

Peer Based Learning Application

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Introduction

- High pupil to teacher ratio has affected normal teaching mode and also the presence of different learning styles has led to the high adoption of peer learning.
- Peer learning is learning where learners don't learn in a traditional teacher centered approach but by joint effort amongst students or students and teachers (Smith, 1992).
- Peer learning has been identified as an effective way to improve students performance (Safqat, 2011).

Problem Statement

Use of Intelligent Tutoring Solutions (ITS) can be used with the goal of aiding in classrooms that have high pupil to teacher ratio. The use of ITS has the following challenges

- i. It does not work well with non-structured domains subjects that depend on different explanations or even context.**
- ii. This affects the adoption of ITS across all domains, this evident from the existing solutions that most of them focus on Maths' and Physics**
- iii. This begs the question what can be integrated with ITS to aid in learning across all domains?**
- iv. Also can out of school students benefit from the solution?**

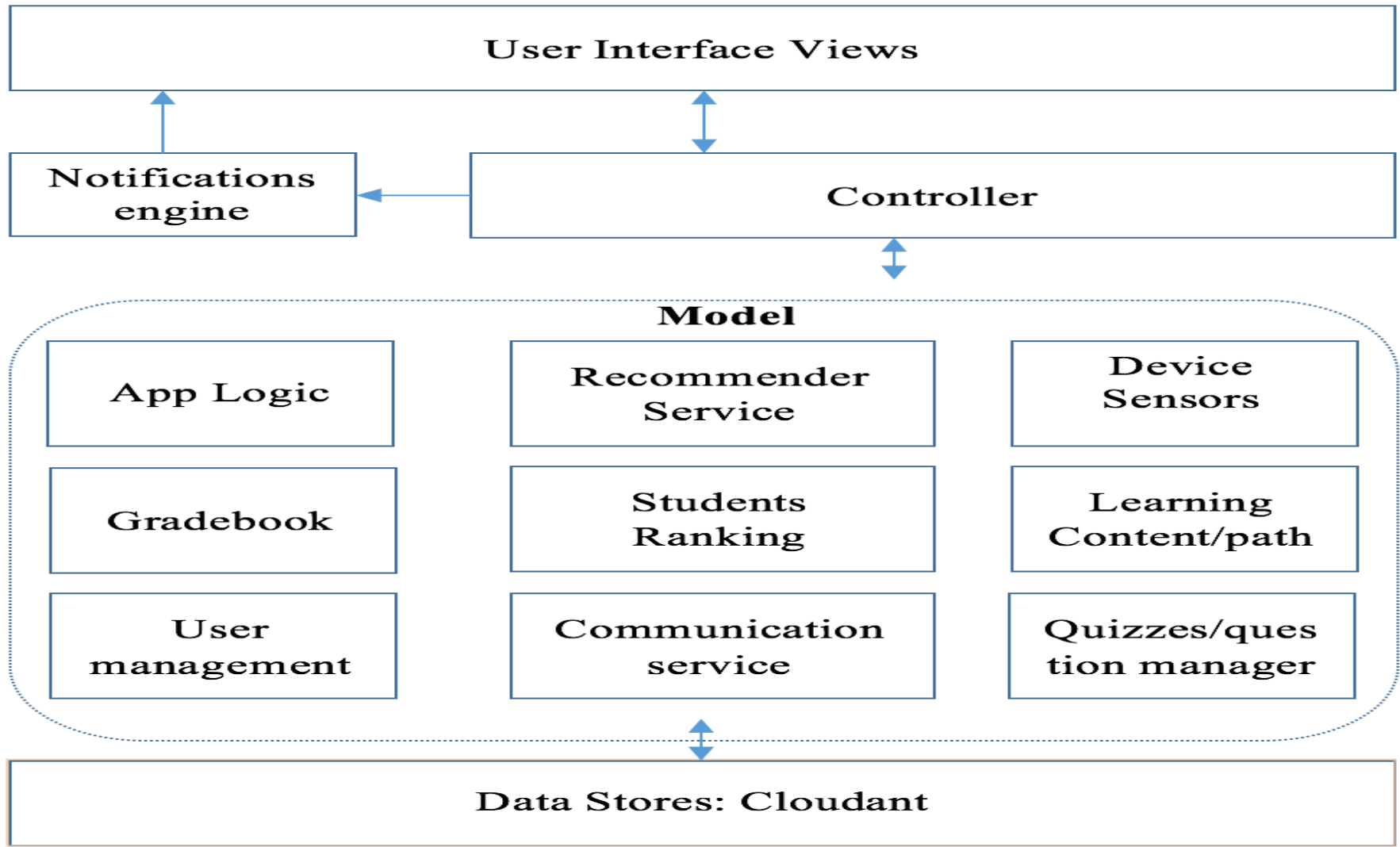
Proposed Solution

- Peer based learning can be integrated with ITS solutions and students can leverage on peers for non-structured subjects.
- Students in school are only limited to students in the same school, leveraging on the rise of mobile phone peers can be crowd sourced.
- Sensors in mobile phones can also be used to improve solutions e.g. using microphone to detect noise and to capture input.
- The integrated peer based learning and ITS features will be implemented and deployed on mobile to leverage on the wide adoption of mobile either in classroom, outdoors or the go.

Solution Features

- Instructors are only allowed to moderate and not allowed to answer questions, they also recommend or comment on students answers and create learning path with quizzes or just upload independent quizzes
- Solution provides a communication channel where students in the application can interact with each others by asking questions, sharing learning materials and quizzes.
- Students are provided with question by questions recommendation of the best answers that they can learn from and compare to see where they when wrong.
- The application provides different way of interacting, whenever they are required to enter any input they can choose what favors them either voice, keyboard input or scratchpad interface using stylus pen.
- The application will also provide a feature where teachers can use to pair up students for seat arrangement based on their performance with the goal of one helping the other to improve their grades.

