

Hello Teacher

Team: Darth Guavadars

INTERNATIONAL DEVELOPMENT & DESIGN SUMMIT

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Team: DARTH GUAVADERS

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0. Project abstract (idea)

Education is basic right of every person – regardless of gender, religion, ethnicity or economic status. A nation can be strong with education citizens and a strong system of education will play a vital role in the advancement of any nation. Pakistan follows decentralized system of education administration with all institutions being under the purview of respective provincial administrations. Education reform has been high on the government’s agenda, but a recent policy recognizes weak governance of the education system, low resource commitment, and the lack of a uniform national education system resulting in uneven quality and parallel systems of education that are not available equally to all strata of society. The policy also stresses the importance of leveraging ICT to improve quality and access at all levels.

Context

1. Background

In the recent report by the World Economic Forum (WEF), Pakistan ranks 113 out of 124 in the ‘Human Capital Index’ because of its poor performance on educational outcomes. At present, about one third primary school age children are out of school, 42% population (age 10+) is illiterate. A total of 12 million 15 to 24 year olds lack basic skills, which is the second highest number in developing countries. Wide discrepancies persist in education indicators pertaining to provinces, location (urban vs. rural) and gender. At the national level, about two third woman of age 15+ cannot read and write, and 35% girls remain out of school. There is general scarcity in terms of resources, one of its most eminent manifestations being the high student teacher’s ratio. In class of 65-90 students, teachers just cannot properly take a look after every individual, and provide that personal side of education which is important.

2. Community Description

Working with public government school, we had firsthand understanding of community. Our team visited a public government school as opposed by an organization-admired school. The “Government Boys School Tajpura” is all boys, with around 3000 students and 65 teachers – This extremely high student teacher ratio is a paramount problem. The school is both an elementary as well as secondary school. The teachers for the elementary school are both female and male and the teachers for the secondary school are all male. Classes last 35 minutes and there is a short lunch break for the students and teachers to have something to eat, but they are allowed to leave the premises. As of now, there are no ICTs being used in the school and no working computers. However, most of the teachers have phones. Around 95% of the younger teachers have smart phones and the older teachers mostly have feature phones. Students are not allowed to use phones in the school. It is estimated that around 30% of the students have their own phones.

3. Problem Framing Statement

Teachers of English in government schools find it challenging to engage 6 and 7 class students enough to enable mastery of the subject; causing students to depend on academies.

We will develop an ICT system to assist teachers to enhance classroom engagement in English.

This is so that the students can achieve mastery of the subject without depending on academies.

Design Process

4. Problem Framing Tree

- Learning will improve if parents feel empowered in their children education.
- Having interactive learning methods will create more interest and better learning outcome.
- Students study in academies.
- Students who go to academy are more successful academically.
- If parents are supportive of their children in term of finances, outcome is good.
- Parents are willing to help improve the children education.
- Awareness is needed for teachers and students to introduce interactive methods (games or other apps which help in learning while playing).
- Parents care about their children education.
- Parents don't know how to participate in their children's education.
- There are success stories of parents boosting their children learning.
- Parents have their resources to spend on their children's education.
- Teachers do know and notice if parents participated in their children education.

5. Value proposition

- Supports the teacher in managing the classroom progress, and increasing student engagement in the classroom.
- Helps the teacher to increase the efficiency in marking large numbers of quiz sheets.
- Gives feedback to the teacher on individual student and group performance.

6. Summary of design process

i. Design Requirement Matrix:

USER NEEDS	WHAT MEASURE	HOW TO MEASURE	GOOD VALUE	BEST VALUE
User friendly	Learning curve	Time (Minutes)	< 60	< 30
No additional workload	Time taken daily	Time (Minutes)	< 35	< 15
Affordable	Cost of solution to School	Rupees	<1000	0
Effective	Student marks	No of students getting better marks	15%	30%
Updatable				

