP 2 in February-March 2019 and KAP 3 in May-June 2019), it became apparent that some new equipment had been installed in the F4W schools. This hardware included new toilet blocks installed in three F4W schools between February and April 2019, two toilet blocks rehabilitated in one F4W school, and additional handwashing equipment (veronica buckets) provided for two F4W schools. It is not possible to assess the exact effect of this hardware provision on the average hygiene effectiveness score. However, this did have an impact on the attitudes and practices score of F4W schools, especially on sanitation (Theme 2), and handwashing (Theme 1). Moreover, it was not possible to obtain financial information on F4W implementation costs, which made it impossible to calculate the cost-effectiveness ratio for F4W and compare it with the others.

To assess pupil behaviour change, a within-subject experimental design was used. While this approach is adequate for the topic covered, it also has disadvantages. In essence, repeatedly interviewing the same person may create a training effect, especially on knowledge aspects. The time period between any two 'effectiveness' assessment campaigns was kept sufficiently long to minimise this risk. Furthermore, this limited bias applies to all approaches, so it does not bias the results.

Costs are estimates established from both the documents collected by the team and interviewee statements. These are average costs and may vary according to the size of the school and the willingness of the teaching teams in place. They aim to give an order of magnitude. The cost of the equipment covers a minimum package to enable school cleaning and ensure students' hand hygiene.

Conclusion

This research has demonstrated that play-based hygiene promotion approaches achieve greater effectiveness results than traditional methods. Their cost-effectiveness ratio is better and, even though these approaches are more expensive to implement, they are also more effective at ensuring schools progress from a basic to an improved hygiene situation. **For policymakers, directing funds towards approaches that promote hygiene through play is therefore more relevant and effective in terms of resource allocation.**

In order to maximise the cost-effectiveness of hygiene promotion in schools, it is recommended that the implementation of play-based approaches be fostered through the normal activities of education civil servants. This would require a new national approach to be developed that takes the HHETPS and F4W approaches into consideration, with central-level support provided by their implementing NGOs. This new approach should at least include: implementation of handwashing routines with soap; practical hygiene education activities (e.g. creation of tippy taps); and play activities (songs, games and sports). It should explain the importance of hygiene and encourage the implementation of good practices. This would also require the formal inclusion of capacity-building within both initial and in-course teacher training programmes. The objective is to tackle turnover and capacity gaps in the schools. The capacity of school monitoring supervisors should also be enhanced to enable them to monitor factors such as capacity gaps, dynamism and software implementation. To develop a culture of maintenance within and outside the schools, the WASH cascade training should also be delivered to School Management Committees.

Finally, good hygiene practices cannot be implemented with proper infrastructure, equipment and products alone. The schools need to be supported and provided with the resources required, especially in terms of

equipment (handwashing stations, latrines, water) and cleaning supplies (soap, detergents) to ensure the conditions for instilling good hygiene practices are in place. Schools should also be encouraged to implement small achievable actions, such as building tippy-taps, to increase the ratio of pupils to handwashing stations.

References

Annemarieke Mooijman, Harold Esseku and Vincent Tay, “National Implementation Model, WASH in Schools, Ghana”, December 2013

Central Office of Information (COI) (2009). Communications and Behaviour Change. London: COI. // Sassi F, et al. (2009). Improving lifestyles, tackling obesity: the health and economic impact of prevention strategies, in OECD Health Working Papers. Paris: OECD Publishing.

Curtis V, Schmidt W, Florez R, Touré O & Biran A (2011), “Hygiene: new hopes, new horizons. The Lancet Infectious Diseases”, vol. 11, no.4, p 315

Danniels E, Pyle A. Defining Play-based Learning. Dans: Tremblay RE, Boivin M, Peters RDeV, eds. Pyle A, ed. theme. *Encyclopedia on Early Childhood Development*, 2018

Deluca C. Assessment in Play-Based Learning. Dans: Tremblay RE, Boivin M, Peters RDeV, eds. Pyle A, ed. theme. *Encyclopedia on Early Childhood Development*, 2018

Evaluation nationale Education Santé par les Pairs (ESPAIR), Le Grand, Eric - Sociologist, Health Promotion Consultant, October 2012