System Architecture



Implementation: Screenshots

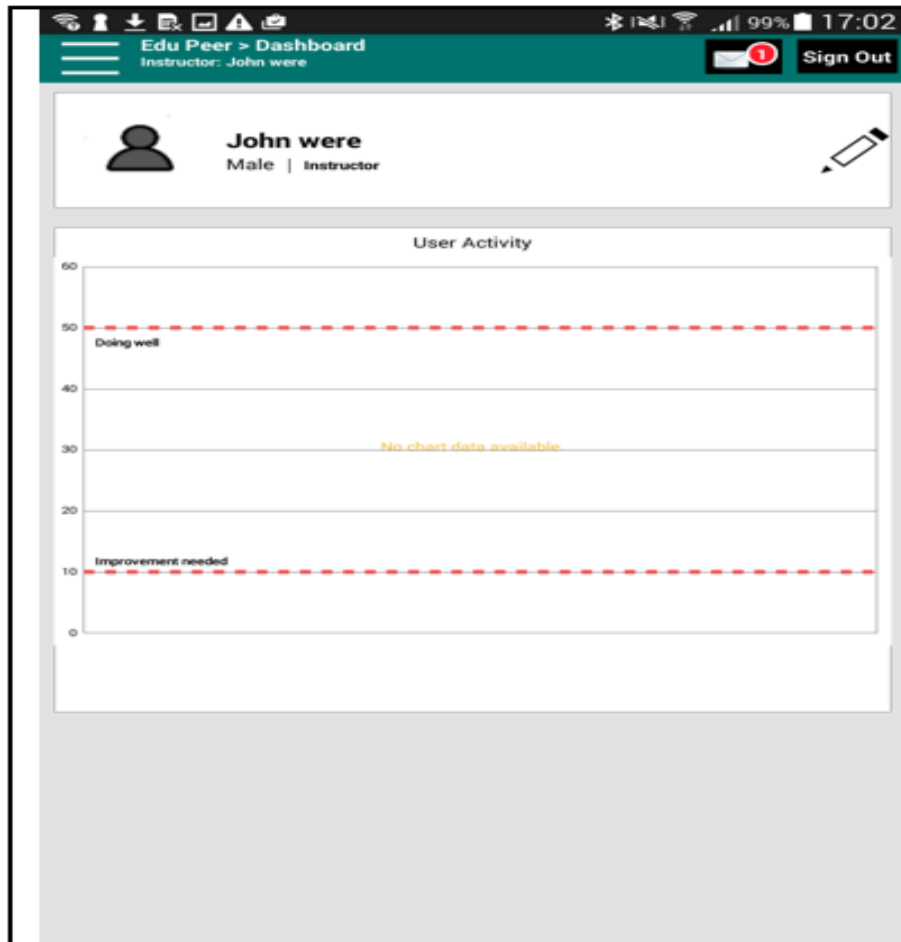


Figure 2. Application dashboard view

