Assessing Children's First Impressions of "WallBo" - A Robotic Handwashing Buddy

Assessing Children's First Impressions of "WallBo" - A Robotic Handwashing Buddy

AMOL DESHMUKH, University of Glasgow, School of Psychology, United Kingdom
KATIE RIDDOCH, University of Glasgow, School of Psychology, United Kingdom
EMILY CROSS, University of Glasgow, United Kingdom & Macquarie University, Sydney, Australia

In this paper we present our preliminary results from the first trial conducted with "WallBo" a robotic buddy to improve handwashing for children in schools. The one-week trial was carried out in a Scottish school with 16 pupils, aged 6-7 in an ecologically valid setting. The 1:1 interaction with WallBo resulted in 86.25% handwashing compliance, a 33.25% improvement from the baseline handwashing technique pre-WallBo training, and an overall, ≈35% improvement on knowledge about hand hygiene. We also report some insights about perceptions about WallBo in this paper.

CCS Concepts: • **Human-centered computing** → **Empirical studies in interaction design**; **User interface design**.

Additional Key Words and Phrases: Child-robot interaction, handwashing, interaction design, user perception, COVID-19

ACM Reference Format:
Amol Deshmukh, Katie Riddoch, and Emily Cross. 2021. Assessing Children's First Impressions of "WallBo" - A Robotic Handwashing Buddy. In *Interaction Design and Children (IDC '21), June 24–30, 2021, Athens, Greece.* ACM, New York, NY, USA, 8 pages. https://doi.org/10.1145/3459990.3465174

1 INTRODUCTION

The aim of this research is to investigate how a novel social robot "WallBo" can act as a persuasive agent to effect positive change on children's handwashing behaviour. This research is being carried in the context of a very important issue in public health: hand hygiene. Handwashing with soap is one of the most inexpensive and effective public health interventions which could prevent diarrhea and respiratory infections by approximately 40%[1], the two biggest causes of child mortality in developing countries [2]. More recently, in the context of COVID-19, handwashing is regarded as one of the most effective measures to prevent the spread of the virus between/from children to the most vulnerable populations [3]. Existing practices for improving handwashing behaviour face three major challenges: **(i)** they are resource intensive [4], **(ii)** complex to measure/monitor compliance at scale [5], and **(iii)** children often lack interest/motivation and know-how to wash their hands regularly [6]. Hence there is need for an interdisciplinary and innovative approach for influencing sustainable handwashing behaviour. We propose a **novel** method for hand hygiene intervention by developing a social robot "WallBo- handwashing Buddy" to improve handwashing compliance and measure its impact by systematic empirical studies. This paper presents initial findings from our first deployment of the "WallBo" robotic buddy to improve handwashing for children in a Scottish school and describe challenges in carrying out such studies in schools under COVID-19 circumstances.

Manuscript submitted to ACM

2 BACKGROUND

Previous hand hygiene intervention programs mostly focus on educating people about health, germs and disease - often using tools such as games, videos, posters, leaflets and charts [7]. Such methods are resource intensive to deliver and rarely result in positive sustained behaviour change [8]. Evidence suggests the disruption of the physical and social setting where the handwashing behaviour should take place by placing eye-catching cues and visual reminders for children can lead to more successful interventions [4]. With regards to behavioural science, it is well-established that people change their behaviour when they know they are being watched, a phenomenon known as the "Hawthorne Effect" [9]. A study by Pfattheicher et al. showed a significant increase of hand hygiene compliance when a picture of watching eyes was presented in a public restroom [10].

Previous research in child-robot interaction has shown that robots in education could motivate children to learn better [11, 12]. A robot can tirelessly offer tutoring experiences that are on a equal with, and often exceed, the effectiveness of computer/screen-based tutoring systems [13]. Handwashing education and training in schools is an effective way of reaching children and teaching them the habit of handwashing at a young age [14]. In this research we want to investigate the extent to which a social robot –"WallBo" can increase handwashing compliance. This research builds on our previous pilot study (pre-COVID) where a wall-mounted, remotely controlled robot was deployed in a rural village school in India showed a **significant** 40% increase in handwashing compliance [15]. In this research, we investigated the perception and impact on handwashing compliance and other factors to be considered in future trials using "WallBo".