Evelyne Vauthier, "Un mode d’apprentissage efficace", in Cahiers pédagogiques, dossier #448 "Le jeu en classe"

Football for WASH, Theory of Change, 2018

Football for WASH, Workbook for Training Participants, 2019

Fung, I. C. H. and Cairncross, S. (2009) *Ascariasis and handwashing.* Transactions of the Royal Society of Tropical Medicine and Hygiene

Ghana Education Service, Requests for funds to organize HHETPS and HHETPS optimized training, 2018

Ghana Education Service: National Costing Strategy for WASH in Schools, January 2018

Ghana Education Service: Wash in Schools, Education Guide, January 2014

Ghana Education Service: Wash in Schools: Facilities Planning and Management Guide, January 2014

Ghana Education Service: WASH in Schools: National Implementation Model, January 2014

Ghana Education Service: Wash in Schools: Technical Guide for WASH in Schools Facilities, January 2014

Government of Ghana: Strategic Education Plan 2010-2020: Ministry of Education, February 2012

Government of Ghana: Strategic Education Plan 2010-2020: Volume 2: Strategies and Work Programme

Hassinger-Das B, Zosh JM, Hirsh-Pasek K, Golinkoff RM. Playing to Learn Mathematics. Dans: Tremblay RE, Boivin M, Peters RDeV, eds. Pyle A, ed. theme. *Encyclopedia on Early Childhood Development*, 2018

HHETPS: Right to Play Progress Report: July, October 2016

Iqbal Dhaliwal, Esther Duflo, Rachel Glennerster, Caitlin Tulloch, “Comparative Cost-Effectiveness Analysis to Inform Policy in Developing Countries: A General Framework with Applications for Education”, Abdul Latif Jameel Poverty Action Lab (J-PAL), MIT, December 3, 2012

L’impossible politique de santé publique en France, Marc Loriol, ERES, Toulouse, 2014

Llwodraeth Cymru Welsh Government, "Practical Approaches to Behaviour Management in the Classroom, A Handbook for Classroom Teachers in Primary Schools”, document #117/2012, 2012

McMichael, Celia. Water, Sanitation and Hygiene (WASH) in Schools in Low-Income Countries: A Review of Evidence of Impact. International Journal of Environmental Research and Public Health, 2019

Ministry of Education, December 2010

Osher, D., Cantor, P., Berg, J., Steyer, L., & Rose, T. (2018). "Drivers of human development: How relationships and context shape learning and development."

Republic of Ghana: Ministry of Education, Science and Sports, GES Curriculum for Basic Schools, 2019

Right to Play Facilitator Manual 2008 "Youth as Leader"

Right to Play: Games Manual, 2011

Right to Play: Youth as Leader Facilitator Manual, 2011

Roger Caillois, Les jeux et les hommes, 1967

Shannon M. Mc Ginnis, Thomas McKeon, Richa Desai, Akudo Ejelonu, Stanley Laskowski and Heather M. Murphy, "A Systematic Review: Costing and Financing of Water, Sanitation, and Hygiene (WASH) in Schools", 2017

SHEP Policy Guidelines, 2012

Shonkoff, Jack P. and Deborah A. Phillips, eds., From neurons to neighborhoods: The science of early child development, National Research Council, National Academy Press, Washington, D.C, 2000; García, Jorge Luis, et al. The life-cycle benefits of an influential early childhood program. No. w22993. National Bureau of Economic Research, 2016; Britto, Pia R., et al. "Nurturing care: promoting early childhood development." The Lancet 389.10064 (2017): 91-102.

Torgerson D, Spencer A: Marginal Costs and Benefits. *BMJ* 1996; 312: 35-6.

UNICEF, Certificate of expenditures related to WASH in Schools (WinS) program in Ghanaian schools, 2017

Weisberg DS, Zosh JM. How Guided Play Promotes Early Childhood Learning. Dans: Tremblay RE, Boivin M, Peters RDeV, eds. Pyle A, ed. theme. *Encyclopedia on Early Childhood Development*, 2018.

WELL (undated) *Health impact of handwashing with soap* [online]. Available at: www.lboro.ac.uk/well/resources/fact-sheets/fact-sheets-htm/Handwashing.htm