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**WATER, SANITATION AND HYGIENE:
SUSTAINABLE DEVELOPMENT AND MULTISECTORAL APPROACHES**

**An assessment of sanitation and hygiene
in primary schools in Zambia**

P.A. Harvey & E.A. Adenya, Zambia

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Access to sanitation in primary schools in Zambia is woefully inadequate, especially in community schools. Through analysis of national Ministry of Education data and a survey of schools in 16 districts an assessment of sanitation and hygiene in primary schools was undertaken. This revealed that while almost all schools have some type of sanitation facility, just over one third have permanent toilets and less than 10% of schools provide adequate numbers of toilets for girls. While lack of sanitation facilities may play a role in discouraging the attendance and retention of girl students no correlation was found between pupil-toilet ratios and school retention rates. However, for schools with unimproved traditional latrines retention rates were significantly lower than for those with improved sanitation facilities, especially for girls. While hygiene education programmes were present in most of the sample schools, only 45% of schools had soap for handwashing and the impact on hygiene behaviour in the school catchment areas appeared to be limited. There is a strong need to incorporate sanitation in the Ministry of Education's infrastructure development plans.

Introduction

Zambia's Education System consists of academic learning at the primary, secondary and professional or tertiary levels. However, the lower levels (i.e. pre-university education) are currently being re-organized into two levels: Basic Education running from grades 1-9 and High School, running from grades 10-12. The Ministry of Education (MoE) has also been mandated to run Early Childhood, Care, Development and Education (ECCDE). This transition has brought out many challenges in terms of inadequacies in infrastructure, and institutional and human capacity, including critical shortages of teachers, especially in rural areas. The Ministry of Education also officially recognizes an alternative approach to primary or basic schooling through Community Schools and the Government has continued with its policy of encouraging private providers of education, as can be seen from the large number of private schools that have been registered with the Ministry in recent years.

With the assistance from the World Bank and USAID, the Academy for Educational Development (AED) designed the national Education Management Information System (EMIS) for Zambia and this was rolled out in 2001. Data is captured annually through a school census. The head-teachers are the primary respondents, supervised by the District Education Boards. Since 2001 the EMIS data have been continually updated. In 2004 information on sanitation facilities in schools was incorporated into the school census form and EMIS database, yet to date there has been little analysis of this.

Objectives and methodology

The purpose of this study was to determine the current status of sanitation and hygiene provision in primary schools in Zambia and to investigate the relationships between sanitation infrastructure and primary education efficiency.

This paper draws on a preliminary analysis of the 2007 and 2008 EMIS data for 8,572 schools in 2007 and 8,756 schools in 2008. Over 90% of schools were primary schools and over 80% were in rural areas. The

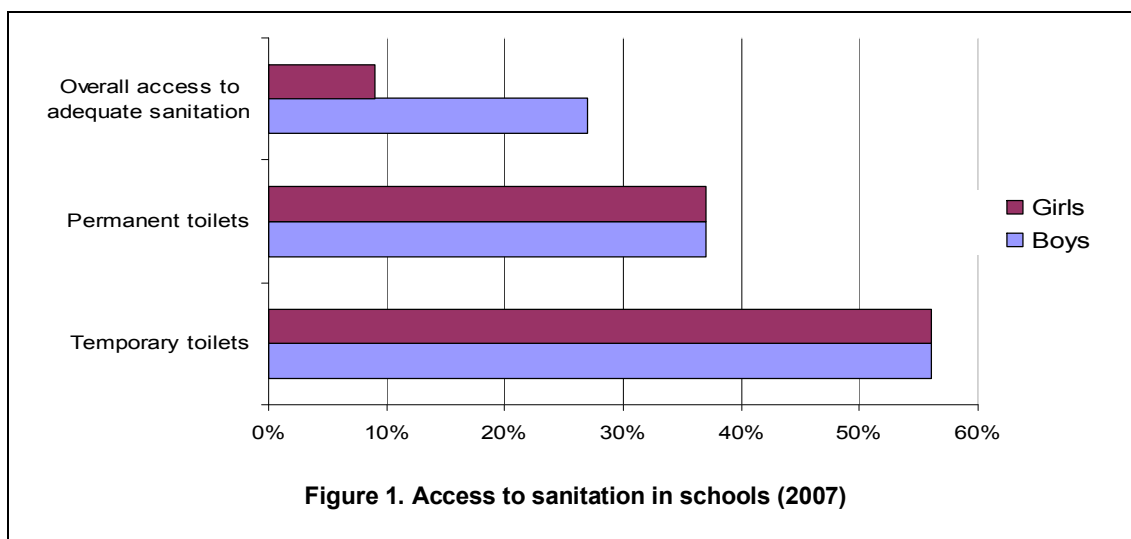
EMIS data were analysed with respect to the number and type of sanitation facilities and pupil-toilet ratios nationwide. Repetition and dropout rates were also investigated.

