MANJARA CHARITABLE TRUST
RAJIV GANDHI INSTITUTE OF TECHNOLOGY, MUMBAI

Department of Computer Engineering

Innovative Teaching and Learning

Class: Second Year **Year: 2024-2025**
Subject: Analysis of Algorithm
Topic: Dijkstra Algorithm
Method of teaching: Active Learning Strategy

The main objective of NEP is based on the philosophy of student-centric teaching and learning. Outcome-based education also focuses on developing different skills and knowledge. Some of the graduate aptitude skills in the 21st century are lifelong learning and self-directed learning skills.

Problem Identified: Our classroom teaching is still teacher-centric. Different educational research also reveals that most of our students are comfortable with teacher-centric teaching-learning strategies as their main focus is getting good marks in the exams. They lack in developing problem-solving skills and thrust for acquiring knowledge and skills that will make them lifelong learners or self-directed learners.

Teaching Methodology: In this lab session a total of 18 students were present. A technology-enhanced teaching methodology was adopted (Mishra et al.,2015). While delivering the lecture content, students are asked to write their doubts anonymously using a web-based platform developed by us. After writing questions, students were asked to prioritize each other's questions using a scale of one to three. That will represent the whole class's doubt based on the priority assigned by the students.

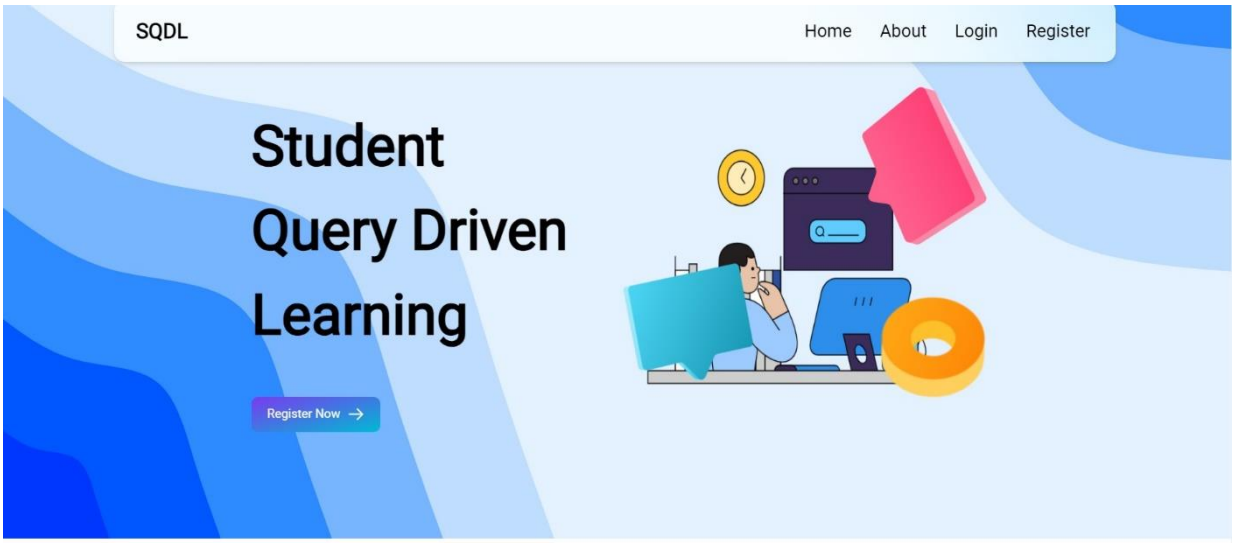

Fig. 1 A snapshot of a web-based App developed.

