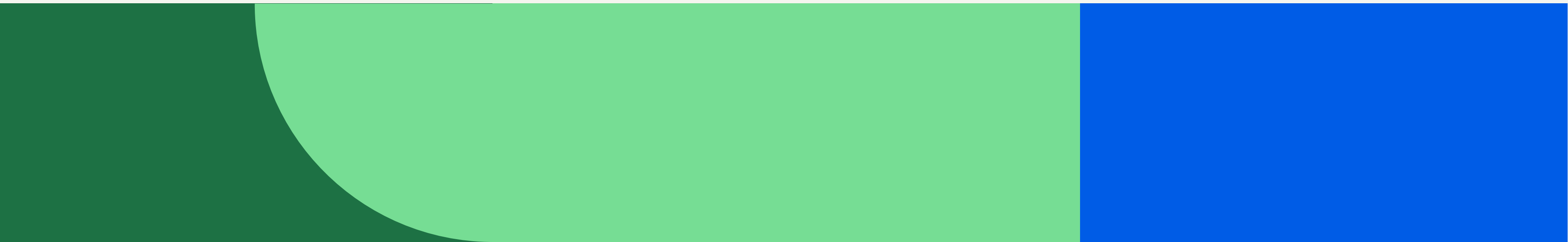# BAYESIAN NETWORK IN E-LEARNING

Abstract

The Development in technology, internet, infrastructure have made E-Learning very popular. The introduction of E-Learning has instilled a curiosity in the minds of young and adult-learners and the possibilities it can help us achieve by breaking the traditional teaching methods. By giving importance to the student's learning and behavioral patterns which sadly a remote teacher may not be able to understand. The loopholes based in this industry gave rise to a new generation of systems known as adaptable learning systems.

Introduction

— PROBLEM
— SOLUTION
— OBJECTIVES
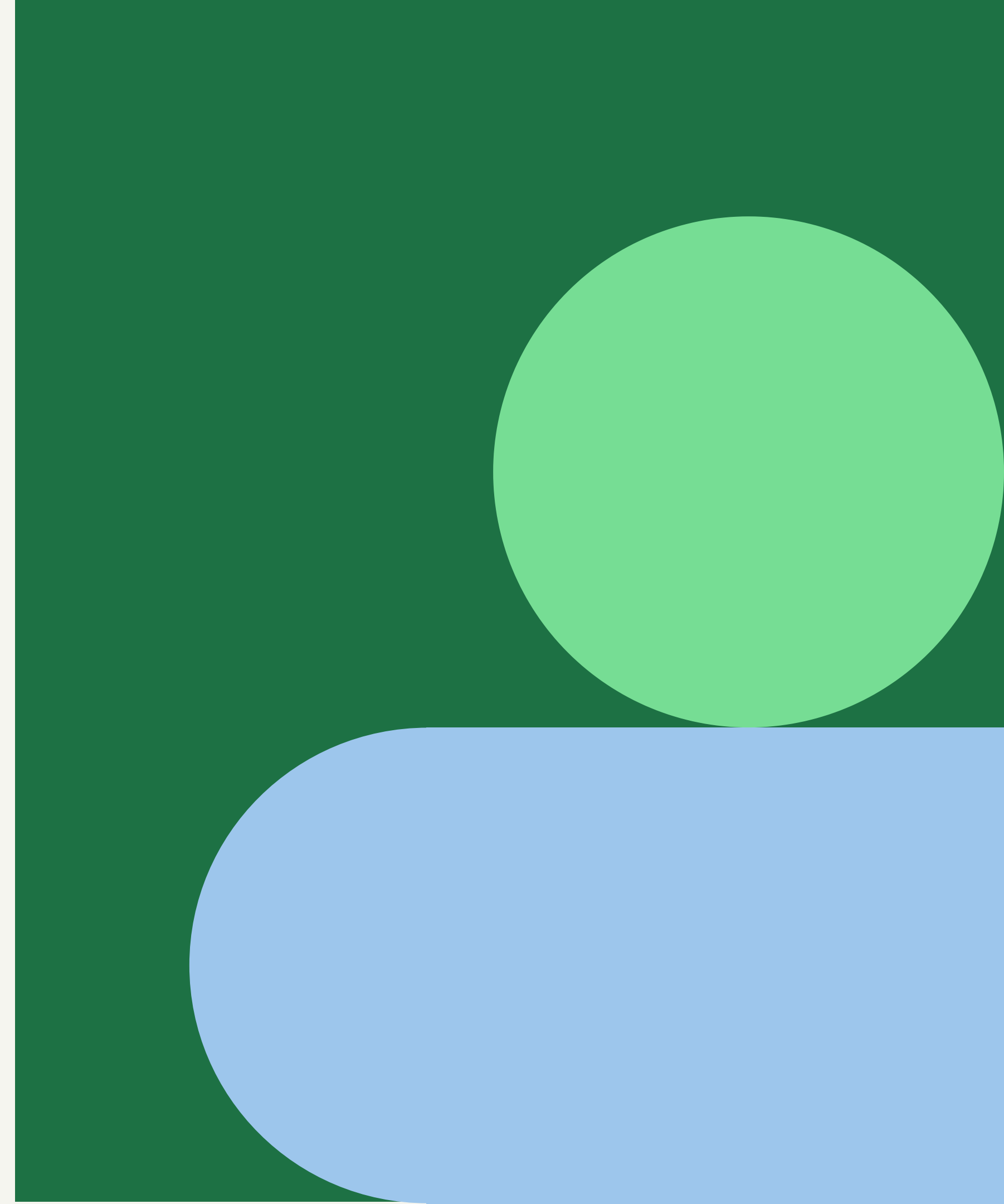
Problem