In addition, a more in-depth assessment of hygiene and sanitation was undertaken in 132 schools across 16 districts of Zambia in late 2007; 71% of these were community schools, 26% basic schools and 3% middle basic schools, 59% were classified as rural and 41% as urban or peri-urban. The school survey used a questionnaire which was completed for each school by trained data collectors. This was used to gather information on types of sanitation facilities, enrollment rates, retention rates and pupil-teacher ratios. Pearson's correlation coefficient test was used to test the hypothesis that a higher pupil to toilet ratio will result in a lower retention rate, and the relationship between type of sanitation facility and retention rate for boys and girls was also examined. These analyses were used to test the widely held belief that the presence of sanitation facilities in schools increases attendance and retention rates, especially among girls who are menstruating (UNICEF, 2006; IRC, 2006; Pearson & McPhedran, 2008). Over 16,000 community members from all age groups (with equal numbers of males and females) within school catchment areas were also interviewed concerning hygiene practices to assess the effectiveness of school hygiene education programmes.

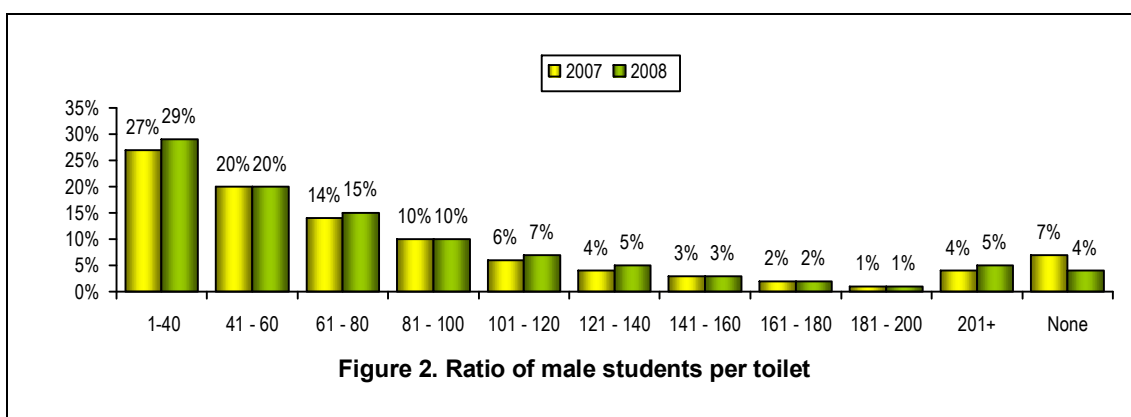
School sanitation infrastructure

There are two main classifications for school sanitation infrastructure status. The first category is permanent – these are structures built to last, usually at high cost using skilled labour and relatively advanced technology. The second category is temporary – these are improvised structures built as a temporary solution to provide much needed school infrastructure, they are usually of low cost and hinge on local improvisation.

