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# Content Analysis of BYJU's App Reviews: Data Analytics Approach

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**ABSTRACT :** The article reports the insights gained from the study of customer reviews of BYJU's app on google play store. The prime objective was to understand the customer needs & pain points to supplement the research & development of similar Ed-Tech products. The data for the study was scraped from google play store using web scraping and stored in structured format. The analysis was done using both Natural Language Processing as well as manual content analysis. Sentiment analysis was done to sample the 30,000 reviews with extreme emotions in order to generate word clouds. Another sample of 3000 was taken to perform content analysis. The output of the research is a list of suggestions and features to be considered by the new players in the Ed-Tech market. Top pain points of the customer's were found to be slow responsiveness of the app, toxic calls and unprofessional behavior of sales personnel and absence of majorly demanded topics/subjects. Top satisfaction points of customers were found to be clear explanations, expertise of educators and use of visualizations in teaching. Total 130 themes were identified during content analysis, but only 20 themes with the criteria of more than 40 theme counts are explained in this paper.

*Keywords : BYJU's, App, Customer Reviews, Pain Points, Satisfaction, Suggestions, Word Clouds, Content Analysis*

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## Introduction

According to Forbes, India's ed-tech market is expected to develop significantly and reach \$10.4 billion in 2025 with 37 million paid users (Zheltov, 2022). It is observed that this increase is being driven by the rising demand for nonacademic courses in second and third-tier cities as well as the ed-tech sector's need for customization. Global ed-tech leaders like Byju's, which is valued at \$22 billion, have entered the market as a result of the sector's huge private investment over the past five years (Byju's – the learning app - apps on Google Play, Google). Market leaders including Unacademy, upGrad, Vedantu, and others have also recently emerged. The rise of online schooling was sped up by the pandemic. Due to the rising inclination of students and parents to complete their education from home using various online educational platforms, lockdowns have resulted in a large increase in investment in the ed-tech sector.

Even though the competition seems tough, there is still space for new Ed-Tech companies to prosper if they deliver better services and something innovative. All these current Ed-Tech giants are more or less the same and their crowns can be disturbed by a significant revolution in the Ed-Tech concept. Ozibook Tech Solution Pvt. Ltd. is developing an innovative Ed-Tech App that is aiming to do the same.

But where do we find these customer requirements and pain points? The answer is customer reviews on Google Play Store. The Google Play Store reviews are the best and most raw source to peek into customers' minds. The researchers procured these reviews using Web Scraping to further analyze them using hybrid analytical techniques (Rubik's Cube, 2022). The system, process and code developed by this study is reusable and can be applied to other platforms like Unacademy,

upgrade, Vedantu etc. This study has considered only a 10.37 % sample among all reviews for manual theme counting due to constraints on human resources. Although, the company can take a bigger sample when conducting a similar study on a different platform in future. Obtaining a suggested list of features for a new Ed-Tech App is the prime purpose of this study. This list of features can be considered by the development team to make a superior platform (Content analysis, 2023).

## **Related Work**

A study by Demir&Akpınar presents how undergraduate students' academic achievement, attitudes toward mobile learning, and animation development levels are affected by mobile learning applications (Demir&Akpınar, 2018). In the study, a quasi-experimental design was used. Authors have reported an interpretive study of educational apps (Camilleri&Camilleri, 2019). The study is based on interviews with the learners. As per the learners their skills have improved as a result of using the educational apps.

In order to learn more about the use of mobile apps in tertiary education and research, researchers at a New Zealand university were surveyed using an online questionnaire to find out which apps were used for which tasks and what obstacles prevented their use (Hinze et al, 2022). This study discovered that academics and students utilized mobile apps for both teaching and research, primarily for document and data storage, exchange, and communication. A case study on learning apps has examined the impact that the Byju app had on students during the COVID-19 pandemic, as well as whether or not subscriptions to the app increased during the outbreak (Sathyan&Karani, 2021). This research also looked at how e-learning apps can help improve customer focus and subscription rates while also improving students' experiences. This study resulted in Byju's app being a leading online education brand during the COVID-19 pandemic. 85% of parents subscribed to this mobile application for their child's education.