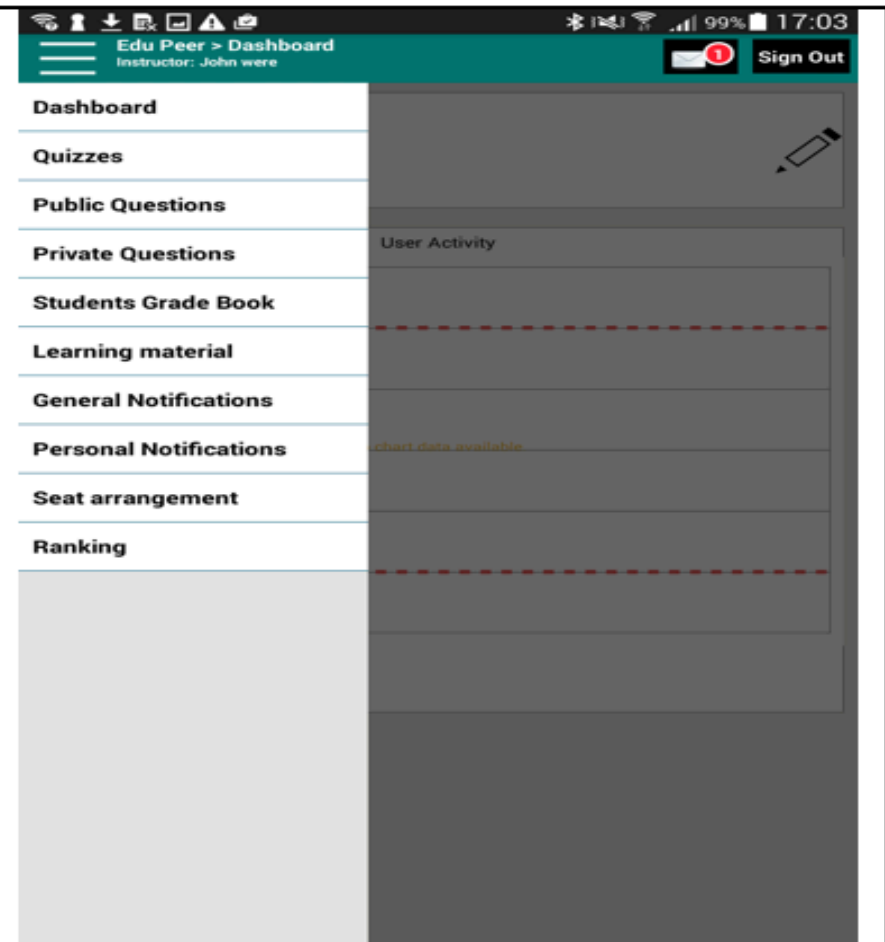


Figure 3. Applications side menu view

Implementation: Screenshots

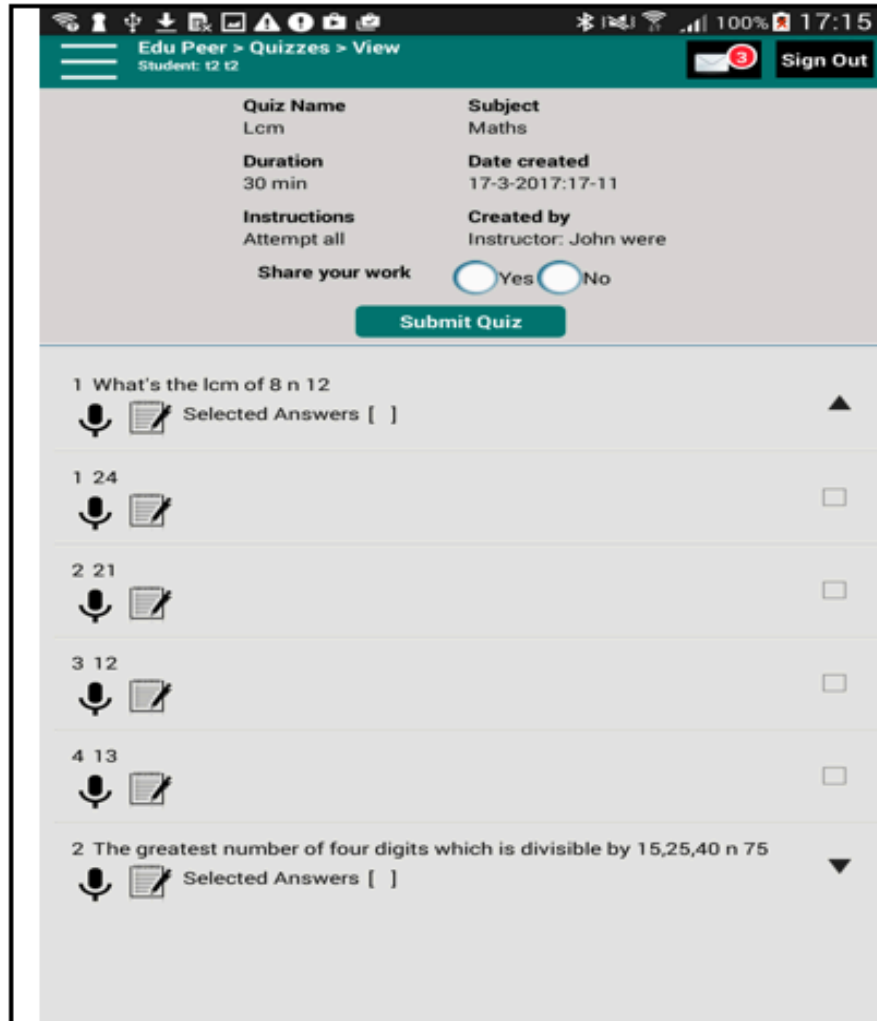