3 STUDY DESIGN

The study was conducted in a primary school in an economically deprived area of Glasgow, UK. The study was carried out for one week (5 days, 22nd – 26th March 2021) under COVID-19 circumstances. This was a Wizard of Oz study (WoZ) where the researcher sitting in the same classroom could see the pupils at the solitary handwashing station and controlled the robot's behaviour. Day 1 and day 5 of the intervention was collecting pre/post-knowledge about handwashing. WallBo was introduced on days 2-4 when 1:1 sessions were conducted with the pupils while handwashing.

3.1 Participants

The school enrolls children primarily from immigrant families from south Asian and Romanian ethnic minorities. The study was carried out P3 (Primary 3) class with 16 pupils aged 6-7 years (12 Boys, 4 girls). All parents provided written informed consent for their child to be video recorded and audio interviewed as part of this study. Also, informal verbal assent as received from the pupils before the interviews. The study was approved by the ethics committee at the University of Glasgow (approval number 200200012), Glasgow City Council Educational Services ethics committee, and the school authorities. All participants were provided random IDs and no personal identifications were collected.

3.2 WallBo- Robotic platform

The WallBo robotic platform has been designed and created by researcher Dr Amol Deshmukh at the University of Glasgow as a **low-cost**, **portable** platform for encouraging handwashing for children in schools [16]. WallBo is designed with a hand shaped to elicit a symbolic meaning relevant to handwashing. As evidence shows childlike voices to be most effective in child-robot interaction studies [17], this is what we incorporated into our speech design. WallBo displayed the 10 steps of handwashing on the small screen and verbally communicated the 10 steps of handwashing and the pupils were following WallBo's instructions at the handwashing station in the classroom (See Fig. 1 Left).

Fig. 1. WallBo giving 1:1 instructions to the pupil near handwashing station about 10 steps of handwashing (left), WallBo (right)

3.3 Data collection

Data were collected in the form of: (i) audio recorded interviews (to avoid physically touching and exchanging papers during a pandemic); and (ii) videos of handwashing on Day 1 (Baseline, no WallBo) and Days 2-4 (During 1:1 intervention with WallBo). The video data was collected using a camera trap positioned on top of handwashing station (see Fig. 1 for illustration of the setup). The handwashing data was scored based on the number of handwashing steps completed, see Appendix Fig. 3.

On Days 1 and 5 (pre- and post- intervention) the pupils were asked questions to assess their hand-washing knowledge. We adapted a previously validated questionnaire [18]. These included questions regarding when their hands should be washed, the steps involved, the purpose of soap, and if they enjoy the handwashing experience (see Table 1 in Appendix). Responses for these questions were scored based on whether they said specific keywords (e.g. soap, rub, water, germs). After the intervention, pupils were also asked a series of questions relating to their perception of WallBo. Questions probed what they like or would change about WallBo, gender of WallBo, if its "alive, like a person", and whether they would like to see WallBo again. The first language of some pupils was not English, and they were offered additional prompts to aid their understanding as a result (See Appendix Table 2). To gain a deeper understanding of the answer, most questions (minus Q3) were followed by the question "Why do you think that?".

4 RESULTS AND DISCUSSION

In this section we present and discuss the results from the analysis of audio interviews from the pupils and video recordings during handwashing.

4.1 Perception

4.1.1 Understanding: When asked if they could understand what WallBo was saying, all pupils (100%) responded "yes" or similar. All pupils (100%) also responded with "yes" or similar when asked if they washed their hands "better" with WallBo around, with reasons given including that WallBo was 1) watching them, 2) giving them the steps, or 3) showing them what to do (through videos). This finding emphasises the importance of the robot's physical presence, to watch and remind them. All pupils (100%) said they want to see WallBo again in their school, reasons given, WallBo "helped them wash their hands" and "get rid of the germs". The researchers had expected to hear mention of how WallBo was "fun" or similar, due to the young age of the children, so this germ-orientated response was surprising. One explanation for the almost-scripted germ-orientated response is the context of the experiment – it took place nearly one year into the COVID-19 pandemic (where there is an increased emphasis on illness, germs, mask-wearing, and handwashing).

4.1.2 Gender: When asked whether they thought WallBo was a boy or a girl, 81% of pupils (n=13) reported that they thought WallBo was a boy. This corresponds to 100% of female participants, and 75% of male participants. Reasons given: the voice, green colour, and lack of eyelashes. Of the remaining 9% of the pupils (n=3, all boys) two said the voice sounds like a girl, and one said the voice sounded "in between" (the genders). Previous studies with synthetic voices and children have indicated differences in the perception of gender based on appearance of a robot [17, 19].