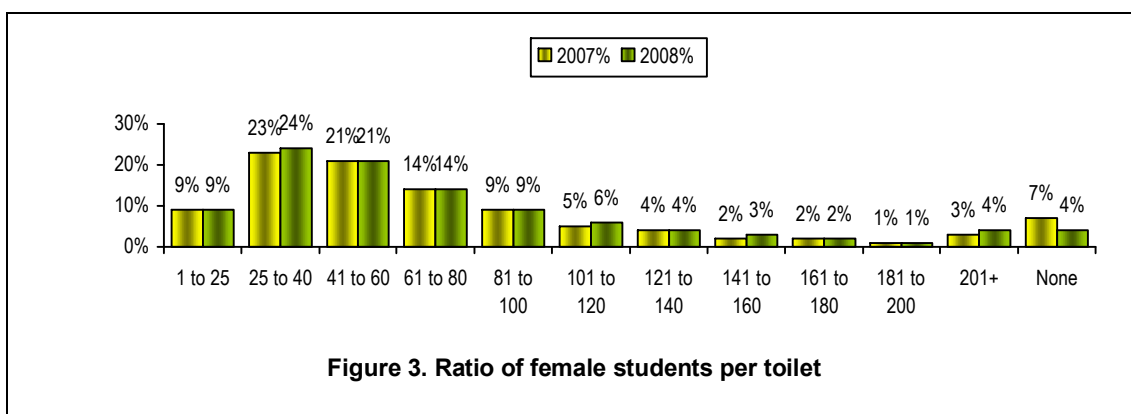
Figure 1 illustrates the gender disparity in sanitation infrastructure in schools based on the EMIS data for 2007. While 37% of all schools reported the presence of permanent toilets and 56% reported the presence of temporary toilets, the actual numbers of toilets are almost identical for girls and boys. However, since it is recommended that there should be one toilet for every 40 boys and one toilet for every 25 girls, this means that in real terms 27% of boys had adequate access to sanitation while only 9% of girls did.



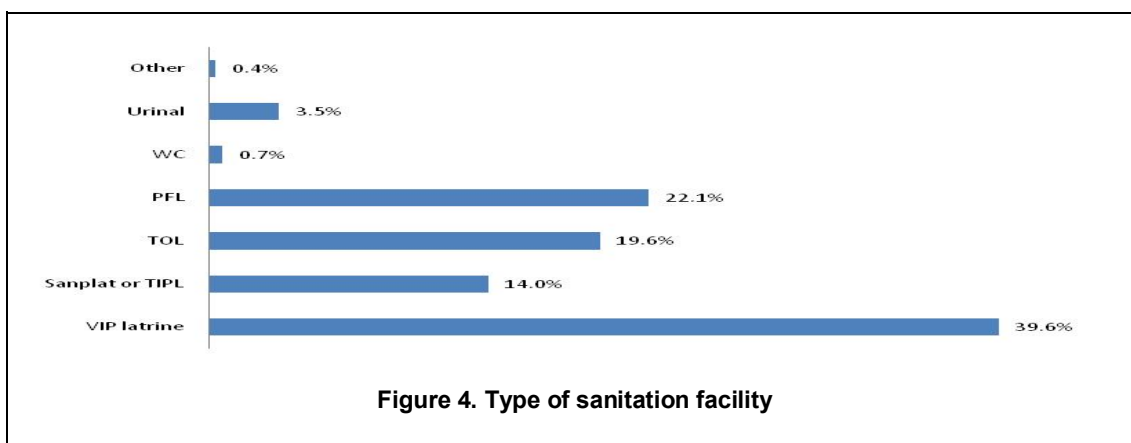
An analysis of the EMIS data reveals some interesting trends regarding the ratio of students to toilets. While only 7% of schools had no toilets at all in 2007, this had reduced to 4% in 2008. In 2008, only 29% of schools met the MoE recommended ratio of 40 male students per toilet, while over half of all schools had over 60 students per toilet and more than a quarter had over 100 students per toilet or no toilets at all (see Figure 2).



A similar pattern emerges for female students although this situation would appear to be even worse given the need to provide more toilets for girls. In 2008, only 9% of schools met the MoE recommended ratio of 25 female students per toilet, while 46% of schools had over 60 students per toilet and 24% had over 100 students per toilet or no toilets at all (see Figure 3). This shows that the situation of sanitation infrastructure in schools in Zambia is currently woefully inadequate. This situation is unlikely to improve in the near future as the Ministry of Education’s infrastructure development plan, while including classroom and furniture needs, does not make provision for sanitation facilities.



The findings of the survey of 132 schools appear to back up the analysis of the EMIS data in that 5% of schools had no toilet at all and the average recorded number of pupils per toilet was 43.8 (for schools with toilets only). Of the sanitation facilities provided almost 40% were Ventilated Improved Pit (VIP) latrines and 23% pour-flush latrines or Water Closet (WC) toilets, in line with the MoE recommended standards; 14% were Sanplat or improved pit latrines and 20% were unimproved traditional latrines (see Figure 4).