Figure 4. Applications quiz view.

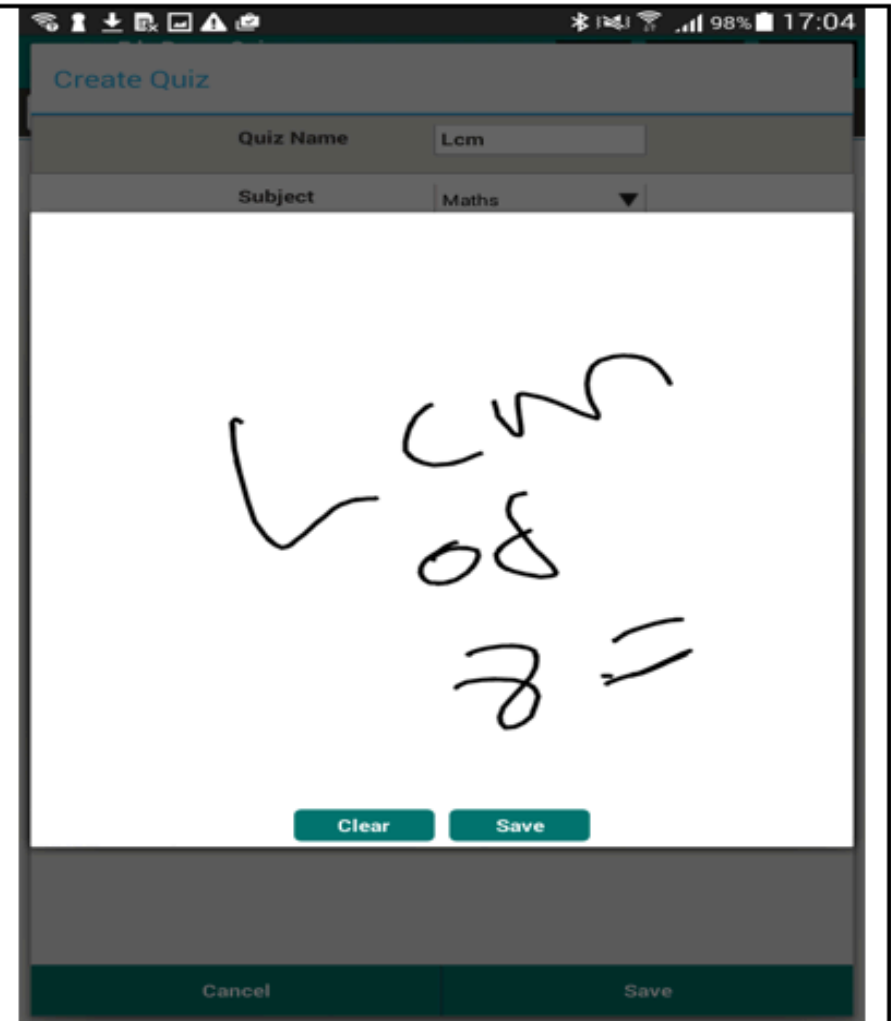


Figure 5. Applications scratchpad view.

