Introduction

India hosts a significant portion of the global visually impaired population, constituting one-third of the 2.2 billion affected individuals (Hindustan Times, 2017). In India, there are about 400+ special schools dedicated to the visually impaired students employing 2000 teachers, of whom 60% are persons with visual impairment. (Vikaspedia, 2020) Even among the school going VI children, many do not study science and mathematics beyond the seventh grade. The current STEM pedagogy is highly visual, making it inaccessible for students with visual impairment. (Parthasarathy, Dey, Gupta 2021).

To make the curricular content accessible for the VI population and also enable and empower the teachers who play a pivotal role for creating an inclusive learning environment with well-designed pedagogical materials, Learning Management Systems are a necessity. With the introduction of screen readers, VI individuals can now navigate web and mobile applications. Furthermore, the World Wide Web (WWW) Consortium has proposed Web Content Accessibility Guidelines (WCAG) to design software products like NVDA and JAWS. Tying these needs, an accessible Learning Management System was envisioned by Vision Empower (VE), a non-profit organization. This NGO has been successful in addressing institutional voids in the education sector (Parthasarathy, Dey, Gupta 2021). One of their prominent solutions is the accessible Learning Management System (LMS) called Subodha.

Subodha LMS was created using the Open EdX platform for sharing inclusive and accessible content and pedagogical approaches. It is used for the dissemination of accessible STEM content for K-10 created by the team.

Features :

a) Login-based system for teachers and students.
b) Diverse content including various school curricula, tutorials on numeracy and digital literacy.
c) Teacher Instruction Kits for various grades and boards
d) Available as an Android as well as a Web Application.
e) WCAG compliant, screen reader-friendly UI.
f) Additional toolkit to enable equitable access for low-vision and colour-blind users.
g) Indian regional languages support using Translation Management System.

While Subodha presents a platform for the publication of rich and curated content, upon deployment of the LMS, the feedback from the field showed that the teachers' usage of this application as a stand-alone repository was slightly restrictive in terms of how they used the content. Once broadcast through Subodha, the teachers could use the information, but had no means to discuss their experiences. Feedback about the content, clarifications, queries, issues, context-specific challenges were all emerging from the field. While these were heard on the one-on-one calls, given the increasing number of users, it was clear to the VE team that a community of Subodha users needed to be created and managed. VE also wanted to foster a culture of discussion and discourse that lead to bettering the quality and quantity of the content of Subodha. The Subodha users had common interests (about the accessible curriculum and content), a strong passion in making this available for the VI children using assistive technologies, and were connected by the VE organizational structure. Thus, this group ideally formed a Community of Practice that could exchange their ideas, questions, clarifications and discuss about the various aspects of the LMS from their contextual experiences.

The key interactions among the members of the Communities of Practice are communication and collaboration. WhatsApp, has been a commonly used tool for these needs. Being freely available in India, it is also very prevalent for communication among families, friends and work teams. To leverage the familiarity of this application for Subodha LMS discussions, it was decided to provide a way to launch WhatsApp from within the Subodha Application, opening into the appropriate group chat (Example: "Science Group", "Maths Group" etc.) Users joined the groups they needed to prior to this.

Once the chat was launched, to provide the context for the discussion, shortcuts to copy-paste from Subodha into the chat window were planned for. In the pilot testing phase, a test group was linked to the Subodha.

Pilot Test Cases (tested by sighted and non-sighted VE team members):

a) Copying text into WhatsApp from Chrome browser manually and with the last phrase from the screen reader
b) Using the talk back gestures (like double tap, hold etc.) and checking for their functionalities. Select all from the screen and paste in WhatsApp
c) Voice search and copying the result to WhatsApp using gestures (double tap and hold to copy; three finger triple tap to paste)
d) Testing with the student and teacher logins

e) Testing with regional content from the LMS

The results of these actions were posted in the WhatsApp group for verification. The bugs reported in the testing group were looked into and resolved.

The pilot testing revealed the various accessibility and navigation features that were needed to launch WhatsApp from Subodha and to copy the content to set the context for the discussion. Once pasted, the poster could send subsequent messages to continue the discussion. The pilot proved the case of useful integration of WhatsApp with the LMS for the purpose of creating and managing the Subodha Community of Practice.

Conclusion:

The messages asking "Is this the Math room?", "Is this the Subodha adda?" when people joined the WhatsApp Groups, gives the visualization in the minds of the users - that of entering dedicated spaces where they could discuss with their community of practice. Integrating a communication and collaboration solution along with the LMS is a promising way to encourage more users to effectively use the LMS itself. Our approach leverages the existing familiarity with WhatsApp making it more convenient. The design to launch specific groups and the various accessible UI/UX features to embed the context from the LMS to WhatsApp, make it seamless to access as well as discuss about the content within the Community of Practice. As next steps, we intend to onboard all the teacher and student users of Subodha into the various groups and encourage discussions about the content regularly.

Acknowledgement:

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References

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