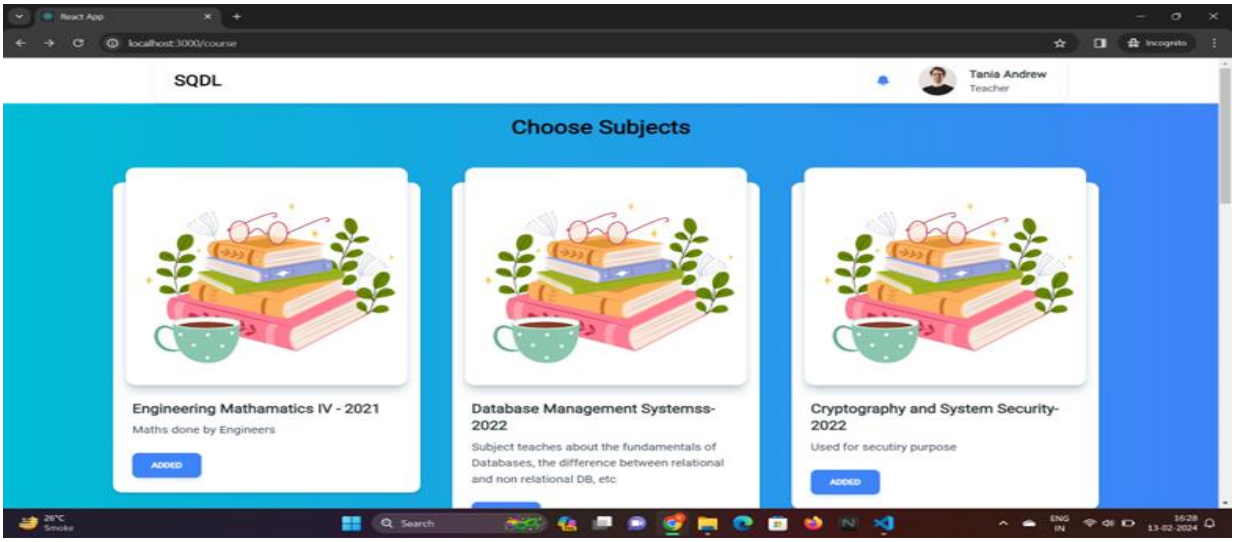

Fig. 2 Teacher Dashboard

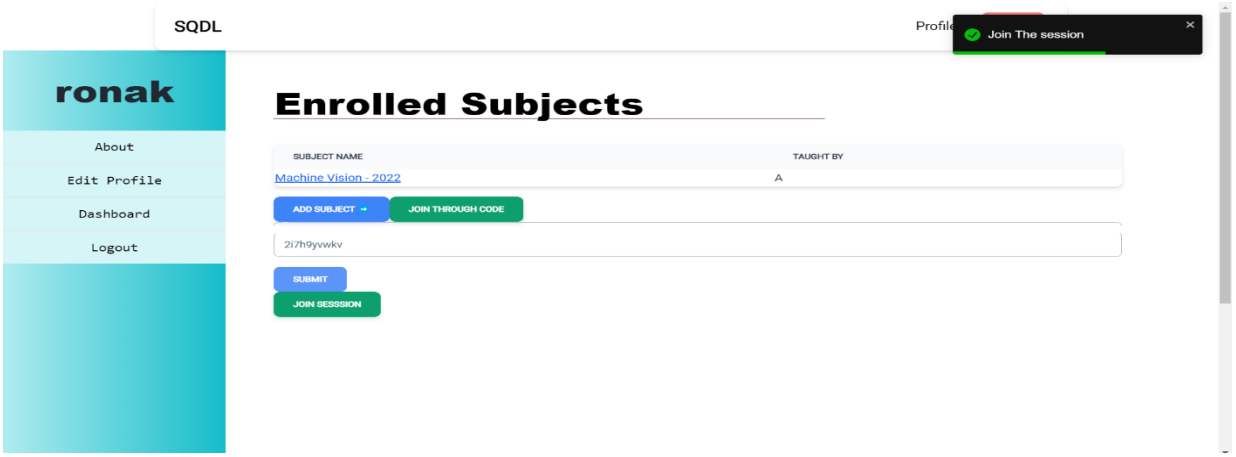

Fig. 3 Student can join using code.