WHAT WE WANT TO SOLVE

The method of delivery of the teacher and compatibility of the student with that along with the student's prior preparation and eagerness to learn along are difficult to gauge upon by an instructor in a remote setting.

Solution

WHAT WE WANT TO PROVE OR DISPROVE

With the help of Learning Analytics developed using a given student data. We determine variables that affect the student, teacher relationship and suggest reformative steps of action to the instructor.

Objectives

WHAT WE WANT TO ACHIEVE

Using a Bayesian Network to predict the success of an E-Learning model

Probability of conducting an online course and its Success.

Analyze different types of learning styles in the e-learning platform.

Methodology

— TIMELINE
— LITERATURE REVIEW
— DATA COLLECTION
— STEPS FOLLOWED

Timeline

PHASE 1
Literature Review, Bayesian Network Design
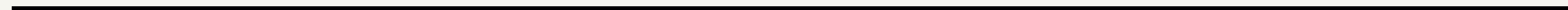
PHASE 2
Formulate the Method of Study

PHASE 3
Float a Survey and gather its responses

PHASE 4
Report, Analyze the Findings

LITERATURE REVIEW

- Luis, Anna and Jon used a similar correlation to measure the reputation by considering the activities and resources used by the students "*An aggregation algorithm adapted to the VLC area, calculates the direct experience considering the interaction of members of the VLC with resources and learning activities managed in an LMS*."
- López-Faican et al. describe the use of BN to implement a model of uncertainty to predict the student learning style through interaction in a Virtual Learning Environment based on the Felder-Silverman model. The uncertainty model is designed and developed for Moodle Learning Management System.
- Zhang and Zhuang in 2007 proposed an ITS (Intelligent Tutoring system) their "*assessment system determines what a student knows by BNs. This information is useful for an assessor to make decisions for next step education or learning.*"
- In 2019, Kondo and Hatanaka used a Bayesian Network to find out the learning states of the students which provided feedback to the instructors of the students that were likely to get a lower grade

QUANTITATIVE METHOD

Data Collection Methods

STEPS AND ACTION ITEMS

STEP 1	→	STEP 2	→	STEP 3

we picked 1 Electrical Electronics Department course ADVD for the study to be conducted upon.

For the students the data was categorized and collected through floating a google form which had 4 main attributes

The sum and averages of all the questionnaire answers were computed to draw conclusions.