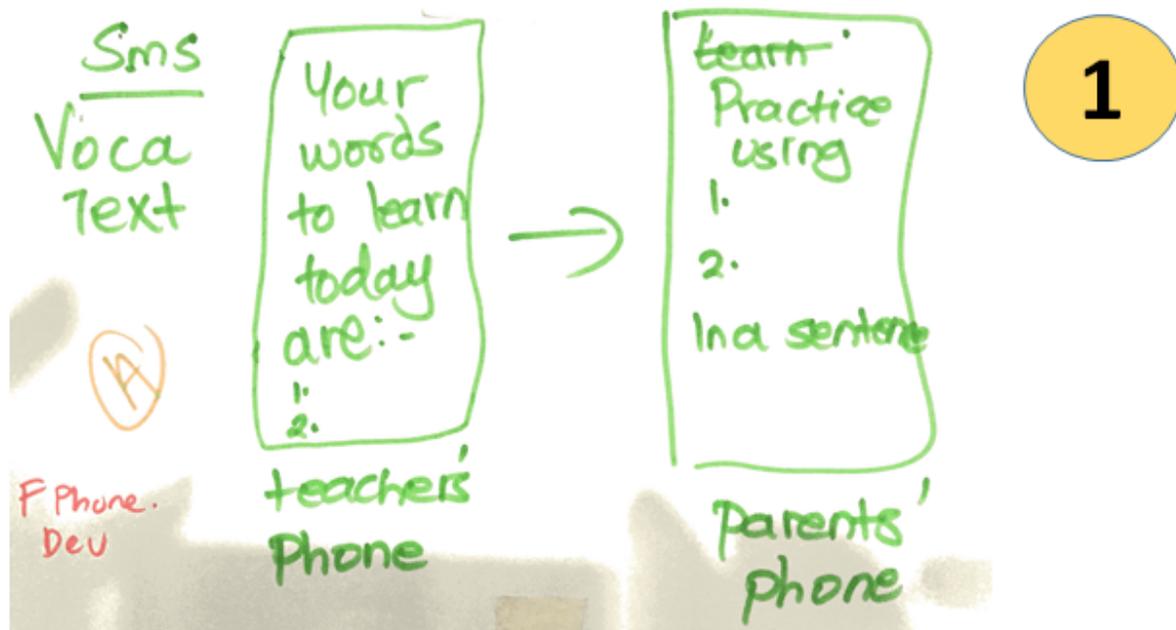
ii. Idea Generation:

Following is the list of ideas that were generation during design process:

1. Teacher ranking/incentive: give gold, stars or vouchers
2. Interactive English games
3. Group students in number of at least five
4. Gamification
5. Group role plays
6. Let students speak in English
7. Flash cards (English words card games)
8. Give milk to students
9. Cartoons for grammar leaning
10. Give students chocolates as incentive
11. Special points for talking in English language
12. Story narration of famous personas or movie heroes in English language
13. Making leaders in class
14. Sports activities in English
15. Mobile app for interactivity
16. Extra classes for parents
17. Incentives for parents to help children
18. Fellowship for teachers
19. Teaching English poetry and songs
20. Use YouTube.com for leaning purposes

21. Use simulations of various concepts
22. Practice exercises of basic English language
23. Peer to peer discussion
24. Let students watch English animated movies.
25. Competition of English words and then turn them into game.
26. Story writing
27. Innovative games in class
28. Doing homework using ICT solutions.
29. "Translation to English" mobile app
30. English dialogues
31. Let students watch movies with subtitles.
32. Student's theatre space that could be used for English language learning.
33. Teacher would hop for 5 times when students get the concept right (Teacher should dance a bit).
34. Make rhymes for basic concepts of English
35. Let students to connect with foreign students so that they can talk to one another. You may use Skype app for this purpose.
36. Demonstrate words physically
37. Bring parents for teaching
38. Extra points for students who teach other students
39. Teachers can teach students to act, role, and play.

iii. Concept Selection:



2



CLASS iA

- BOX HARDWARE
- Electronic

3

SPhone Dev. Collaboration - Recognition - Gamification



System to manage gamification collaboration of students



4



4a

Teacher
Dashboard
for teachers
Dash!

You get a voucher
for Rs 800 from
Foodpanda!

Good morning
Ms. Nadia
How do you rank
against your friends
today?

1. Ms Naheen

2. Ms Nadia

3. Mr Omar

Spone
Dev.

5



Class 2 Class

connect groups of 2 students to
groups of 2 students in another country
who have class at the same time via
smart phone & have them solve a task
that requires to get info forth & back

6

7. Analysis and Experimentation

During the course of The Summit, we were able to carry out several small scale experiments and analysis within the team, and with targeted users. The feedback is detailed in the next few sections, while we note below our observations during those experiments.