Implementation: Screenshots

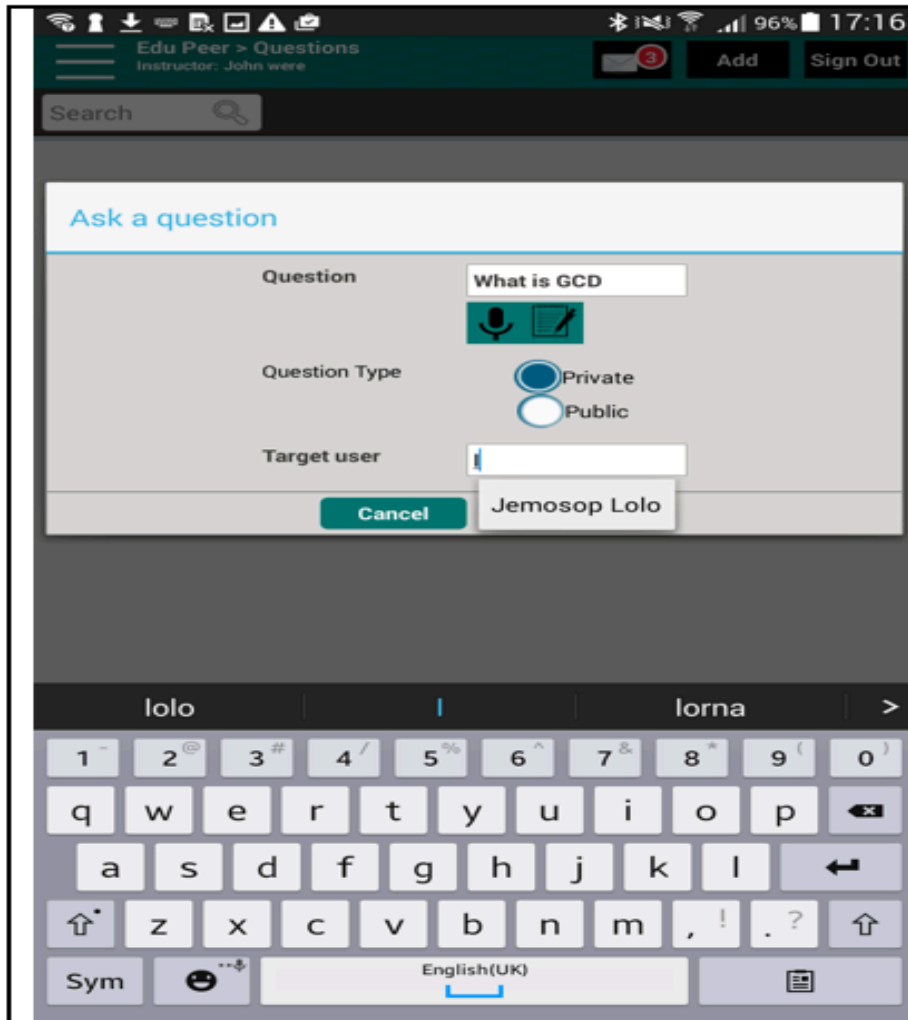


Figure 6. Shows question input interface

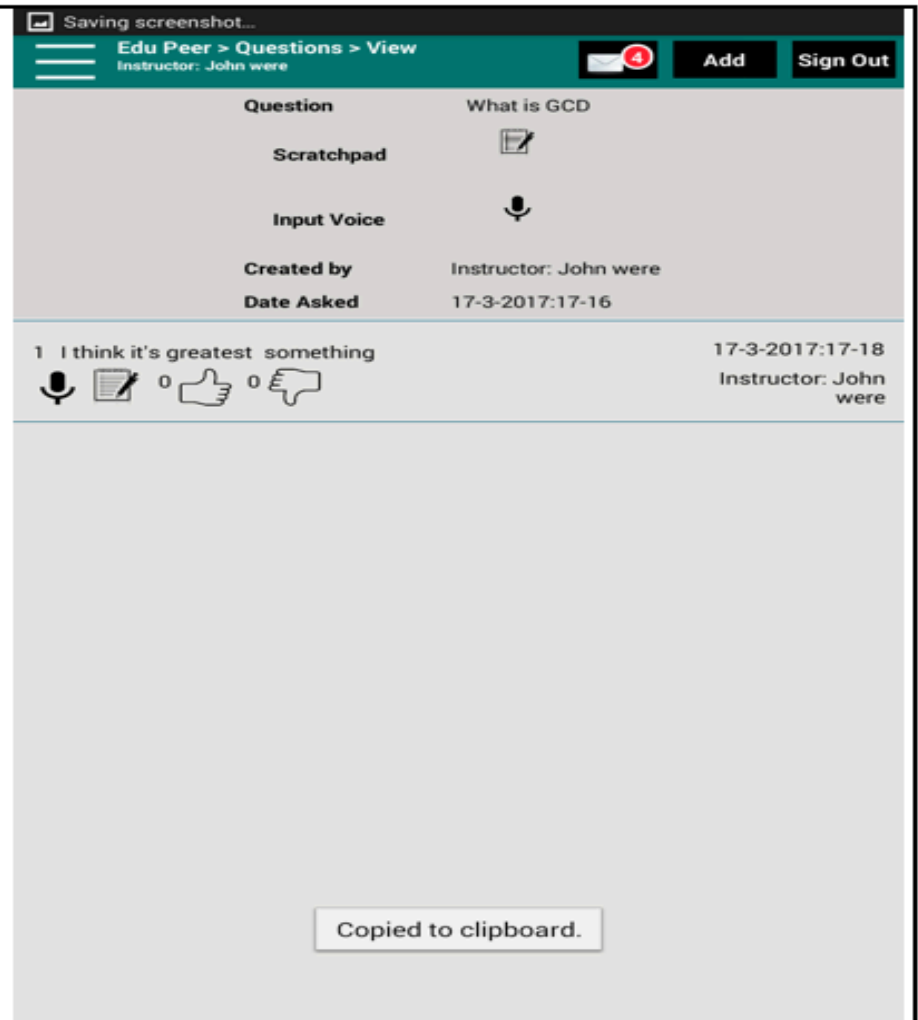


Figure 7. Shows question thread view