Singh &Suri have portrayed reviews of mobile learning apps. On the Google Play store, 2000 reviews of four highly rated, downloaded, and reviewed mobile learning apps were subjected to word frequency, sentiment, and content analysis. The findings showed that teaching, mobile applications, and courses were the most frequently mentioned subjects. The majority of the reviews were favorable. The most prominent feelings were found to be trust, anticipation, and happiness (Singh &Suri, 2022). Sruthi and Mukharjee have reported the detailed study of BYJU's learning app and explored a group of high school and postsecondary students from CBSE and Kerala State Board to analyze the transition from traditional classroom instruction to technology-based personalized instruction (Sruthi&Mukharjee, 2020).

In the backdrop of the research portrayed here the present study reports the insights gained from the study of customer reviews of BYJU's app on google play store.

## **Methods and Materials**

### **Data Collection**

The data used for this study is secondary in nature and is scraped from Google Play Store using google-play-scraper (Google-play-scraper). The data is basically the most relevant 2 Lack 89 Thousand & 182 app reviews and some important dimensions of them like score, thumbs up count, etc. We have scraped reviews for each score (star rating) separately and then appended them later in the analysis phase to form a master data frame. We have chosen this approach as it would be too time & resource consuming to scrape all 2 Lack 89 Thousand & 182 reviews at once. The aim of this project is to supplement the research process for the development of a new Ed-Tech app. The study was looking for things from which inspiration can be taken and things to avoid can be noted through studying the customer reviews of BYJU's APP.

## **Sampling Techniques**

This study used analytical techniques as mentioned above and the sample used for each technique was different. There were a total of 2 Lack 89 Thousand & 182 reviews and using them all would not be efficient as well as effective. Hence, appropriate samples were taken as required by each analytical technique.

### **Sampling for Theme Counts**

Reading all 2 Lack 89 Thousand & 182 reviews will be extremely time-consuming. Although it might give us superior results, the study considered a sample of 3000 reviews that follow the following criterion:

- The review must have at least one thumbs up
- The length of the review should be more than 50 characters
- The number of reviews must be the same from positive and negative categories

### **Sampling for WordClouds**

All 2 Lack 89 Thousand & 182 could not be fed into the Word Cloud generator. Doing so would have caught so many unnecessary repetitive words and irrelevant reviews. The researchers have considered extremely positive reviews, extremely negative reviews & a mix of extremely positive and extremely negative reviews to generate 3 separate WordClouds (Erickvarela, 2021). This is to give a quick peek into the satisfaction & pain points of users to the stakeholder

#### ***Criteria for a positive sample of 15,000:***

- First priority has been given to reviews with the highest polarity
- Second priority has been given to reviews with the highest number of thumbs-up counts
- Third priority has been given to reviews with the highest review lengths

#### ***Criteria for a negative sample of 15,000:***

- First priority has been given to reviews with the lowest polarity
- Second priority has been given to reviews with the highest number of thumbs-up counts
- Third priority has been given to reviews with the highest review lengths

#### ***Criteria for a mixed sample of 30,000:***

- Positive Sample appended to Negative Sample

## **BYJu's App Reviews' Content Analysis**

### **Theme Counts and Theme Summary**

The researchers went through the picked-out sample, read each review, identified recurring themes and counted the number of times each theme had been observed in reviews manually. The procedure followed to calculate theme counts is as follows:

#### ***For each review:***

- Read the review thoroughly
- If a new theme is discovered, then add a new column to count that theme & add 1 at the intersection of that review row and the new theme column
- If an existing theme is detected, add 1 at the intersection of that review row and the detected theme column

#### ***Once the above procedure is applied to all the reviews:***

- Sum all the columns to get the count for each theme
- Generate a barplot to visualize the weightage of each theme in the sample

Table 1 gives theme counts and theme summary with pain points and corresponding suggestions. This is visualized in figure 1. Table 2 explains theme counts and theme summary of themes satisfied with. Figure 2 shows the corresponding visualization.

