All Children Reading – ASIA (ACR-Asia)

Vision and Hearing Screening Pilot Activity Brief

On June 21 and 22, 2018, selected teachers, assessors, and medical officers from the Philippines National Capital Region (NCR) and Region-IV A participated in a two-day training to learn how to use electronic vision and hearing screening tools. The trained screeners then piloted the tools from June 25 to July 4, 2018, in a total of eight schools in the country. The activity was a proof of concept initiative that examined the feasibility of using electronic disability screening tools in the local school context. It also investigated how teachers might be trained to serve as effective screeners for students in their classrooms.

Internationally, school-based screenings are often conducted by non-medical staff or volunteers to determine whether a student might have a potential disability. Screening activities do not result in, or replace, a medical diagnosis by a trained professional. The aim of a school-based screening effort is to determine the need for referral for further evaluation and intervention.

Dr. Perla Vicenta M. De Castro, MD, of Region IV-A conducts a vision screening.

The screening tools used in this activity included hearScreen,[1] a hearing test application for Android devices and Peek Acuity,[2] a vision screening application that enables eye checks in homes, communities, and schools. The pilot activity included screening of a convenience sample of 1,218 students in grades 1–3 in four schools in NCR and four in Region-IV. According to 2017 Department of Education (DepEd) data, these two regions showed the highest prevalence rates of vision and hearing impairment in the country.[3]

Pilot Activity Tools and Data Collection Methods

To administer the hearing test with hearScreen, the screener places a noise-cancelling headset, calibrated to the specific screening device, on the student. Standing behind the child, the screener then asks the student to respond to a series of beeps in either their right or left ear by raising their corresponding hand. The application plays the beeps at various frequencies and at different noise levels (in decibels) to detect to what degree a student might experience difficulty hearing and in which ear(s). The hearScreen application also records the level of ambient noise (talk, traffic, construction, etc.) present at each beep.

Dr. Josefino DL Lu, Education Program Supervisor, administers a hearing screening to a student in NCR.

To administer the vision test with Peek Acuity, the screener stands facing the student, holding a tablet where the student can see it. The student then covers one eye at a time. The symbol “E” appears on the screen of the tablet and rotates and changes in size throughout the duration of the test. The child responds by pointing in the direction the symbol is facing. The test detects whether a child is experiencing difficulty seeing, at what severity level, and for which eye.

[1] For more information, visit https://www.hearxgroup.com/hearscreen/
[2] For more information, visit https://www.peekvision.org/

[3] Consolidated SPED Data 2016–2017, Enhanced Basic Information System Learner Information System (EBIS-LIS) Office of the Planning Service, DepEd

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The pilot activity included three types of screeners: eight teachers, four medical officers, and six government employed data collectors (in this case, school administrators such as principals, district supervisors, education program supervisors). Screeners were assessed for their ability to conduct the screenings and accurately record responses in the electronic applications. All participating screeners, including teachers, had previous training related to inclusive education. Unlike the medical officers, none of the participating teachers or government-employed data collectors had previous experience using hearing or vision screening tools.

Two screeners observe Dr. Khareen M. Cadano, MD, of Region IV-A and score her accuracy as she performs a hearing screening.

The activity also examined screening conditions at the schools and their effect on the reliability of results. Prior to every student's screening, screeners recorded information about the selected screening space. Finding a private and quiet screening location was key to this effort; 45% of the screenings took place in an empty classroom, 38% in classrooms with other students or teachers present, 8% in small offices, and 6% in outside public areas. Four percent of screenings took place in private areas outside or other locations.

To collect the data, screeners travelled to each of the eight schools, spending on average six hours at each school. Each participating school received information about the activity in advance, including information for parents. With this information in hand, parents were asked for their consent to have their child participate in the activity. Students were not selected randomly. The activity targeted specific grades in each school. The screening team then screened as many sections (or all sections) within the selected grade as possible during the duration of the visit. Across the eight schools, screeners screened a total of 1,218 students, 50% of whom were girls. Within the sample, 190 students were grade 1 students, 814 were grade 2 students, and 214 were grade 3 students.