Implementation: Screenshots

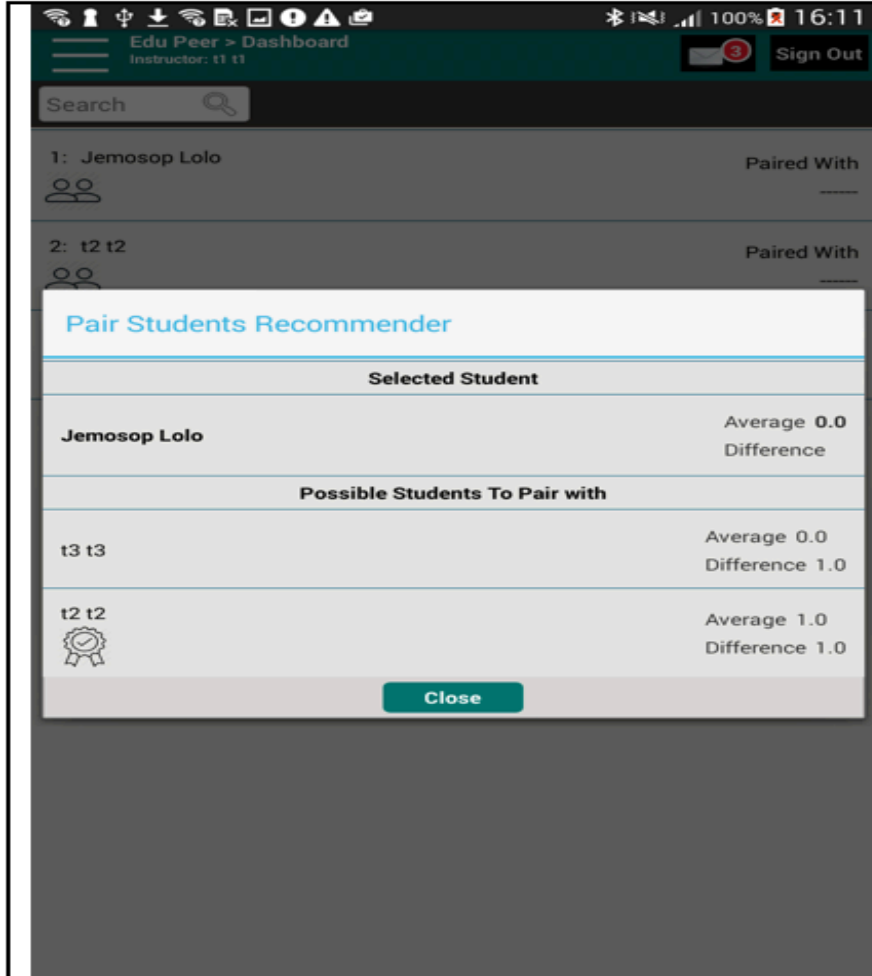


Figure 8. Student pair recommender view

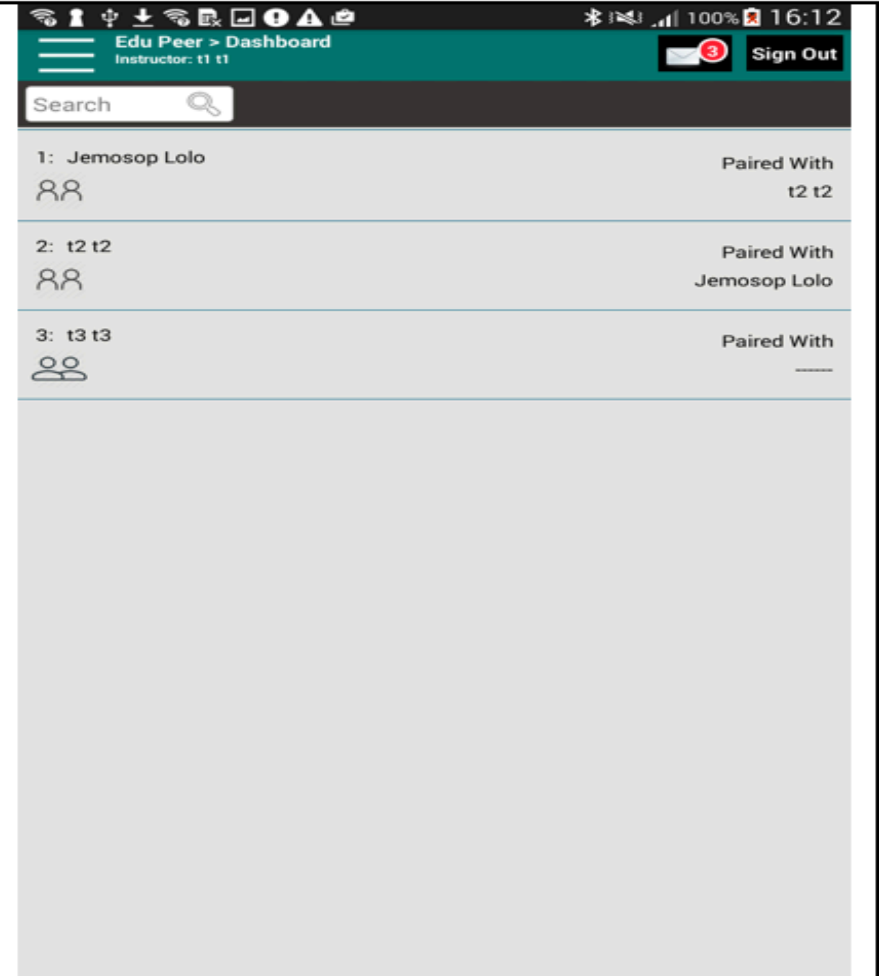