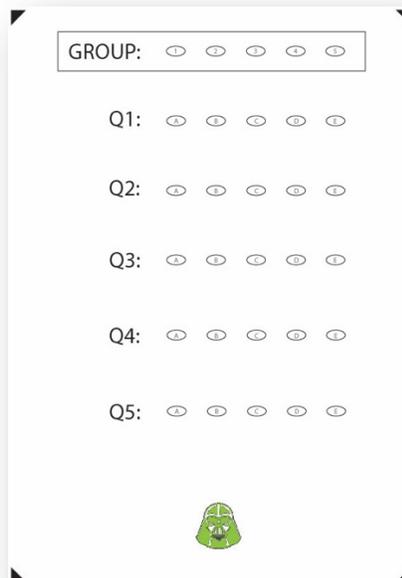
Of the features listed in section 9, we were able to experiment the audio lessons feature as well as the quiz-marking feature.

We settled on audio lessons, as opposed to the projector idea, as on it's own, it would be a feasible approach cost-wise. Apart from that, our focus was on English lessons, hence an audio only approach is acceptable. To carry out the testing, we recorded several samples of English language lessons onto our app.

In a classroom setting, when we tested the audio lessons, we found the response to be generally enthusiastic to this approach, within the boundaries of our limited lessons samples. Further testing could be done to analyze which sections of the English language syllabus is more suited for audio lessons, as well as which type and configuration of Bluetooth speakers is sufficient. We note that some classes are held in 'open-air' environment, therefore the acoustics of the venue should be taken into consideration.

For the quiz-marking feature, it took several iterations to get the marking feature right. The current answer sheet we used is below. During our experiments, we found that that as long as the marking was unambiguous (completely cover the circle, with a dark blue or black ink), the results would be accurate. There is space between the answers if teachers wanted to elaborate on the answer selections.

One feature idea that we did not manage to further explore is automated answer sheet generation, that could be useful to ensure that the answer sheets used have a higher reliability of being read properly by the software.



8. Design Requirements

As per item 6.1

9. How it Works

i. General overview of features

The features of the final prototype can be grouped into four main categories.

Firstly, the application helps the teachers in managing their classes, akin to a digital personal diary. The app can track the progress of each of the teacher's classes in terms of pace and progress through the given syllabus.

Secondly, and one of the core features is the audio lessons. Since our focus is the English subject, the teachers have a selection of audio lessons, based on the syllabus, to play through the Bluetooth speakers. These audio lessons can be paused and repeated as the teacher sees fit. Our field study confirmed that audio lessons are suitable for language based subjects and early indications show that students are enthusiastic about them.

Thirdly, our solution is able to mark quiz papers quickly. The teacher needs only to take a photo of the answer sheets and the app will revert the results, all with his or her smartphone.

Lastly, the app can be configured to track students' performance. This feature is used in relation to the quiz papers marking.

On feature number four, the application can also be configured to track the overall or average class performance, track the average teacher's progress or even flag difficult components of the syllabus. All of which would be critical feedback particularly to the government agencies, such as the Punjab IT Board, that can use this data as feedback to educational initiatives.