STEPS FOLLOWED

- Analyzed the G-form Responses.
- Formulated the Dataset
- Cleaned The Dataset for Training
- Split the Data into train, test
- Fed it into the Naive Bayes Algorithm
- Created a Gaussian Model
- Tuned the Hyperparameters
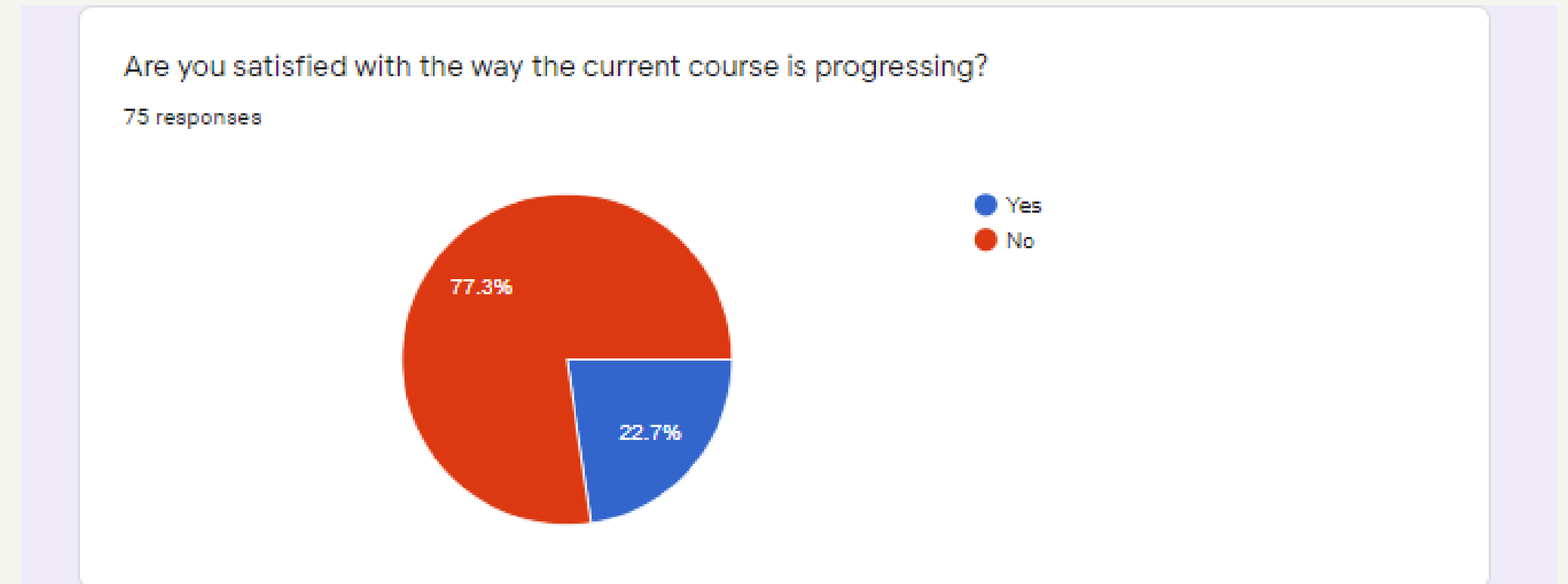