**Table 1: Theme Counts & Theme Summary: Pain Points / Suggestions**

Theme	Theme Summary	Count
Slow Responsivity/ Bugs	Users found the app to be buggy. There were many bugs related to phone number authorisation using OTP, video loading, login attempts etc. Despite having a full-speed internet connection, the app indicated that there is no internet connection. The slow video loading was the most prominent issue users faced.	326
Toxic Calls/ Shady Activity	Users suffered from toxic & highly frequent calls from BYJU's sales team. There were reviews that mentioned unprofessional behavior from the sales team of BYJU's. Despite uninstalling the app and discontinuing the services, the calls still kept coming.	283
Missing Topics	Users found a lack of many subjects and topics in existing subjects. People requested for following subjects: <ol style="list-style-type: none"> <li>1. Commerce Related Subjects</li> <li>2. Languages like Hindi, and English</li> <li>3. Social Science &amp; Humanities Subjects like History, Civics</li> <li>4. Economics</li> <li>5. Political Science Etc.</li> </ol>	155
High Pricing/ Not Free	Users found this app to be too expensive or expected it to be a free app. The app was accused by a significant number of people to have made education into a pure business. People were not happy with the fact that they have to pay money to be able to access the application.	153
Video Limit / Not-Self Paced	Users were frustrated because of the video limits in the app. In simpler words, the app is not self-paced. It forces users to revise the content they have just watched and prohibits them from watching further videos for a certain amount of time.	143
Add Languages	Users complained that the content on the app is majorly available in English. English is not the first language of many Indian people and education should be accessible in various vernacular languages.	122