4.1.3 Living: Of the pupils, 62% (n=10) did not think WallBo was "alive, like a person". Reasons given included: "it's a robot!", it "doesn't look like a person", "it's a hand", it "doesn't eat", and because they could see the wires. The remaining pupils (38%, n=6) did think WallBo was alive. These pupils spoke about how this perception was the result of the fact it could 1) talk, 2) show them what to do, and 3) move its eyes. This was contrary to the result we obtained from our first trail with rural school children in India where 72% of the pupils thought it was alive. This difference in perception of aliveness also highlights the cultural differences between rural and urban populations perhaps due to exposure to modern technology [20, 21].

4.1.4 Likes: When asked "What are some things that you like about WallBo?", numerous pupils commented that they liked WallBo's ability to speak (37.5%, n= 6), its mouth moving (12.5%, n= 2), and its ability to "teach" and "help" them (37.5%, n= 6) either by telling them (12.5%, n=2) or showing them what to do on the screen (25%, n=4). This finding suggests that the ability of the robot to speak is a desirable quality in handwashing context. Numerous pupils also mentioned that they liked the song of WallBo (25%, n=4).

This was also supported by observations made by the researchers of 1) individual pupils, not prompted by anyone, singing the song on their break, and 2) the majority of pupils joining in with the song, performing the corresponding gestures, and smiling, during the group sessions. Use of songs in handwashing context has shown positive results in the past [22]. Additional comments mentioned by individuals included a liking that WallBo was "nice", "happy", that it was a hand shape, and that it has eyes that can move. One child commented that they thought it was "cool" seeing the wires, and one another expressed that they "love" WallBo .

4.1.5 Improvements and Changes: Generally, all pupils appeared to like WallBo, and the teacher also expressed that this seemed to be the case. Five children commented that they would change nothing about WallBo (even when given prompts such as "colour", "shape", "voice"), however, three children (18.75%) commented on how they would like WallBo to be able to answer questions - for example, respond to questions such as "would you like to be my friend" and "can you pass me the paper towel?". Multiple children also suggested that they would like WallBo to be able to go home with them (12.5%, n=2), go outside in the playground (18.75%, n=3), and play games (e.g. "tig" or "blocks") with them (12.5%, n=2). These findings suggest that some children want to spend more time with WallBo outside of the hand-washing context.

4.1.6 Handwashing Knowledge: After the intervention, more children reported that soap "gets rid of germs" after the intervention (75%, n=12) compared to before (62.5%, n=10) a **12.75% improvement**. Both before and after the intervention, most pupils knew that washing their hands was the best way to get rid of germs (93.75%, n=15). These findings suggest that children already have a good (albeit broad) understanding that handwashing is a good way to get rid of germs from the hands. The teacher informed us that handwashing and germs are a part of the Science and Health UK teaching curriculum, which offers an explanation why the base understanding was high. Upon considering the nuances of handwashing (e.g. the steps, the timing) gaps and variation in knowledge became apparent.

4.2 Specifics of Handwashing

4.2.1 Steps of Handwashing: Before the intervention 37.5% of children (n=6) identified 2+ steps of handwashing (from "wash", "soap", and "rub"). After the intervention, 93.75% of children (n=15) used 2+ key words (**56.25% improvement**). More children used all 3 key words to describe the steps of handwashing after the intervention (56.25%, n=9), compared to before (18.75%, n=3) a **37.50% improvement**.

4.2.2 Handwashing Timing: After the intervention, there was still variability between children, however overall there was improved knowledge of when to wash their hands. Specifically, before the intervention, 50% of the children (n=8) said they did not know when to wash their hands. After, only 12.5% of children (n=2) said they did not know (**37.25% improvement**). Additionally, before the intervention only 18.75% of children (n=3) knew more than 2+ instances in which they should wash their hands. After the intervention, 43.75% children (n=7) gave 2+ answers (**25% improvement**).

4.2.3 Thoughts about handwashing: Most children indicated that they "like" washing their hands, however more children claimed to dislike washing their hands after the intervention (18.75%, n=3) compared to before (6.25%, n=1). When asked "why?" they dislike washing their hands, the children indicated that they are "too busy" and that handwashing takes too much time (n=1), that they don't like washing in general (n=1), and that "the water can be too hot/cold" (n=1). Further work should investigate whether the apparent decrease in enjoyment is the result of the intervention, or a result of pupils building a rapport with the experimenter during the week (and feeling more comfortable to disclose their dislikes after the intervention, compared to before).