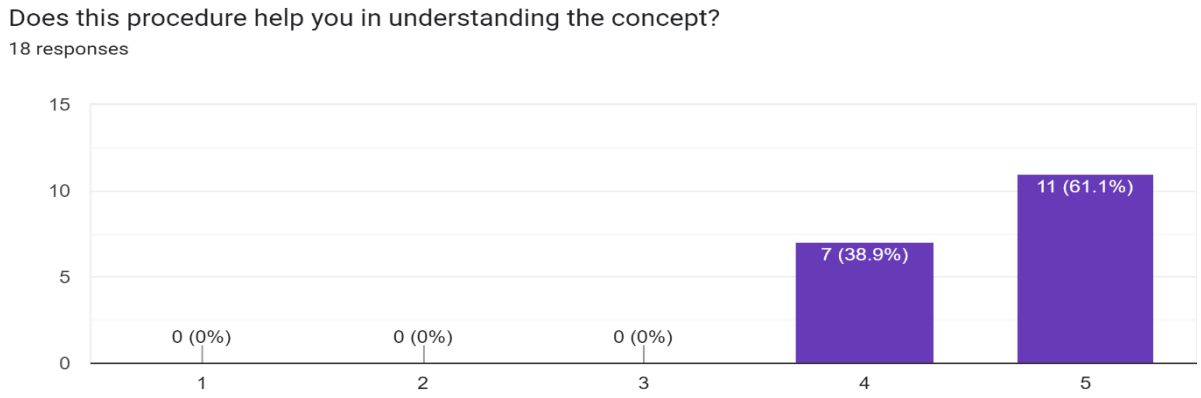

Fig. 4 Student Feedback

References:

Mishra, S., Iyer, S. An exploration of problem posing-based activities as an assessment tool and as an instructional strategy. *RPTEL* 10, 5 (2015). https://doi.org/10.1007/s41039-015-0006-0

MANJARA CHARITABLE TRUST
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Department of Computer Engineering
Innovative Teaching and Learning

Class: Second Year
Subject: Discrete Structure and Graph Theory **Year: 2024-2025**
Topic: Types of Function (Surjective, Injective Bijective)
Method of teaching: Role Play

Role Play:

Role play exercises give students the opportunity to assume the role of a person or act out a given situation. These roles can be performed by individual students, in pairs, or in groups which can play out a more complex scenario. Role plays engage students in real-life situations or scenarios that can be "stressful, unfamiliar, complex, or controversial" which requires them to examine personal feelings toward others and their circumstances (Bonwell & Eison, 1991, p.47).

Benefits of Role Playing:

Role playing can be effectively used in the classroom to:

- Motivate and engage students
- Enhance current teaching strategies
- Provide real-world scenarios to help students learn
- Learn skills used in real-world situations (negotiation, debate, teamwork, cooperation, persuasion)
- Provide opportunities for critical observation of peers

Teaching Method:

Six students are arbitrarily selected to make two group. Each group will represent two different sets. They are asked to join hands between sets according to type of functions.

References:

1. https://www.niu.edu/citl/resources/guides/instructional-guide/role-playing.shtml

MANJARA CHARITABLE TRUST
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Department of Computer Engineering
Innovative Teaching and Learning

Subject: Web Design, Python, DSA and Cyber security **Year: 2024-2025**
Method of teaching: Flipped Classroom

Flipped Classroom:

A flipped classroom is structured around the idea that lecture or direct instruction is not the best use of class time. Instead students encounter information before class, freeing class time for activities that involve higher order thinking.

Although flipping classrooms has long been the practice within certain disciplines (even if it was not given that name), the concept took off as technological changes made it easier to access and create educational materials. This approach assumes that there is no difference between a student listening to a lecture individually and with other students in class. There are plenty of ways these activities differ, and there are benefits that lecture can provide, such as create a social experience, students pick up from other students' social cues. There are also strategies you can use to make lectures interactive (see our tipsheet on interactive lecture techniques).

Benefits of Role Playing:

- Students take responsibility for their learning.
- Students learn rather than encounter material in class.
- There are more opportunities for higher level learning.
- It does not waste time transferring information to students when that information is available to them in books or online (Mazur 2009).
- Instructors and TFs work more closely with students, getting to know students better and providing better assistance increased collaboration between students.