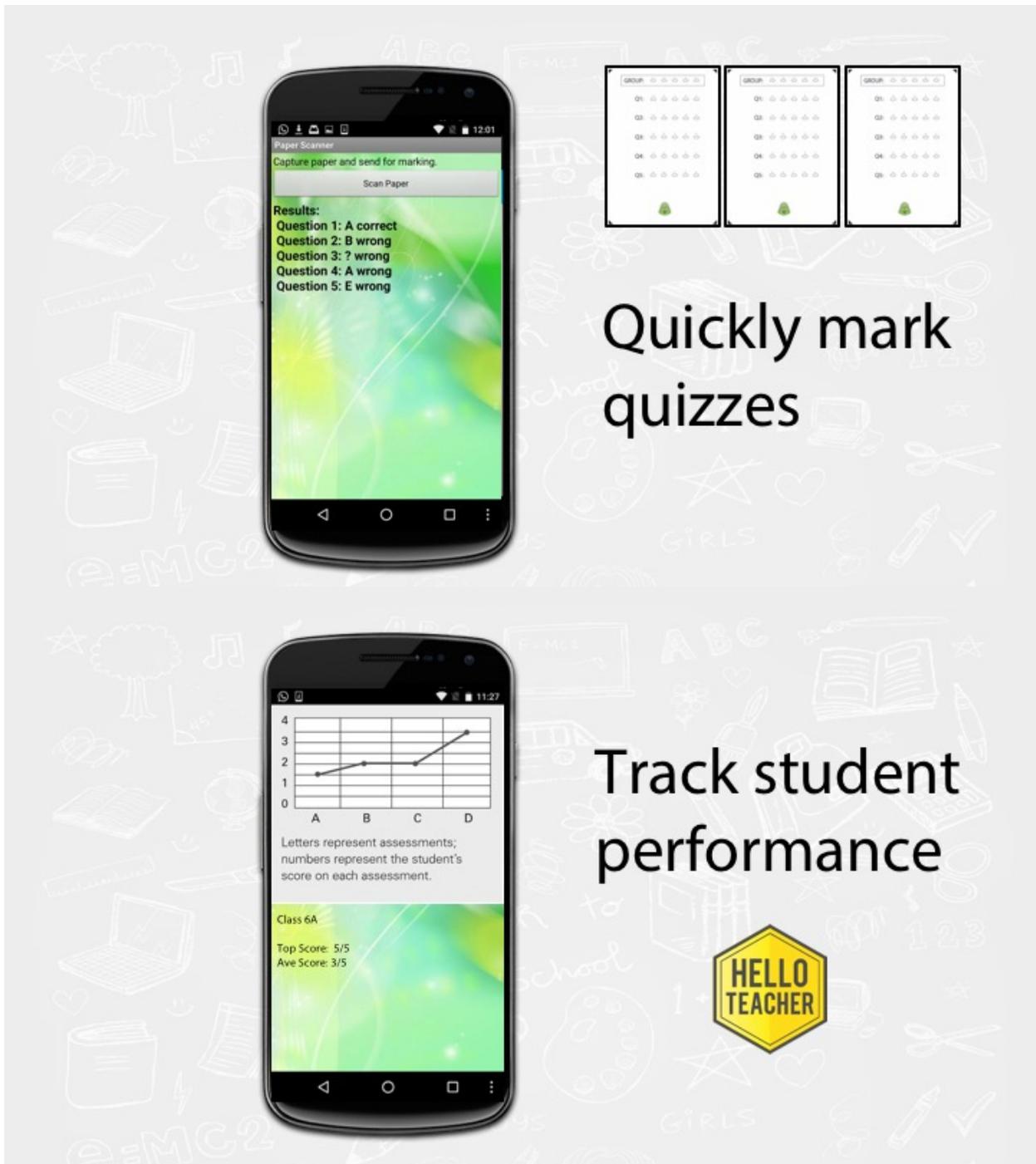


Manage your multiple classes



Engage the class with audio lessons via a speaker





Quickly mark quizzes

Track student performance

ii. Technology

For hardware, the technology needed is off the shelf android smartphone and a Bluetooth speaker.

For software, our prototype was developed using MIT App Inventor as proof of concept, and hence can be easily replicated using standard developer tools and programming languages.

The prototype feature that helps to quickly mark quizzes was developed using proprietary technology from one of our team member's organization in Brazil, although there are also open source optical character recognition technologies available.

10. Performance

Apart from the experimentations, full performance was not tested during our field visits.

11. Bill of Materials

The bill of materials covers setup for one classroom session.

Part	Quantity	Source	Cost	Notes
Mobile Phone	1	Government	< USD 50	Android-based smartphone
Mobile Application	See Note	Project Team		Once Off
Syllabus Content	See Note	Government		Once Off
Answer Sheet	See Note			Printouts depend either individual testing or group work.
Bluetooth Speaker	1		< USD 10	

Lessons Learnt

12. Community Feedback

We have obtained feedback from members of the community with regards to the project. Some of these insights are general comments that may not affect the project directly, but could be useful nonetheless.

Feedback from Mr Waqas from ITU/PITB (Special Project):

1. The ability to monitor classroom progress would be beneficial for the government.
2. Working on acquiring the English Syllabus content for the product has to be the next step in development.
3. Perhaps a ranking system for teachers who do well with the product / or syllabus (based on the product)
4. Additional feature: Text to Speech
5. Likes the idea of using speakers. An economical alternative to their own project of LED Television in class.
6. Pause-play function.

Feedback from Mdm Temina from PITB:

1. The audio syllabus should have a neutral accent.
2. Focus should be given on the syllabus preparation to ensure the quality.
3. Considerations should be given to smartphone usage and teachers' familiarity with them.
4. To look into the reach of a speaker in a large classroom
5. To carry out more work on the business model
6. To ensure it does not give additional work to teachers.
7. Extra features could be put in, such as a bi-lingual dictionary.

13. User Feedback

The feedback from teachers that were interviewed were generally positive.