4.3 Handwashing Compliance

We measured the 10 handwashing steps based on WHO handwashing technique (See Appendix Fig. 3) [23]. Each handwashing video was given a score from 1-10 (one point for each of the handwashing step completed).

4.3.1 Pre-WallBo Handwashing compliance. We scored the handwashing technique from videos gathered from Day 1 (baseline, pre-WallBo training). We analysed 62 handwashing occurrences and observed only a mere 53% handwashing compliance, with most pupils not performing steps 4-8. However, this result needs to be treated with caution as the children had access to only one handwashing station in the classroom and were rushed to wash their hands quickly due the queue before going out/coming in the classroom during breaks.

4.3.2 WallBo 1:1 session. Each of the 16 pupils during 1:1 handwashing session with WallBo (See Fig. 1) were independently analysed. Each session was about a 1 minute long. The measurements were carried out two times to reduce human error, **(i)** on-line by the researcher observing near the handwashing on a score sheet and **(ii)** off-line by watching/scoring the videos of the recorded session. The error rate was 12% between the on-line and off-line video analysis. We report the more accurate video analysis results here.

We observed an average of **86.25% handwashing compliance** on all the 10 steps carried out, with (25%) n=4 pupils getting a perfect 10/10. All pupils completed steps 1, 2, 9, and 10, however, some pupils struggling a little with Step 7: Rubbing the tips of your fingers on the palm (56.25% compliance) and Step 8: Cleaning wrists (68.75% compliance) may be due to lack of motor skills due to their young age given they are slightly complex steps to perform (See Fig. 2). This result also coincides with the study by Öncü et al. where the most missed areas when washing hands in children were fingertips and palmar surfaces [22]. Perhaps a better/clearer demonstration and repetition for steps 7 and 8 can help to aid pupils to develop their motor skills and complete these steps better.

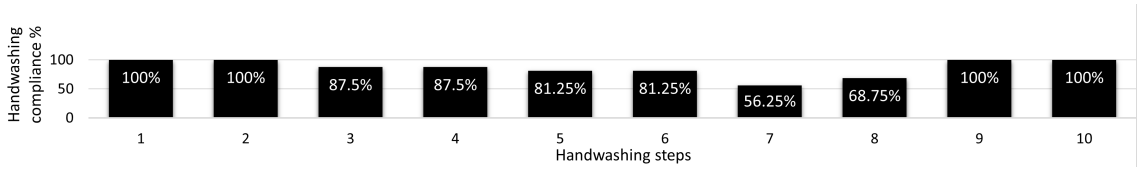

Fig. 2. During 1:1 with WallBo: Handwashing Compliance Graph, N=16

5 LIMITATIONS AND FUTURE WORK

The study was conducted under severe COVID-19 restrictions and the 2 researchers were only allowed access to one classroom, where they were required to adhere to strict social distancing protocols. We acknowledge the small number of participants and gender imbalance for this study, more sophisticated statistical tests were not feasible to carry out. In the future trials we are aiming to study a greater number of pupils if feasible due to COVID-19. Also there is a possibility of people-pleasing effect occurring, where children are always agreeing with the experimenter. We also acknowledge several uncontrollable confounds that arose due to the real-world setting of this study [24, 25], such as the fact that classes were running in parallel in the same classroom where the handwashing station is located. Furthermore, the presence of researchers during the intervention and completing the handwashing interviews at the beginning could have prompted children to think more about their handwashing might have influenced the results. From this trial we cannot say conclusively if the pupils still carried out the 10 handwashing steps learned in their normal handwashing routines and if the handwashing compliance sustained and we will investigate these factors in the next trial, however the initial results seem promising. We are working towards developing the autonomous technology for accurately recognising the steps of handwashing using computer vision (deep learning techniques) and automatic prompting of behaviours from WallBo during handwashing. We also plan to refine the next trial with 1:1 handwashing sessions pre/during/post interactions with WallBo to determine the changes to handwashing compliance more accurately and understand how these change over a longer-term period of 2 weeks (to measure sustainability and novelty effects [26] of the intervention). We will also investigate with control condition how verbal (handwashing step-by-step instructions) Vs non-verbal actions (handwashing steps displayed on the screen) from WallBo influences handwashing compliance.

6 CONCLUSION

In this pilot study we presented preliminary results from the audio interviews about the perception of WallBo in handwashing context. We observed an overall **86.25% handwashing compliance** during 1:1 session with WallBo (N=16) a **33.25% improvement** from the baseline handwashing technique pre-WallBo training and an overall ≈**35% knowledge improvement** about handwashing. WallBo has a great potential to serve a supportive role in large scale health interventions as an agent of positive handwashing behaviour change. This first trial will also help inform design decisions for WallBo and improve them iteratively through feedback obtained from consequent trials.