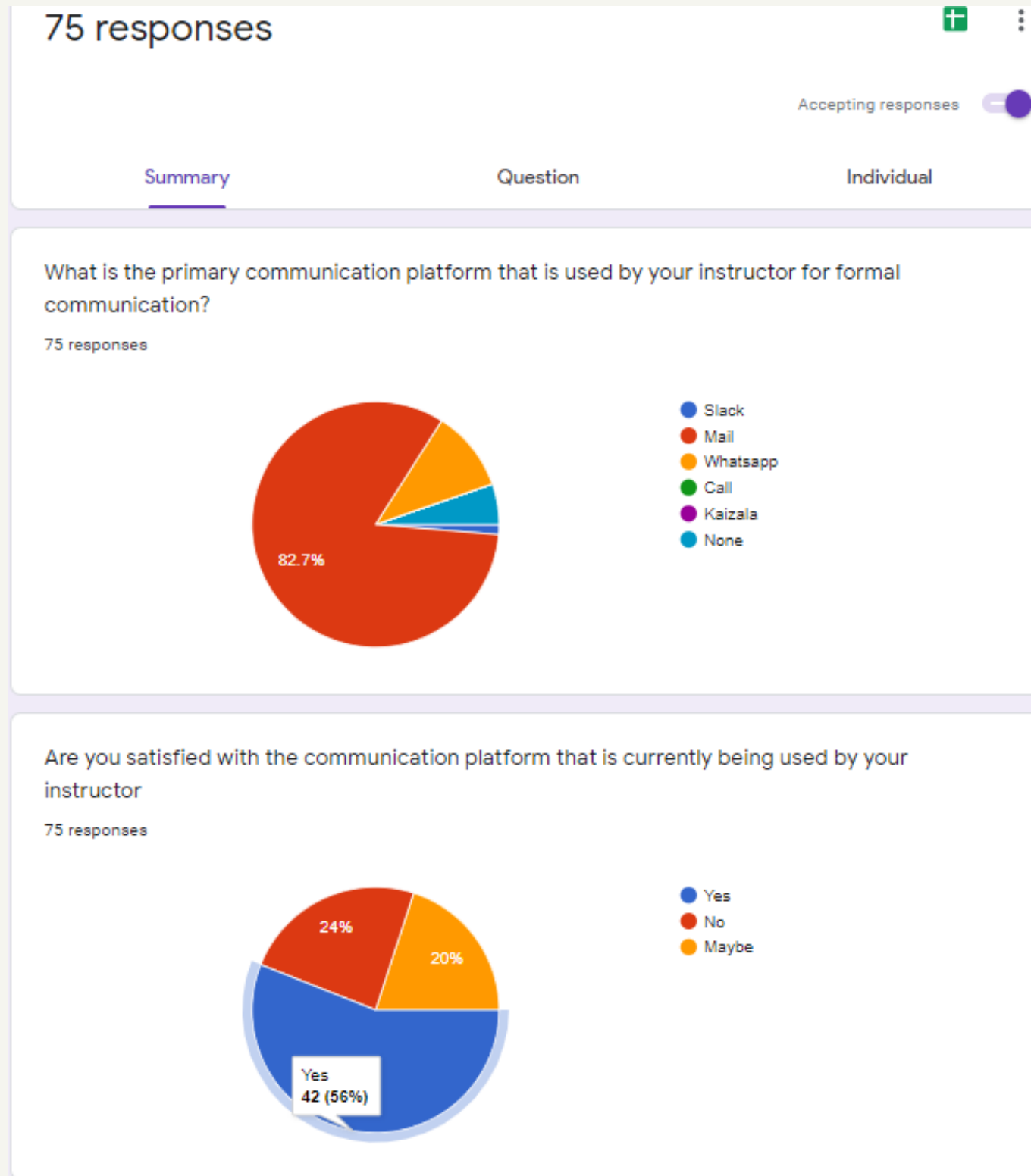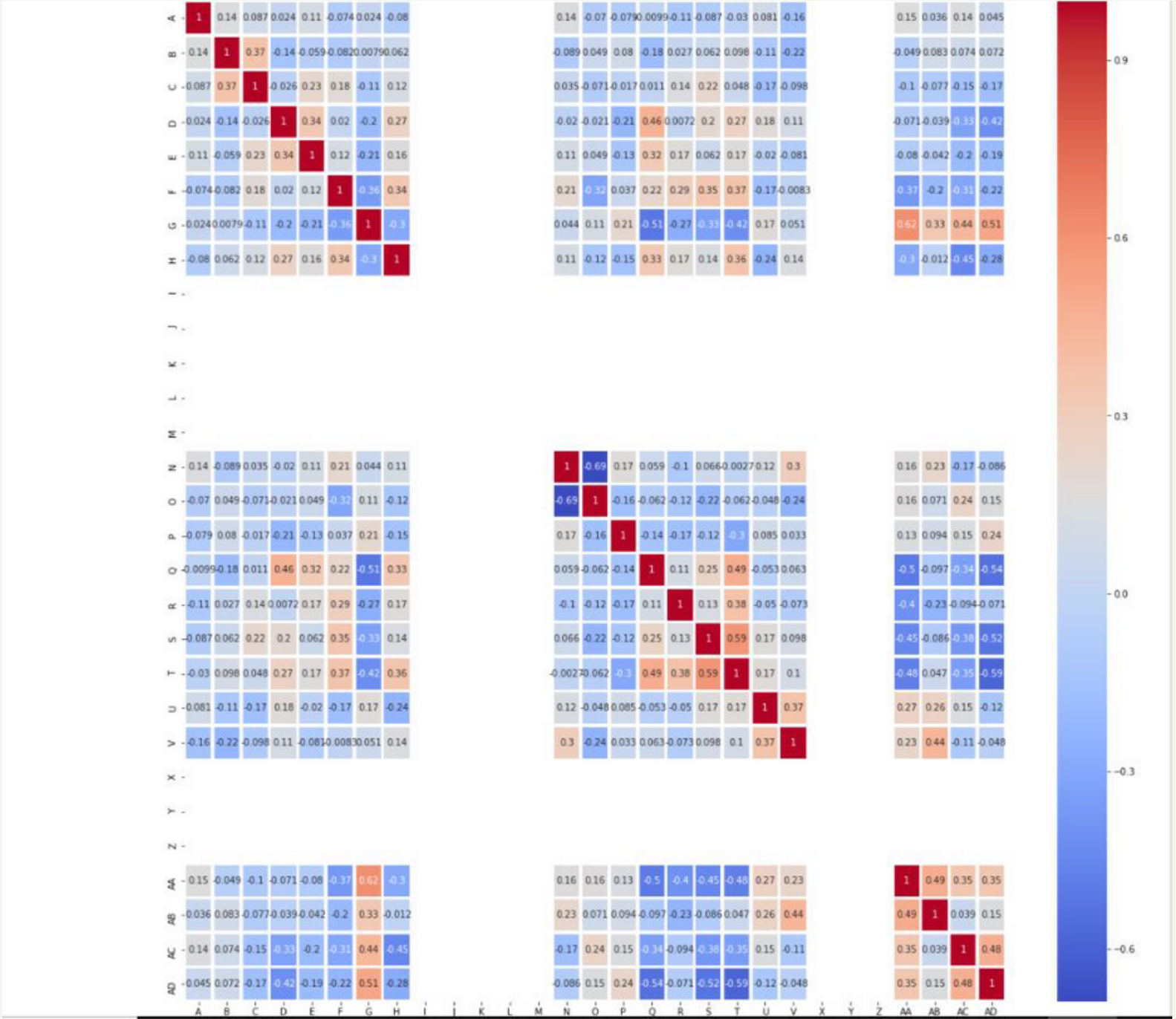- Analyzed the final accuracy readings