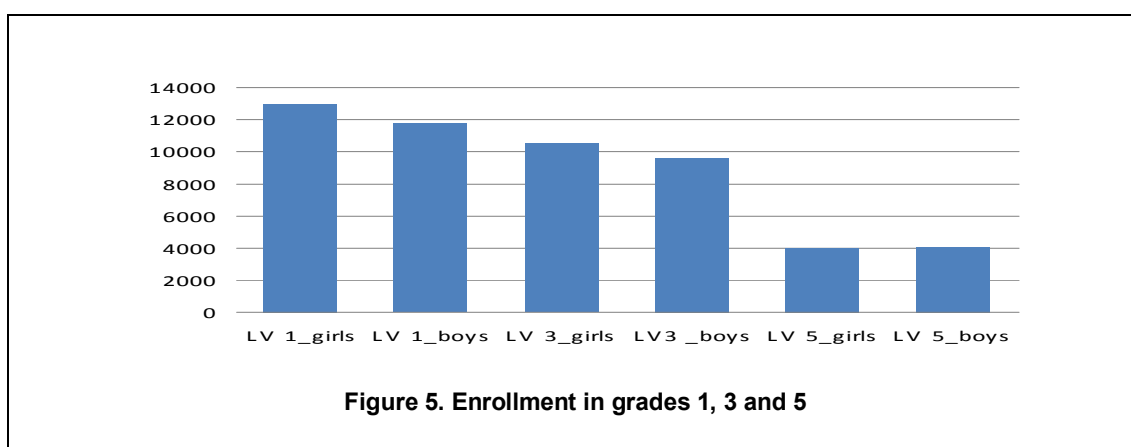


Access and participation

Access refers to the extent to which education is being accessed by the general eligible population at a given education entrance level. In the *Zambian* case, access is predominantly at four levels, namely Grade 1 entrance, Grade 8, Grade 10 and entrance into tertiary institutions. Since the focus of this paper is on primary schools, access to education will mainly be looked at in terms of the initial entrance to education, which is at Grade 1, and retention of students in the primary educational system to Grades 3 and 5.

Enrollment

Figure 5 shows the numbers of students enrolled at Grades 1, 3 and 5 across the 132 schools. While there are significantly more (1,151) girls than boys enrolled at Grade 1, since there are more girls born than boys, this reduces at Grade 3 (to 878) and at Grade 5 there is almost exactly the same number of girls and boys (in fact there are 56 more boys than girls). This shows that the retention rate of girls from one grade to the next is lower than for boys. This seems to be most apparent between Grade 3 and 5 which is typically when many girls in rural community schools start menstruating (some girls may not even enter Grade 1 until the age of 10).



Dropout, repetition and retention rates

The dropout rate is the proportion of pupils who leave the system without completing a given grade in a given school year. According to EMIS data, the average dropout rate at primary school Grades 1-7 was 2.43% in 2006 and 2.27% in 2007. Although the dropout rates vary significantly from region to region, on average the dropout rate for girls is twice as high as that for boys.

The repetition rate measures the phenomenon of pupils from a cohort repeating a grade, and is one of the key measures for analysing and projecting pupil flows from grade to grade within the educational cycle. Repetition rate ideally should approach zero percent, as a high repetition rate reveals problems in the internal efficiency of the educational system. Based on the 2007 EMIS data, there is a high positive correlation ($r=0.78$) between repetition and dropout rates. This is something that one might intuitively expect, i.e. when many students dropout, many students also repeat grades.

Retention rate (sometimes called 'survival' rate) is inversely related to dropout and repetition rates and is defined as the percentage of a pupil cohort actually reaching a specific grade, in this case Grades 3 and 5 respectively. Note that the retention rate can occasionally be more than 100% since the calculation used by MoE is an approximation based on the number of students in Grades 3 and 5 in relation to the *current* number of students in Grade 1, which could be less than the number of students in Grade 1 five years ago. For example, birth rates may change and good schools may attract students who move from other schools to join in grades higher than Grade 1.

