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The WRC operates in terms of the Water Research Act (Act 34 of 1971) and its mandate is to support water research and development as well as the building of a sustainable water research capacity in South Africa.

Female Urinals: An Appropriate Technology to Reduce Queues at Public Places

A Water Research Commission (WRC) study demonstrated the potential for acceptance of the introduction of urinals for girls and women in schools and public toilets in South Africa.

Background

Urinals are sometimes used to reduce the number of toilets required at a school, which typically reduces the cost per child served. Urinals can also reduce queues for school toilets and the need for small learners to use pit toilets that are not suitable for them. Urinals for girls and women have been used with success in some countries and are easy for young children to use, are cheaper and faster to build than toilets.

For younger children, using urinals for urinating may be easier, cleaner and safer than using pedestals, where they may have to use their hands to lift themselves onto a soiled toilet seat. For older children, defecating may happen only rarely at school and the primary need for a toilet may be for urination.

Where school facilities are inadequate it may be possible to add urinals more cheaply and quickly as an interim measure while resources are collected for improving toilets. Urinals for girls can sometimes be left unenclosed in the case of young girls who do not require privacy from each other. For older girls, urinal stalls with a water source can provide a means for cleaning and washing during menstruation. Provision of urinals for girls would have to take into account the need for bins for disposal of wiping materials.

This study demonstrates the potential for acceptance of the introduction of urinals for girls and women in school and public toilets in South Africa. Though the concept is relatively new and unknown, it is clear that there are existing problems which female urinals can effectively solve. Poor situations in school and public toilets do not keep girls and women from using them, and thus improved options are likely to be used.

Field trials with a wall-mounted urinal demonstrated that as long as urinals are kept clean; adequate education is provided; and privacy is provided, adoption and acceptance of the technology in schools is likely.



Female Urinal by LiquidGold.

The advantages that could be realised through urinals, as identified in that research, are as follows:

- **Safety:** If the school has pit toilets with some risk to learners of falling into the pit, the availability of urinals limits their exposure to this risk to just those occasions when they need to defecate.
- **Reduces burden on toilets:** If toilets are reserved for defaecation, the demand for them decreases dramatically. This can ease the situation at schools where the number of toilets is inadequate and reduce the number of toilets needed in the design of new toilet blocks. Where school facilities are inadequate it may be possible to add urinals more

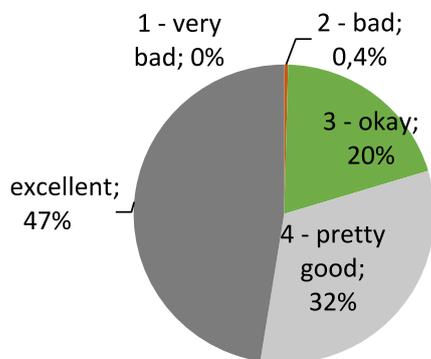
cheaply and quickly as an interim measure while resources are collected for improving toilets.

- Reduces exposure to disease: Using a urinal rather than a toilet eliminates contact with key disease transmission points in the toilets, including the toilet seat and flush handle, and possibly with the door handle as well. Small children using toilets that are too big for them may have to use their hands to lift themselves onto a soiled toilet seat, which represents an unacceptable level of potential exposure to disease.
- Overcomes difference in user size: A trough urinal can serve users of any size, overcoming difficulties for young learners who have to climb onto toilet seats if they are too high for them.
- Reduces odour: The unpleasant smell of pit latrines is partially caused by the mixing of urine and faeces, which produces ammonia. Separate disposal of urine eliminates it from the pit, reducing the offensive smell. In addition, urine around toilets is often a big contributor to the unpleasantness of public toilets. By eliminating urine from the toilets, the environment will be cleaner, drier and less smelly.
- Can be located close to the classrooms: While many schools prefer to locate pit toilets some distance from the administration block and classrooms to prevent the unpleasant smell of the toilets from reaching these buildings, this is