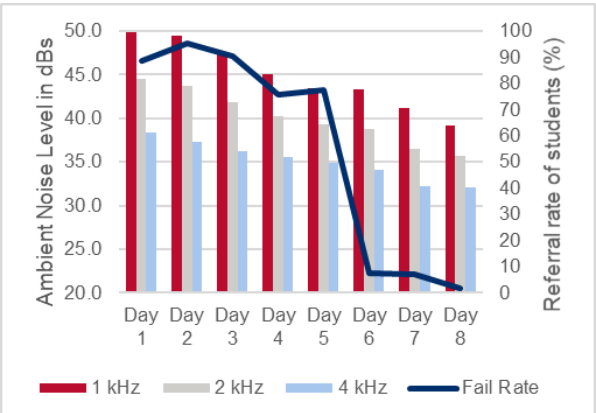
Pilot Activity Findings – Student-Level and Screening Context Results

The vision screening activity identified a total of 76 (6.2%) of the 1,218 participating students with a potential vision impairment. Of these, 3 students (0.2%) were screened for a severe vision impairment, 44 students (3.6%) for a moderate vision impairment, and 29 students (2.4%) for a mild vision impairment. There were no significant gender differences in these results.

An analysis of the screener observation data, school screening condition information, and screening results data indicated a high degree of feasibility and reliability in the use of the vision screening tool in participating schools and by all three types of screeners.

These findings contrast with results of the analysis of screening conditions for conducting the hearing screenings at the participating schools. The hearing screening protocol had to be adjusted repeatedly throughout the pilot due to significant ambient noise levels, despite screeners' efforts to find quiet places on school grounds. Across the eight schools, screeners noted noise distractions for nearly 75% of the screenings. Ambient noise can distort results and falsely indicate a potential hearing impairment when there is none. The pilot activity thus examined feasibility of different protocols available within the hearScreen application, incrementally adjusting the sound level at which the beeps are being played and the number of frequencies a child needed to fail to be referred for a potential hearing impairment. **Exhibit 1** indicates average ambient noise levels and referral (fail) rates for each day of screening. The most viable protocol tested students' hearing at Frequency

Exhibit 1. Average ambient noise levels by day and frequency



an initial 30 decibel and required the child to fail at least two frequencies in at least one ear.

Using this final (recommended) protocol, the hearing screening activity identified a total of 72 (13%) of the 555 students screened on this protocol with a potential hearing impairment. Of these, 8 students (1.4%) were screened for a moderate-severe hearing impairment, 16 students (2.9%) for a moderate hearing impairment, and 48 students (8.6%) for a mild hearing impairment. There were no significant gender differences in these results.

In summary, the pilot activity was able to confirm that electronic vision and hearing screening tools can provide effective screening approaches within schools. However, their use requires in-depth pre-testing of screening protocols and logistics to ensure reliability. Within the Filipino context, this might require incremental testing of various hearing screening protocols, testing outside of school hours, or even the decision to not use an electronic hearing screening tool if the chance for false referrals is high given elevated ambient noise in the setting. As shown in **Exhibit 2**, the issue of ambient noise in schools more generally is actively recognized and regulated by the Philippines Department of Health.

Exhibit 2. Code for acceptable noise levels on school grounds

b. Noise. The school site shall be so selected that the intensity of noise field in which the building is to be constructed will be as low as possible. Noise levels at the school site shall not exceed 70 decibels. The acceptable noise levels in the school shall be as follows:

Table 1. ACCEPTABLE NOISE LEVELS IN SCHOOL AREAS

TYPE OF ROOM	ACCEPTABLE NOISE LEVELS (DECIBELS)
Classrooms	35 to 40
Hearing Test Rooms	Less than 40
Music Rooms	Less than 40
Health Rooms	Less than 45
Cafeterias/Canteen	50 to 55
School Sites (outdoor noise level	Less than 70

Source: Philippine School Sanitation and Health Service Code

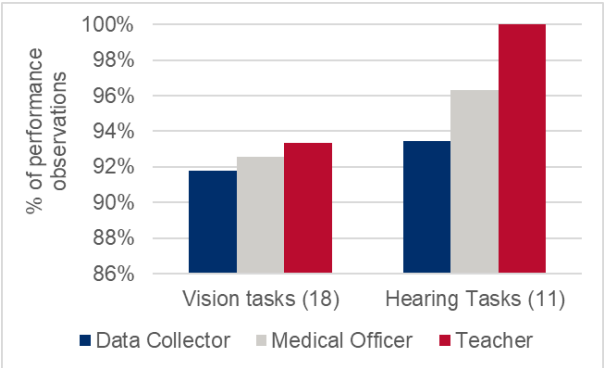
Pilot Activity Findings – Screener-Level Results