Using the data from the 132 schools, statistical analysis was conducted to test the hypothesis that a higher pupil to toilet ratio will result in a lower retention rate but no correlation was found between the two variables. It should be noted, however, that this does not necessarily mean that inadequate sanitation does not affect retention. There are likely to be many other factors that influence retention rates including teenage pregnancy, teacher-pupil ratios, school management, construction of new schools and socio-economic factors.

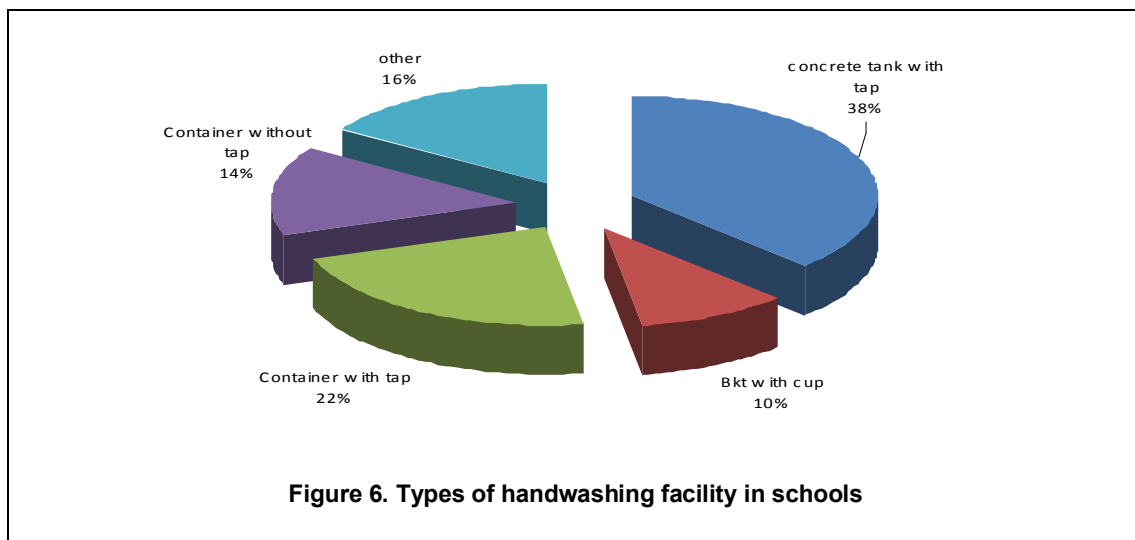
In addition to this correlation test, the average retention rates for girls and boys to Grade 3 and Grade 5 were examined in relation to the type of sanitation facility present (see Table 1). Unfortunately, there were insufficient data to compile this information for schools where there were no toilets at all. The average retention rate figures for schools with any type of improved sanitation facility (including improved traditional latrines) are almost identical to those for schools with the MoE recommended technologies of VIP, pour-flush latrines and WCs. This suggests that improved traditional latrines are just as effective in promoting school attendance as the recommended facilities. There are significant differences in the figures, however, for the schools with unimproved traditional latrines only, especially in the retention rates for girls. Indeed, for these schools the retention rate to Grade 3 is 28 percentage points less for girls than for boys. Also, the retention rate to Grade 5 is significantly less in these schools than those with improved sanitation for both girls and boys.

Type of sanitation facility	Retention rate G3 – Girls (%)	Retention rate G3 - Boys (%)	Retention rate G5 - Girls (%)	Retention rate G5 - Boys (%)
All types	90	102	73	81
Unimproved traditional latrine	73	101	65	71
Improved sanitation facility	97	102	76	80
VIP, WC or pour-flush	96	102	73	78