Data Consuming/ Video Resolution Adjustment Feature	There is no option to adjust the video resolution in the app. The lack of this feature causes two major problems: <ol style="list-style-type: none"> <li>1. When the internet speed is slow, the video resolution is set so low by the app that it is unfathomable.</li> <li>2. When the internet speed is adequate, the video plays at the highest resolution possible which results in unnecessary loss of user data.</li> <li>3.</li> </ol>	106
Poor Customer Support	Users found the customer support of the app to be poor. The process to reach customer support was found to be	104



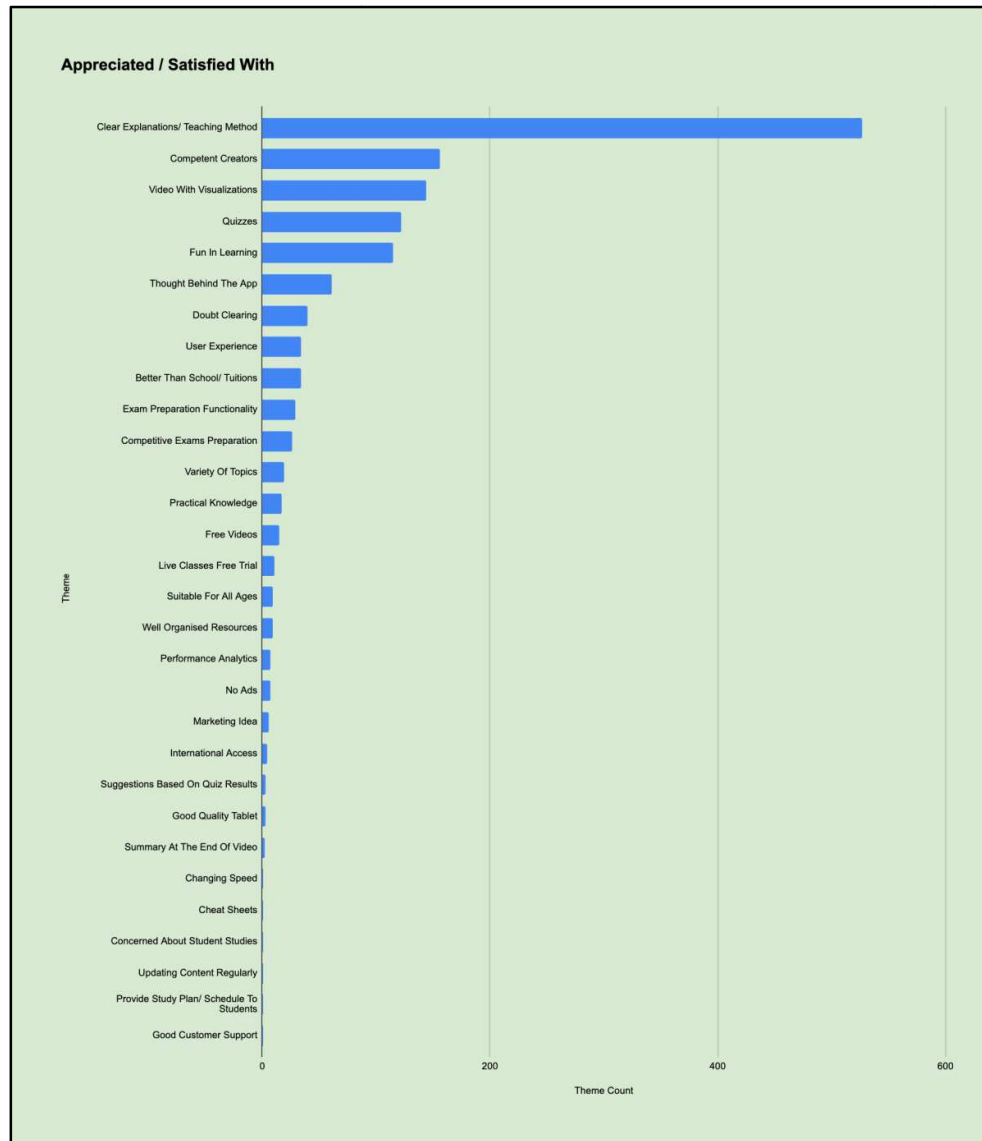
	complicated. Many times, users could not reach the customer support team despite calling repeatedly. A considerable number of users got an automated message that claimed that the support team will call them shortly, but never got a callback.	
Errors With Gamification	The gamification done in the app included small tests and quizzes. Users found errors in these modules. There are games in the app where users can play educational games with other users. Many users reported an error where the game showed victory on the opponent's part despite doing all the necessary things to win.	86
Poor Quality Topics	Users were not satisfied with the content provided under certain topics. The quality refers to the quality of material, videos & delivery by the teachers.	65
Lying	Users complained that many unethical tricks were used by the marketing team to lure people into buying this app. There were many users who were disappointed by the fact that the app was advertised to be free but is in fact paid. The marketing team doesn't let you use the app for free for long & start disturbing you with calls to force you to buy the subscription.	55
No Cancellation/ Refund	Users were furious because they were denied the refund upon cancellation. There were many cases where the users were lured into buying a plan using the idea of 'No Questions Asked' Return Policy. The return policy was in reality very complicated and the users faced a partial or complete loss of the sum paid.	47