7 ACKNOWLEDGEMENTS

This work was supported by Wellcome Trust (ISSF) COVID-19 response and European Research Council under the European Union's Horizon 2020 Research and Innovation Programme (H2020-ERC-2015-StG-67720-SOCIAL ROBOTS). We thank the Glasgow City Council, the school authorities, all the children who participated in the study and special thanks to the class teacher who facilitated the pupils during the trial.

REFERENCES

[1] Dean T Jamison, Joel G Breman, Anthony R Measham, George Alleyne, Mariam Claeson, David B Evans, Prabhat Jha, Anne Mills, and Philip Musgrove. *Disease control priorities in developing countries*. The World Bank, 2006.

[2] Tamer Rabie and Valerie Curtis. Handwashing and risk of respiratory infections: a quantitative systematic review. *Tropical medicine & international health*, 11(3):258–267, 2006.

[3] Deepti Gurdasani, Nisreen A Alwan, Trisha Greenhalgh, Zoë Hyde, Luke Johnson, Martin McKee, Susan Michie, Kimberly A Prather, Sarah D Rasmussen, Stephen Reicher, et al. School reopening without robust covid-19 mitigation risks accelerating the pandemic. *The Lancet*, 2021.

[4] Adam Biran et al. Effect of a behaviour-change intervention on handwashing with soap in india (superamma): a cluster-randomised trial. *The Lancet Global Health*, 2(3):e145–e154, 2014.

[5] Libbet C Loughnan, PAVANI K RAM, and ROLF LUYENDIJK. Measurement of handwashing behaviour in multiple indicator cluster surveys and demographic and health surveys, 1985–2008. *Waterlines*, pages 296–313, 2015.

[6] Alyssa Vivas, Bizu Gelaye, Nigusu Aboset, Abera Kumie, Yemane Berhane, and Michelle A Williams. Knowledge, attitudes, and practices (kap) of hygiene among school children in angolela, ethiopia. *Journal of preventive medicine and hygiene*, 51(2):73, 2010.

[7] Val Curtis, Wolf Schmidt, Stephen Luby, Rocio Florez, Ousmane Touré, and Adam Biran. Hygiene: new hopes, new horizons. *The Lancet infectious diseases*, 11(4):312–321, 2011.

[8] Emmy De Buck, Hans Van Remoortel, Karin Hannes, Thashlin Govender, Selvan Naidoo, Bert Avau, Axel Vande Veegaete, Alfred Musekiwa, Vittoria Lutje, Margaret Cargo, et al. Approaches to promote handwashing and sanitation behaviour change in low-and middle-income countries: a mixed method systematic review. *Campbell Systematic Reviews*, 13(1):1–447, 2017.

[9] Henry A Landsberger. Hawthorne revisited: Management and the worker, its critics, and developments in human relations in industry. 3(2), 1960.

[10] Stefan Pfattheicher, Christoph Strauch, Svenja Diefenbacher, and Robert Schnuerch. A field study on watching eyes and hand hygiene compliance in a public restroom. *Journal of Applied Social Psychology*, 48(4):188–194, 2018.

[11] Tony Belpaeme, James Kennedy, Aditi Ramachandran, Brian Scassellati, and Fumihide Tanaka. Social robots for education: A review. *Science robotics*, 3(21), 2018.

[12] Marco Nalin, Linda Bergamini, Alessio Giusti, Ilaria Baroni, and Alberto Sanna. Children's perception of a robotic companion in a mildly constrained setting. In *IEEE/ACM Human-Robot Interaction 2011 Conference (Robots with Children Workshop) Proceedings*, 2011.

[13] Wilma A Bainbridge, Justin W Hart, Elizabeth S Kim, and Brian Scassellati. The benefits of interactions with physically present robots over video-displayed agents. *International Journal of Social Robotics*, 3(1):41–52, 2011.

[14] Robert Dreibelbis et al. Behavior change without behavior change communication: nudging handwashing among primary school students in bangladesh. *International journal of environmental research and public health*, 2016.

[15] Amol Deshmukh, Sooraj K Babu, R Unnikrishnan, Shanker Ramesh, Parameswari Anitha, and Rao R Bhavani. Influencing hand-washing behaviour with a social robot: Hri study with school children in rural india. In *2019 28th IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)*, pages 1–6. IEEE, 2019.