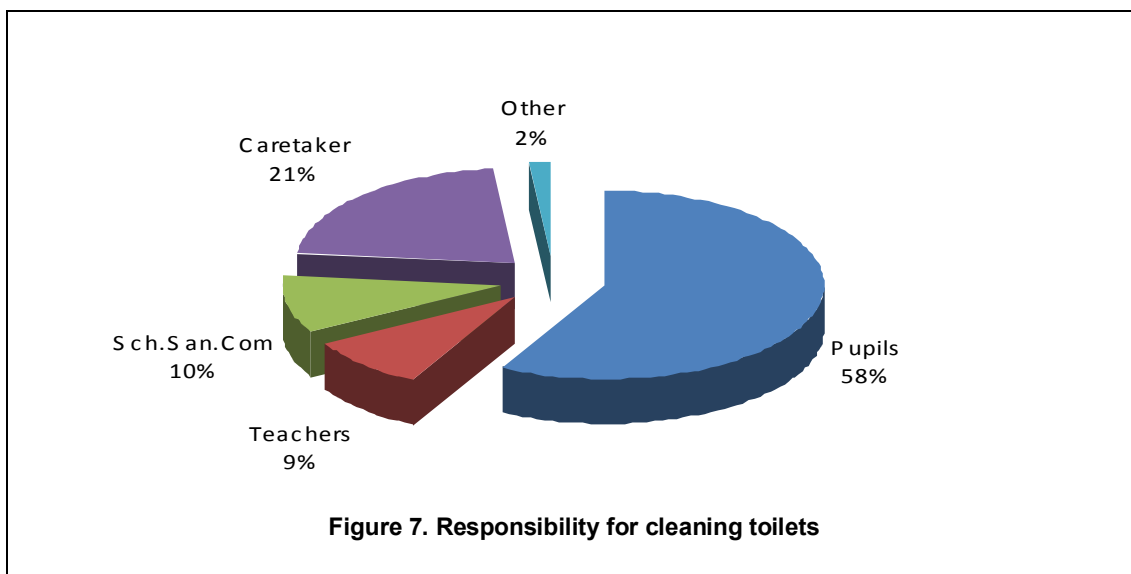
The above analysis does not necessarily mean that it is the standard of sanitation facility that is the primary reason behind increased retention rates. It may simply be that schools with more resources are more likely to have high standard sanitation facilities as well as better teachers and a better learning environment, and hence higher retention rates. Interestingly, the average pupil-teacher ratio across all schools was 60 pupils per teacher and there was moderate correlation ($r = 0.47$) between pupil-teacher ratio and pupil-toilet ratio. This does not necessarily mean that there is a direct link between the two factors as it is more likely that both are influenced by the overall school environment.

Hygiene education in schools

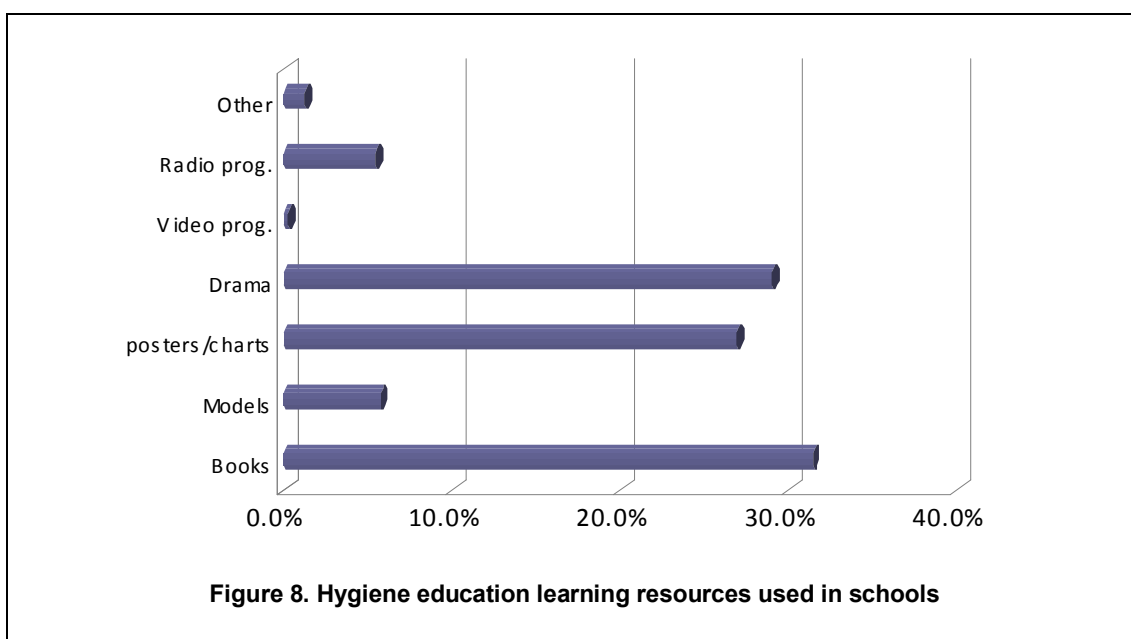
The survey of 132 schools found that 98% of schools had hygiene education programmes, although this proportion may be higher than in the population at large, as most of these schools have had some external support. While 80% of schools had some kind of water source in the school grounds, 87% also had some kind of handwashing facility, 60% of which consisted of a container or concrete tank with tap (see Figure 6).