1. Some teachers would teach English in Urdu, so likes the idea of audio recording.
2. Likes the music played between audio soundbytes, as it keeps the students interested.
3. Some schools would not allow teachers to bring smartphones to class.
4. Excited about the quiz marking element as it is a tedious task.

14. Troubleshooting

During testing, we faced only minor glitches, but a majority revolved around the module that marks quizzes. As this specific module is working well elsewhere, we believe given more time to test and tweak it for this project, it would not be a major issue.

Next Steps / Project Future

15. Reflection on Project Viability and Other Design Opportunities

The project, in its current scope, has strong potential. As a solution to a specific problem, the project does not currently have any competition within the Punjab Education sector. As of now, the Punjab Government is focusing on providing TV and learning modules that focus on STEM subjects. Thus, our solution, which focuses on English language, is not yet addressed, and can actually be a complement to the government's current efforts.

For the English syllabus, there are two options that can be pursued. In the first option, it could be designed and developed the same way that the STEM subjects of the current project are developed, that is through the Virtual University.

In the second option, it can be developed with the help of a third party entity. In Bangladesh for example, the BBC has a program called BBC Janala which is a multi-platform service that facilitates English language education. They are funded by the UK government's Department for International Development (DFID). This is but one example, but we believe there are many avenues such as this to take the project a step further.

16. Continuity / Dissemination Model

There is a general consensus to continue the project amongst the team members, in one form or another. Team members from foreign locations will check the viability of replicating the project in their current locations. At the same time, they will continue to support the team's focal persons within Punjab.

The focal persons, our two team members residing in Punjab will be the main liaison for the project. It is hoped that we would be able to incorporate the support of IPAL lab, and expand the team to include students from ITU to take the project forward.

For the software, the next logical step is to move out of the prototyping environment, and rebuild it to full production.

17. 6-Month plan and Team Engagement

It is planned to have monthly engagements with the team with regards to the project to consolidate the project in terms of the direction best to take, and plan the details of the immediate next steps.

18. Anticipated risks and challenges

It is anticipated that securing English language content is key to have any viability in the model. Without sufficient and syllabus-relevant content, the project would not be able to meet its goals of assisting teachers in engaging

Furthermore, the project in its current form, has to have full support of the government in order to be successful. This is because any project related to education in schools would have to have some form of ministry approval and oversight.

19. Stakeholders

Our field visits and interviews have validated our assumptions that it is prudent to focus on Teachers and the Punjab Government as a catalyst to develop the project further. The Punjab Government, and by this we mean the Punjab IT Board, as well as the state organization in charge of education, has the authority to approve and promote this project for wide implementation.

Similarly, and ultimately, the project is designed for use by teachers, and to that end, the final product has to be suitable and usable by teachers.

Stakeholder	Interests in Project	Effect of project on interests	Importance of stakeholder for success of project (U= unknown, 1=little to 3 = very)	Degree of influence over other stakeholders (U= unknown, 1=little to 3 = very)
Principal	Wants to support initiatives for school	+	2	3
Teachers	Wants to be more effective on the job Does not want to be burdened by additional work.	+ -	3	3
Parents	Wants children to do well in school	+	2	2
Students	Wants to enjoy school	+	3	2
Punjab Government (including Punjab IT Board, Directorate of Staff Development)	Wants to track student performance / teacher performance.	+	3	3
Academies	Wants more customers / students.	?	U	U

Contact Information

20. Team members and point of contact

Team members:

1. Sehar Ayesha (seher.ayesha@gmail.com)
2. Erik Miguel de Elias (erikmelias@phac.com.br)
3. Mugethi Gitau (mugethib@gmail.com)
4. Muhammad Zahid Iqbal (zishami8@gmail.com)
5. Hazwan Razak (hazwanrazak@gmail.com)

Design facilitator: Maurice Jakesch (mpjakesch@gmail.com)

Our main contact people are Sehar and Muhammad Zahid, both of whom are currently based in Lahore.

21. Community Partners

During this project, we have liaised with:

- 1) Government Boys' School of Tajpura. This is the location of our field visits and our partners in co-creation.
- 2) Punjab IT Board (PITB). The PITB is a wealth of knowledge and expertise. They are in charge of and working on some amazing IT related innovations for the classroom, and our work is can possibly be a complement to theirs.
- 3) ITU – IPAL. A potential resource, especially in terms of expanding this specific project team to include more local personnel to take the project forward.