Results of the Study

— SURVEY RESULTS
— BAYESIAN NETWORK
TRAINING RESULTS

Survey Results

Bayesian Net Train Results

Bayesian Net Train Results

```
In [303]: accuracy=accuracy_score(y_test, y_pred)*100
          accuracy

Out[303]: 72.22222222222221
```

Conclusion

— STUDY FINDINGS

- AREAS OF IMPROVEMENT

Study highlights

- Our final results was that the decision variable was most positively affected by amount of time spent by the Student in browsing the E-Learning Platform, the Primary Comm Platform, the Percentile Scored negatively affected by the Question Difficulty ,Take-Home Assignments, Reading Materials, Quiz Solutions.
- A good score does define a higher interest of the student in that specific course and higher probability of that course being successful
- The students tend to score a less percentage when they get a hard paper in turn affecting their confidence and making them less interested in the course. The increase in provision of the materials puts a lot of deadlines on the students and kills the freewill
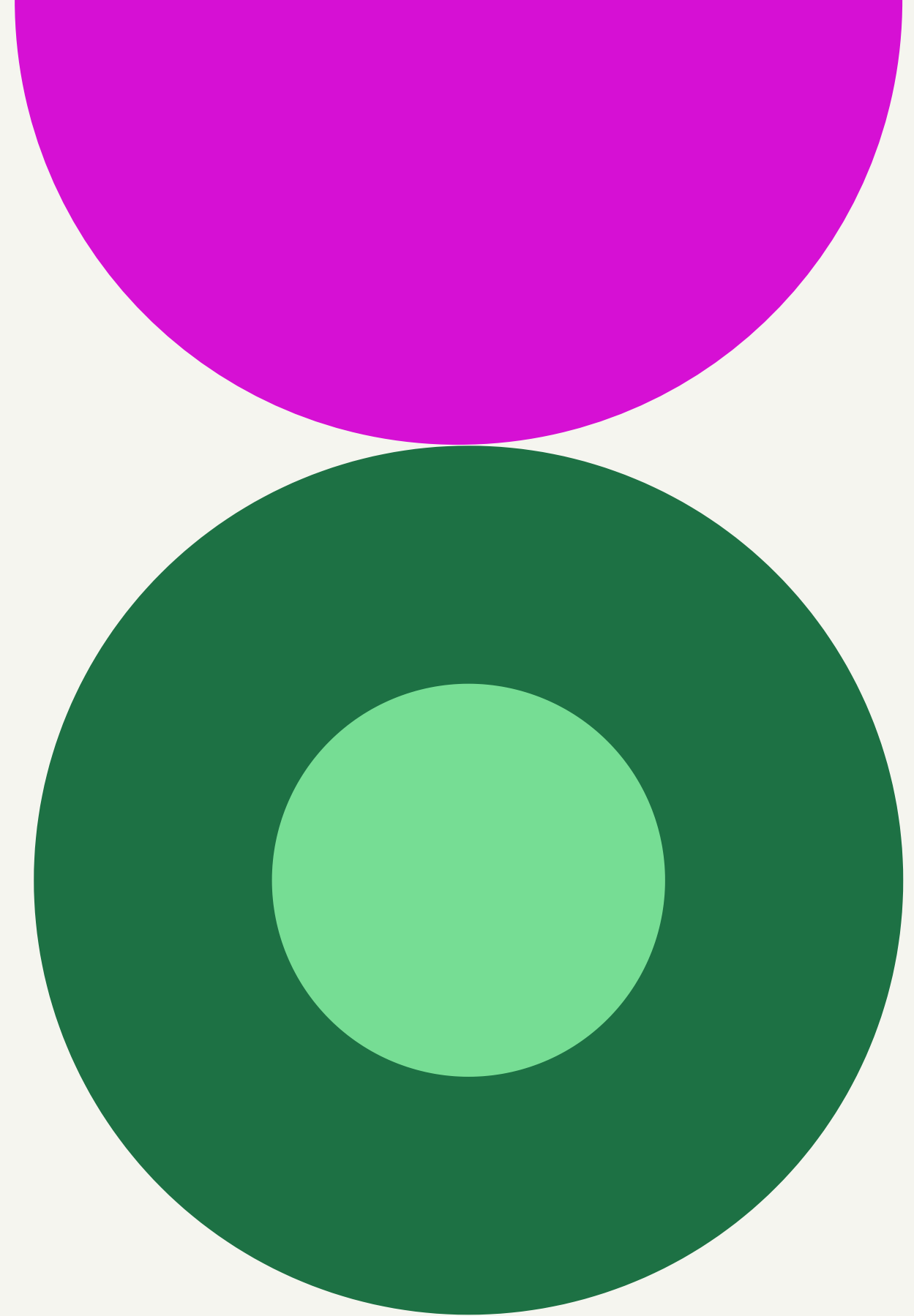
Significant discovery

- For running the course successfully the instructor must not put a lot of pressure on students with deadlines.
- Decrease the number of evaluative and materials provided.
- Covering depth rather than width in that subject
- Setting up a difficult paper just so that the student doesn't get overconfident backfires.
- A higher student score relates to higher Interest evident from browsing history
- Getting sufficient time to cover backlog and revise the previous concepts is also important and a large number of evals makes it difficult
- The Course becomes more demanding as the number of evals increases

Areas of improvement

SUGGESTIONS FOR FUTURE RESEARCH

We had assumed the input variables to be independent in the model, but we can make interconnected and accordingly take the weights of one variable on another and find their interdependency relations.

Thank you!