In 64% of schools handwashing facilities were located outside toilets and in 36% they were near the school buildings. Despite the high proportion of schools with handwashing facilities, only 45% of schools had soap for handwashing on the school premises. In 58% of schools the pupils were responsible for cleaning school toilets and 10% had school sanitation committees, consisting of committed pupils, to undertake this responsibility (see Figure 7).

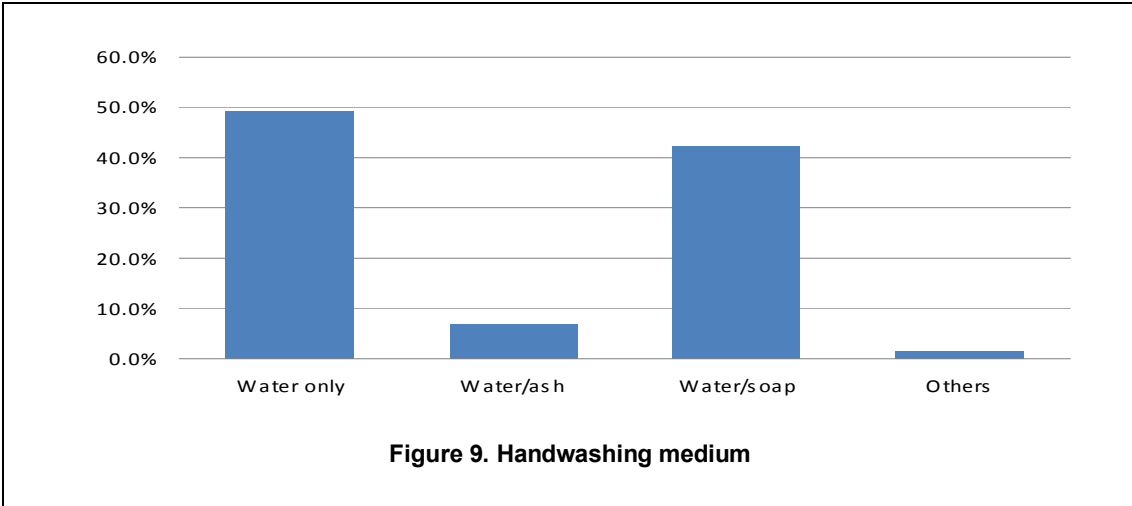


The school hygiene education programmes reported using a wide range of learning resources (see Figure 8). While books were the most common medium used, with 32% of schools reporting their use, drama is also a popular method and was also used in 28% of schools.