Teaching Method:

Students are given topic to read at their home. During lecture session, they are asked to give presentation based on given topic.

References:

1. https://bokcenter.harvard.edu/flipped-classrooms

MANJARA CHARITABLE TRUST
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Department of Computer Engineering
Innovative Teaching and Learning

Class: Second Year **Year: 2023-2024**
Subject: Analysis of Algorithm
Topic: Difference between Greedy and Dynamic programming
Method of teaching: Active Learning Strategy

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Problem Identified: Our classroom teaching is still teacher-centric. Different educational research also reveals that most of our students are comfortable with teacher-centric teaching-learning strategies as their main focus is getting good marks in the exams. They lack in developing problem-solving skills and thrust for acquiring knowledge and skills that will make them lifelong learners or self-directed learners.

Teaching Methodology: In this lab session a total of 18 students were present. A technology-enhanced teaching methodology was adopted (Mishra et al.,2015). While delivering the lecture content, students are asked to write their doubts anonymously using Padlet. (https://padlet.com/dashboard). After writing questions, students were asked to prioritise each other questions using a scale of one to three.

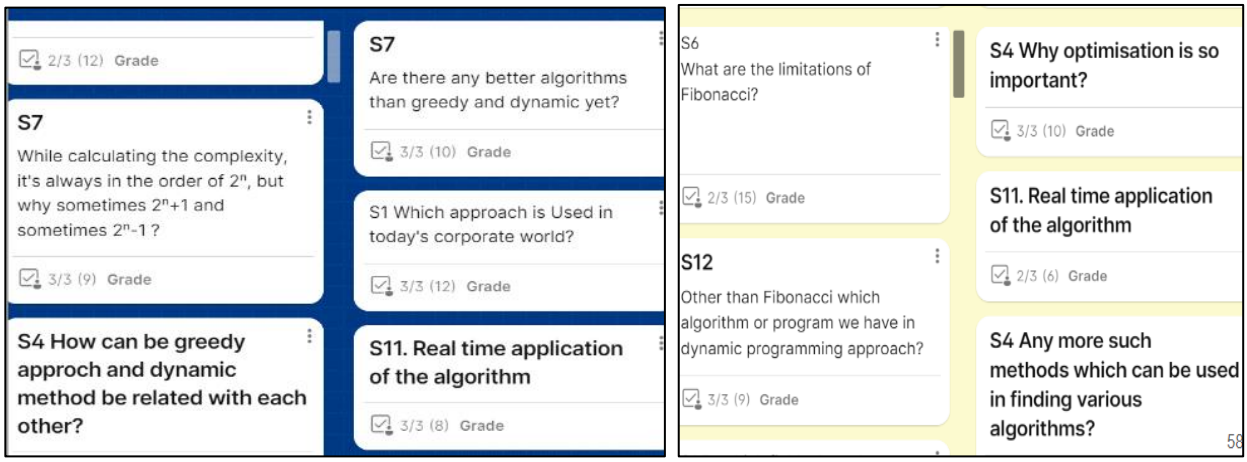

Fig. 1 A snapshot of student's question asked

Result Found: It was found that the students asked a total of 53 questions. There were several repeat questions. The teacher collected and responded to all the student's questions according to their prioritised questions.

Feedback Received:

Below are some of the feedback received from the students.

> This procedure was helpful for me to get my doubts clear clear even if it is very silly one. Didn't get nervous to pose questions. Learned what I want to learn. Thankyou!

> This session helped my to try new way to raise question and solve my doubt, this is very useful for the student who feel scared to raise questions or doubt

> Great interactive lecture. Hoping for more such sessions which are needed for more clarity regarding particular concept

References:

Mishra, S., Iyer, S. An exploration of problem posing-based activities as an assessment tool and as an instructional strategy. *RPTEL* 10, 5 (2015). https://doi.org/10.1007/s41039-015-0006-0