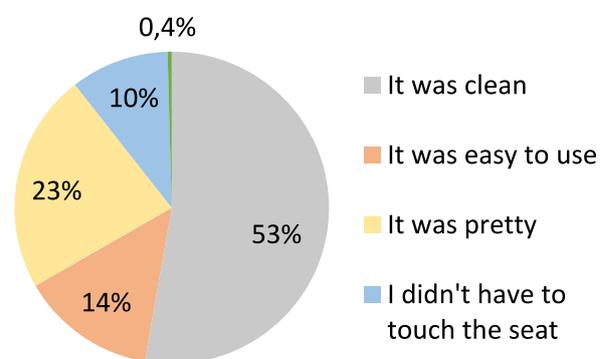
at the cost of safety and convenience. A small block of urinals, however, can be located closer to the classrooms or playground, making it easier for staff to monitor their use and reducing the amount of time learners spend during break or class using the toilet.

- Reduces toilet use time: A urinal is quicker to use than a toilet, reducing waiting times and congestion in the toilets.
- Aids in sludge management: As a result of eliminating urine to a large extent from the pit, sludge will be drier, making it easier to handle during manual emptying.
- Possible use of urine in agriculture: Urine is an excellent fertiliser and on its own does not contain the pathogens that may be present in faeces. If the school has established vegetable gardens, urine from urinals can be collected in a tank and used for this purpose. Urine should be diluted to 1 part urine: 10 parts water and poured onto the soil, avoiding the leaves of plants. Nutrient recovery technologies for separating beneficial nitrogen and phosphorus from urine are also in development and widely used in some contexts.
- Reduces water usage for flush toilets: Where flush toilets are in use, excessive water is often wasted to flush urine. By eliminating these wasted flushes through the use of waterless urinals, water will be conserved.

Main results



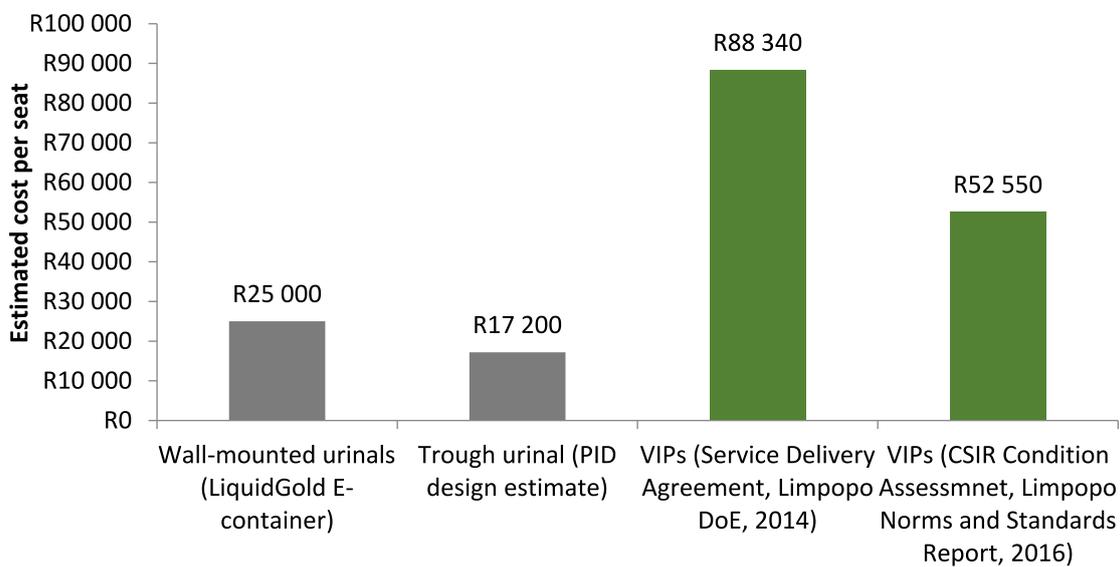
Results of users' experience while using the female urinal



Responses to the question, "What did you like most about the urinal?"