**Table 2: Theme Counts & Theme Summary: Appreciated / Satisfied With**

Theme	Meaning	Count
Clear Explanations/ Teaching Method	Users loved the methods used to explain different concepts. They mentioned that the most difficult concepts were explained so seamlessly that they understood them right away. The optimum and precise way of explaining concepts appealed to users to a larger extent.	527
Competent Creators	Users complimented the teachers on the app. The expertise of teachers and their ability to explain things was hugely complimented. The language used by the teachers and their demeanor also appealed to a large number of users.	156
Video With Visualizations	The use of visualizations is the moat point that BYJU's used in their marketing. The same is also loved by the users largely. Visualizations make it easier to understand the concepts in a better way. As they say.	144
Quizzes	The app makes a use of Quizzes to make the learning process fun and help students retain the knowledge that they have gained. The gamification in the app is loved by the users. There is a module in the app called Quizzo.	122
Fun In Learning	Users stated that they loved the way in which BYJU's is making learning more fun. The traditional attitude of	115

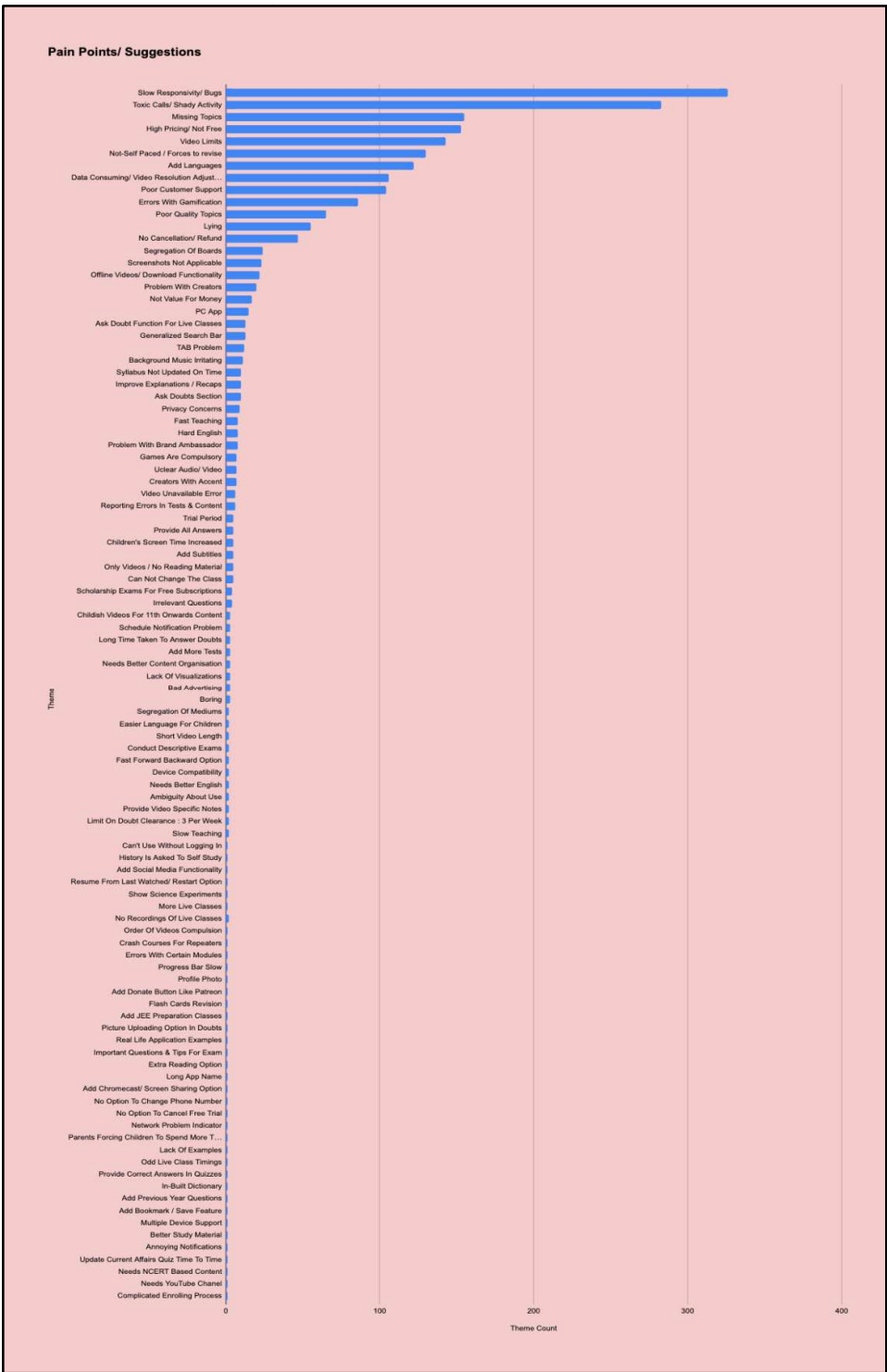
	children toward learning is not so enthusiastic.	
Thought Behind The App	Users loved the thought behind the app which is making education more accessible. The students don't necessarily need to attend schools or tuitions to gain knowledge now.	61
Doubt Clearing	Users loved the doubt clearing feature of the app. Students get many doubts from time to time and they can ask it on the app.	40

**Figure 1. Theme Counts Visualizations with pain points and corresponding suggestions**



*Appreciated / Satisfied With:*[link](#)

Figure 2. Theme counts and theme summary of themes satisfied with





**Figure 5: Word Cloud of negative reviews**



### Features and Suggestions

Based on the above findings, a list of features and suggestions was made to be considered by the developer of a new Ed-Tech app. These are explained in table 3.

**Table 3: Features and Suggestions**

Feature	Based on	Explanation
Fast Responsivity	Slow Responsivity/ Bugs, Video Unavailable Error, Errors With Certain Modules, Progress Bar Slow	The product under development should be as fast as possible with a well optimized cloud that is easily scalable to handle higher user load. The testing process should be air tight and shall detect and fix all the bugs in the product.
Moral Marketing	Toxic Calls/ Shady Activity, Lying	The marketing for the product should be done in the most moral way possible. A business is meant to make money at the end of the day. Although, it is observed that a huge number of users are sensitive towards this topic.
Expansive Subjects & Topics	Missing topics	The product should feature an expansive range of subjects. All subjects should contain all the necessary topics under it & some extra ones.
Competitive Pricing	High Pricing/ Not Free, Not Value For Money, Free Videos, Live Classes Free Trial	The pricing of the product should be initially very competitive to the existing Ed-Tech products in the market. This will help the company gain more users. The product should provide some content for free and few live classes in order to incentivize users to sign up on the platform.