Figure 9. Paired students view

Implementation: Screenshots

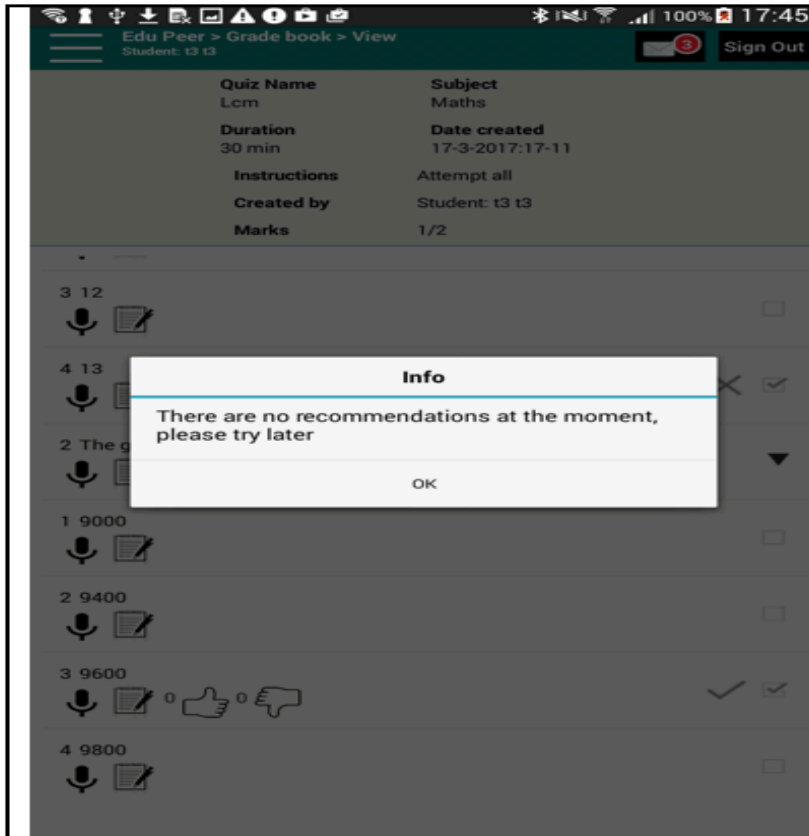


Figure 14. Application view when there are not recommendations to be provided to students.