Due to the extensive benefits that can be realised and the acceptance demonstrated in this study, it is recommended that the Department of Education add female urinals as an option in their toolkit to address shortages in school sanitation and pursue refined designs for both trough and wall-mounted urinals.

Previous WRC research (WRC report K5/2381) demonstrated that most schools have an inadequate number of toilets. Average toilet-to-user ratios at schools assessed in the study were 1 toilet per 36 girls and 1 toilet per 37 boys, which is somewhat higher than the World Health Organisation recommendation of 1:25. The average presented here accounts for all toilets on the school grounds and does not factor in the number of unusable toilets at a school. Thus, in reality, the ratio of usable toilets to number of learners is likely higher in most schools. The need for more toilets in schools could be more cheaply and effectively addressed by implementing female and male urinals in schools.



Estimated costs per seat for urinals and VIP toilets, from various sources. Source: Neethling and Still (2018).



Female Urinal used in study.

Not only should female urinals be seen as a way to increase the number of toilet seats in a school, but they should be considered as a way to improve girls' experience with using the toilet at schools. This study highlighted that girls would prefer to use urinals if they were available at school, due mostly to their cleanliness and better hygiene.

Providing girls with an alternative to sitting on a dirty seat over a deep pit of sludge should be given priority. If urinals are provided for girls, girls will be forced much less frequently to use pit or full-flush toilets, which at schools, often put their health and safety at risk.

Pilot projects using both trough and wall-mounted urinals for girls should be initiated in schools in different parts of South Africa. These pilot projects should be accompanied by extensive education and monitoring and evaluation to solidify the feasibility of female urinals in South African schools and provide evidence for their further implementation.

These projects will also provide the necessary user feedback to refine the design of female urinals and generate a technology that enhances girls' experiences in school toilets. Longer-term pilot demonstrations of the technology will also contribute to management, cleaning, and maintenance guidelines for female urinals in schools. These pilot projects can also partner with nutrient-recovery entrepreneurs, providing more insight into the potential for urine reuse in agriculture in the South African school context.

On a larger scale, further work in the implementation of female urinals in schools and elsewhere can contribute to a number of the United Nation's Sustainable Development Goals (SDG). Implementation of adequate female urinals will contribute to SDG 6, Target 2, to "achieve access to adequate and equitable sanitation and hygiene for all." Female urinals in schools will contribute to SDG 3, good health and well-being, by providing a more hygienic and less odorous experience in toilets for girls.

Conclusion

Female urinals in schools can contribute to SDG 5, gender inequality, particularly where schools have pit toilets. While boys avoid using dangerous and unhygienic pit toilets by

urinating in urinals or outside, girls are presently forced to use the toilets at all times. Female urinals have potential to contribute to SDG 2, zero hunger, by providing women's urine, in addition to men's, for recovery of nutrients for use in fertiliser. It is simple to harvest urine from men, since they use urinals for urination. However, unless urine diversion is used in toilets, women's urine is mixed with faeces and lost in the pit or down the sewer. Implementing urinals for women allows for simple harvesting of urine from the other half of the population.

The implementation of female urinals in schools must be motivated by the need for increased health, safety, and dignity for learners. If their installation does not accomplish these improvements, there is truly no point in pursuing this new technology. As is demonstrated by many failed sanitation projects, any proven technology can fail to protect health, safety, and dignity of users if it is not designed, implemented, and managed properly. This is also true for female urinals, but if they are designed, implemented, and managed properly, the benefits could be numerous compared to the current options for girls and women in public and school toilets in South Africa.

Source:

Testing the acceptability of urinals among girls and women in South Africa (K5/2735) by J Neethling and DA Still.
Visit www.wrc.org.za for more information.