[16] Amol Deshmukh, Shanker Ramesh, Sooraj K Babu, Parameswari Anitha, Rao R Bhavani, et al. Design and perception of a social robot to promote hand washing among children in a rural indian school. In *RO-MAN*. IEEE, 2019.

[17] Anara Sandygulova and Gregory MP O'Hare. Children's perception of synthesized voice: Robot's gender, age and accent. In *ICSR*, pages 594–602. Springer, 2015.

[18] NA Mohamed, NNZ Amin, Isahak I Ramli, S, and NM Salleh. Knowledge, attitudes and practices of hand hygiene among parents of preschool children. *Journal of Scientific and Innovative Research*, 5:1–6, 2016.

[19] Helen Hastie, Katrin Lohan, Amol Deshmukh, Frank Broz, and Ruth Aylett. The interaction between voice and appearance in the embodiment of a robot tutor. In *International Conference on Social Robotics*, pages 64–74. Springer, 2017.

[20] Amol Deshmukh, Sooraj Krishna, Nagarajan Akshay, Vennila Vilvanathan, JV Sivaprasad, and Rao R Bhavani. Technology acceptance, sociocultural influence and gender perception of robots: A human robot interaction study with naive users in rural india. In *2018 27th IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN)*, pages 1–6. IEEE, 2018.

[21] Indrani Medhi, Meera Lakshmanan, Kentaro Toyama, and Edward Cutrell. Some evidence for the impact of limited education on hierarchical user interface navigation. In *Proceedings of the sigchi conference on human factors in computing systems*, pages 2813–2822, 2013.

[22] Emine Öncü and Sümbüle Köksoy Vayısoğlu. Duration or technique to improve the effectiveness of children'hand hygiene: A randomised controlled trial. *American Journal of Infection Control*, 2021.

[23] https://www.who.int/gpsc/5may/How_To_HandRub_Poster.pdf. Who, July 2009.

[24] Guy Hoffman and Xuan Zhao. A primer for conducting experiments in human–robot interaction. *ACM Transactions on Human-Robot Interaction (THRI)*, 10(1):1–31, 2020.

[25] Raquel Ros, Marco Nalin, Rachel Wood, Paul Baxter, Rosemarijn Looije, Yannis Demiris, Tony Belpaeme, Alessio Giusti, and Clara Pozzi. Child-robot interaction in the wild: advice to the aspiring experimenter. In *Proceedings of the 13th international conference on multimodal interfaces*, pages 335–342, 2011.

[26] Iolanda Leite, Carlos Martinho, and Ana Paiva. Social robots for long-term interaction: a survey. *International Journal of Social Robotics*, 5(2):291–308, 2013.

A QUESTIONNAIRES USED WHILE INTERVIEWING PUPILS

A.1 Table 1 - Handwashing Knowledge Questions

	Question	Add-on (for clarification needed)
1	What is the best way of getting rid of germs from our hands?	What are your favourite parts?
2	When should we wash our hands?	
3	When you wash your hands, what do you do? What steps do you take?	
4	Why do you use soap? What does soap do?	
5	Do you like washing your hands, or do you not like washing your hands	
6	Do you remember who taught you how to wash your hands?	What person told you how?

A.2 Table 2 - WallBo Perception Questions

	Question	Add-on (for clarification needed)
1	What are some things that you like about WallBo?	What are your favourite parts? e.g. colour/eyes/voice/screen?
2	Is there anything that you don't like about WallBo? Or anything that you would change?	
3	Did you understand what WallBo was saying/asking you to do?	Did you understand the voice?
4	Do you think WallBo is a boy or a girl?	
5	Do you think WallBo is alive, like a person?	
6	Would you like to see WallBo again?	
7	When WallBo was around, do you think you washed your hands better?	Did you wash your hands differently? How different?

B 10 STEPS OF HANDWASHING

Figure 3: 10 handwashing steps

10 Handwashing steps verbal instructions from WallBo
1. Turn on the water and wet your hands with warm water
2. Put soap onto your hands
3. Rub your hands together.
4. Use one hand to rub the back of the other hand and clean in between the fingers. Do the same with the other hand
5. Rub your hands together and clean in between your fingers.
6. Rub your thumb using your other hand. Do the same with the other thumb.
7. Rub the tips of your fingers on the palm of your other hand. Do the same with the other hand.
8. Clean your wrists.
9. Rinse your hands with water.
10. Dry your hands completely with a disposable towel.