Concerning teachers' potential role as screeners for their classroom students, all screeners, teachers, government-employed data collectors, and medical officers reported the tools as easy to administer. Over 64% of teachers, however, wanted more training to perfect their skills. In future efforts, the two days of initial training provided under the pilot activity may need to be extended to further optimize time for practice. The government-employed data collectors highlighted the usability of the tools, recognizing that their confidence and mastery of the tools improved throughout the pilot. This group of screeners also found the two-day initial training to be adequate, hands-on, and practical. Medical officers noted that the tools were easy to use and (with adjustments throughout the pilot) seemed to produce accurate results. Additionally, the medical officers commented that the screening tools might be more reliable and time efficient than other methods they frequently used to screen children, such as tuning forks. This type of screener also wished for more training and practice on using the tools in advance of the screenings.

Teachers, data collectors, medical officers, and DepEd Central Office staff gather for a group photo during training.

Teachers showed similar improvements in the use and application of the tools throughout the course of the activity, as did government-employed data collectors and medical officers. As shown in **Exhibit 3**, teachers also made fewer errors in administrating the screenings compared to medical officers and government-employed assessors. The results presented in Exhibit 3 are based on performance observations[4]. One or two screeners observed a primary screener and scored performance during the screening based on ability to accurately record student responses. There were a total of 11 tasks for the hearing screening and 18 for the vision screening.

Exhibit 3. Percent of screener performance observations without errors by screener type (n=103)



[4] Each screener was observed 4–8 times throughout the pilot; in total, there were 103 screener performance observations conducted.

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Furthermore, observational data from the activity seem to indicate that teachers had noticeably better rapport with the students, compared to the other two groups of screeners. In summary, pilot activity results indicated that with adequate, practical training of an estimated 24 hours in duration, teachers should be able to effectively use electronic screening tools with their classroom students.

Recommendations

Several initial recommendations emerged from this screening pilot. First, screening tools, electronic or not, must be carefully selected in consideration of the type of disability to screen for, the purpose of the screening activity (and related to use of the resulting data), the age of the child, the resources available for screening and screening follow-up (see below), and the screening context. Related to the latter, screening efforts must invest in careful initial field tests to establish locally appropriate logistics guidance for screeners on where and how to set up adequate screening spaces, especially in noisy school environments. Such field tests should also include comprehensive testing of electronic hearing screening tools to identify the most viable protocols for the context in advance of full rollout.

Further, while teachers performed well in comparison to other screeners in the pilot activity, future training efforts might have to include additional practice opportunities to build confidence and skills in using the tools.

One benefit of deploying teachers as screeners is that, as a result, they would be immediately aware of a potential vision or hearing impairment among their students. Having this knowledge can be useful to better align their instruction with diverse students' needs. Findings from the pilot indicate, however, that teachers might not be aware of specific approaches to modify their classrooms and practices to teach more inclusively. When asked about how they might use the results from the screenings, most teachers indicated informing the students' parents for follow-up. Few teachers responded with action items they could take in their classrooms. Furthermore, most participating teachers struggled to specify what support might help them better meet the needs of students with a vision or hearing impairment in their classrooms. Even if and where resources are limited, teachers and schools should receive some form of guidance and support in how to follow up screening efforts. This might include locally appropriate information packages on foundational inclusive practices (e.g., repeating important questions and responses, describing pictures, writing in large letters on the blackboard, speaking loudly and clearly facing the class), materials, or training. However, more consideration, training, and/or intervention programs may be necessary to support teachers in using the results effectively to improve all students' learning in the classroom.

A key consideration in the implementation of school-based screenings is the socio-cultural dimensions of conducting such a program. There are potential risks of labeling and stigmatization should students' screening outcomes become wider knowledge or result in specific activities to improve the child's educational experience that may be different from those of the other children (e.g., sitting in the front, receiving different materials or auditory supports, engaging differently with the teacher). School and community disability awareness initiatives are thus important to accompany screening efforts. Screening activities also raise expectations among students, parents, and teachers for follow-up and support that must be acknowledged and planned for. As was the case in this screening pilot, a significant number of parents did not give consent to have their children tested. Further research into the causes and drivers for such decisions will be critical to inform future screening efforts.

To request information on the Vision and Hearing Screening Pilot Activity in the Philippines:

Student Inclusion Division-Bureau of Learning Division, DepEd
Bld.sid@deped.gov.ph

Monica Ang-Tan, Project Management Specialist,
Mang-tan@usaid.gov

Kellie Betts, Education Analyst, RTI International
kbetts@rti.org

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