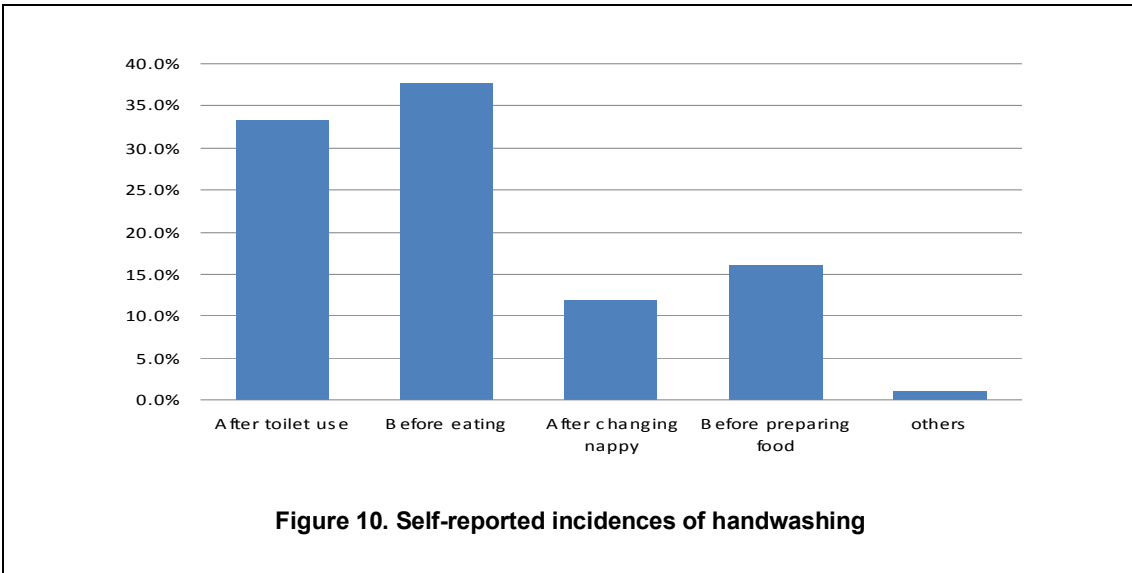


Hygiene practice in schools and surrounding communities

Given that school hygiene education programmes often aim to educate school children to disseminate hygiene behaviour messages to their peers, parents and communities, over 16,000 community members from all age groups (with equal numbers of males and females) within school catchment areas were interviewed concerning hygiene. This survey revealed that, when washing hands, almost 50% of community members use water only and 42% use soap (see Figure 9).



The survey also revealed that only 33% of people reported washing their hands after using the toilet and 37% before eating. Even more worrying is the fact that only 16% wash their hands before preparing food and only 12% after cleaning a baby’s bottom or changing a nappy (see Figure 10). Since these figures are based on the self-reporting of community members it is possible that the true proportions of those washing their hands at critical times are even lower than those quoted. These figures suggest that hygiene education programmes in schools are not having the desired impact on hygiene behaviour in surrounding communities.



Conclusions and recommendations

Access to sanitation in primary schools in Zambia is woefully inadequate. While 96% of schools have some type of sanitation facility, only just over one third have permanent toilets, only 9% of schools provide adequate numbers of toilets for girls and only 29% have adequate numbers of toilets for boys. The predominant type of improved sanitation facility is the VIP latrine.

School enrollment rates seem to decrease for girls through Grades 3 and 5, although it is unclear why this is. While lack of sanitation facilities may play a role in discouraging the attendance and retention of girl students no correlation was found between pupil-toilet ratios and retention rates. However, for schools with unimproved traditional latrines only the retention rate for girls to Grade 3 was 28 percentage points less for girls than for boys, and the retention rate to Grade 5 was significantly lower for girls and boys. Improved traditional latrines appear to be just as effective in promoting school attendance as those facilities recommended by MoE.

The self-reporting aspect of the EMIS could be a potential source of sampling bias. This needs to be monitored closely to ensure that the census forms are completed correctly by head teachers and that data are accurate. Regular spot-checks of schools should be undertaken and observed data compared with that in the EMIS.

Statistical testing of relationships between sanitation infrastructure and primary education efficiency indicators can be strengthened by including analysis of other variables that may have an impact on these. User interviews could also be conducted to explore different reasons for high dropout and low retention rates. It is recommended that MoE undertakes rigorous analysis of the EMIS data using a greater range of variables and that this is triangulated with information from observation and interviews.

Hygiene education programmes were widespread in the sample schools, 87% of schools had handwashing facilities while only 45% had soap for handwashing. The impact of these programmes on hygiene behaviour in the school catchment areas appeared to be limited and self-reported rates of handwashing at critical times were unsatisfactory. There is a need to explore this in more detailed and to find more effective ways of implementing peer-to-peer hygiene education programmes.

Infrastructure support towards sanitation in schools in Zambia is long overdue, many schools are constructed without toilets and there is a strong need to incorporate sanitation facilities in the Ministry of Education's infrastructure development plans.

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Contact details

Dr. Peter Harvey
UNICEF, P.O. Box 33610, Lusaka, Zambia
Tel: +260-211-254709
Fax: +260-211-251546
Email: pharvey@unicef.org
www.unicef.org

Mr. Edwin Adenya
UNICEF, P.O. Box 33610, Lusaka, Zambia
Tel: +260-211-252055
Fax: +260-211-252055
Email: eadenya@unicef.org
www.unicef.org