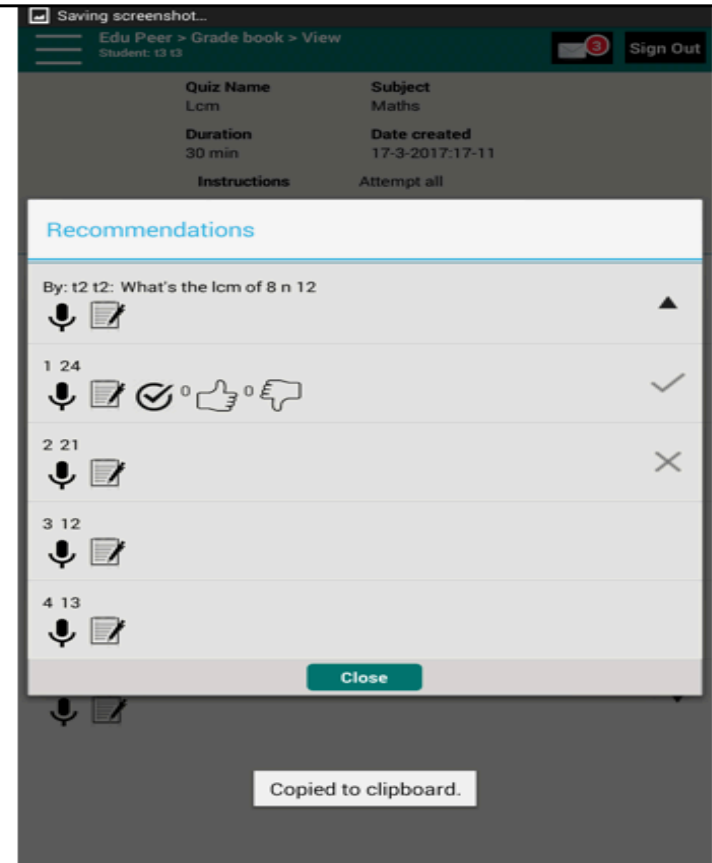


Figure 15. Applications view when the student is presented with recommendations for the questions they failed.

Project Demo Link

- The demo was recorded into three parts, using the following link

<https://www.youtube.com/watch?v=BwZ-DmKpNqc&list=PLKaj7LTX6I8Aphe-Bk0yDAS9HII6jzrCC> one can access the playlist that plays all the three videos.

- For specific parts one can access using the following link <https://www.youtube.com/playlist?list=PLKaj7LTX6I8Aphe-Bk0yDAS9HII6jzrCC>

- The user documentation is also located at

- <https://drive.google.com/file/d/0B43IrGMZgmCoSk9janNtaFRKWkk/view?usp=sharing>

- The app can be downloaded from

- <https://drive.google.com/file/d/0B43IrGMZgmCoX05lR3hPUWp4YzQ/view?usp=sharing>

Related Work

- **Cognitive Tutors**
 - This product is from Carnegie learning targeting math subjects in secondary-level schools (Center for Public Education, 2007).
- **Sesh**
 - This is an application that leverages on providing tutoring on specific courses and people who have taken the course only which is different from the suggested application model. (Michael, 2015)
- **Study Tree**
 - Study tree application works like Sesh described above (Zioedy, 2016).
- **EduSnap**
 - This application is like a question and answer forum, the suggested solution works differently by focusing only on students helping each other. (Tay, 2014)

Novelty

- **Students will get question by question recommendations of students who can explain to them if they need more clarifications and for math problem the application shares to other peers answering approach e.g. via a sketchpad**
- **The suggested solution recommends to teachers' students seating arrangement based on their performance with goal of improving each other's performance.**

Future Work

- Quiz question by questions recommendation depends on human input to read and flag best answers and number of thumbs up votes. This process can be highly affected in situations where there are less instructors or they have no time to go through each answer and recommend.
- This problem can be solved by implement a machine learning based instructor agent that run in the background and analyses the answers and be able to recommend which are the best answers.

Conclusion

- The use of peer based collaboration is not only beneficial to student's performance but also to other aspects of a student e.g. Self-directed learning skills, Critical and problems solving skills, Students get to learn and perfect their communication and teamwork skills and finally the process for learning from their peers increases their assessment and critical reflection because they are more relaxed (nus.edu, 2013).
- Despite the huge benefits of using peer collaboration, this approach can be faced with few challenges e.g. technology limitation in solving some of the problems and some students might not warm up to this approach. Other than the few challenges with the right motivation students can benefit highly.

Thank You