Free Offerings	High Pricing/ Not Free, Free Videos, Live Classes Free Trial	The product should offer a variety of free services to attract more customers. Availability of free content is something that has been observed to be most desired by the users.
Self Paced Learning	Video Limit / Not Self Paced, Order Of Videos Compulsion	The courses on the product should be self paced. The users should have the freedom to learn as much as they want without any restrictions from the product.
Expansive Language Availability	Add Languages	The product should feature content in as many vernacular languages as possible. Users have demanded the content in languages such as Hindi, Urdu, Tamil etc.
Video Resolution Adjustment Option In Video Player	Data Consuming/ Video Resolution Adjustment Feature	The video player should be given a feature that lets the user adjust the streaming resolution as per the need and availability of data.
High Quality Customer Support	Poor Customer Support	The customers in this line of business are quite sensitive as the development of their offspring is in question. The best quality customer support should be provided for the product that ensures the satisfaction & acts on complaints by the users.
Unbiased, Error-Free & Entertaining Educational Games	Errors With Gamification, Fun In Learning	The product should feature games based on educational content to make learning entertaining and captivating. Although, the company should ensure the proper working of these games before integrating them inside the product.
Top Quality Content	Poor Quality Topics	It is crucial to cater top quality content under all the subjects and topics. Users tend to resort to Ed-Tech apps as they face difficulties with understanding certain topics at schools and tuitions.
Easy & Ensured Cancellation & Refund System	No Cancellation/ Refund	There should be an effective Cancellation & Refund System in place to ensure that the users don't feel cheated. Opting out of a course and getting the money back should not be a hassle.
Segregation Of Boards	Segregation Of Boards	The courses and the content on the product should be well segregated by the boards. The name of the board should be clearly mentioned in the course name or through a tag system. Example : "Geometry : Class 9 CBSE Board"

Save Snapshot	Screenshots Not Applicable	There should be a feature that lets the user save snapshots from videos inside the app. Letting the user save it to the camera roll may lead to plagiarism issues.
Download Video Feature	Offline Videos/ Download Functionality	The product should let the user download the video they want. It should also let the user decide the resolution in which the video should be downloaded.
Impressive Teachers	Problem With Creators, Competent Creators	The product should feature top rated teachers who are capable of explaining things in an easy manner. The qualification of a teacher should also be considered to allow him on the platform.
Multiple Device Support	PC App, Device Compatibility, Device Support	The platform should offer support to a variety of devices such as mobile phones, tablets, iPads, iPhones, TVs, Laptops, MacBooks etc.
Tasteful Background Music	Background Music Irritating, Fun In Learning, Childish Videos For 11th Onwards Content	The music used for pre-recorded videos should be tasteful and low enough so that the speaker is audible. It is appropriate to add funny background music for children, but the videos for older users should be tasteful or non-existent.
Up-To-Date Syllabus	Syllabus Not Updated, Update Current Affairs Quiz Time To Time	As per the changes in syllabus, the content under the old courses should be edited from time to time.
Easy Explanations	Improve Explanations / Recaps, Clear Explanations/ Teaching Method	The method of explaining should be easy. The content should be delivered in small understandable chunks. The easy explanations provided on the app can be a moat point for the product.
Ask Doubts Tab	Ask Doubts Section, Limit On Doubt Clearance : 3 Per Week	Under every course, there should be a tab under which students can post their doubts. The teachers should be bound to give timely responses.
Reasonable Paced Teaching In Videos & Live Classes	Fast Teaching, Slow Teaching	The teaching in the videos and live lectures should be reasonably paced i.e neither too slow nor too fast
Simple & Understandable English	Hard English, Creators With Accent, Easier Language For Children, Needs Better English	The English used for teaching should be simple in terms of vocabulary and Indianized in terms of accent for the better understanding of the users from vernacular background.

High Quality Audio & Video	Unclear Audio/ Video	There should be a set standard for creators on the platform to be able to qualify as a creator. Example : The videos uploaded should be of minimum xyz P & the audio quality should be abc KBPS
Error Reporting Function	Reporting Errors In Tests & Content, Provide Correct Answers In Quizzes	The users should be able to report corrections if they find any problems, anomalies or errors in the content or questions provided by the teacher.
Subtitles	Add Subtitles	Subtitles should be available for all videos. There should be at least three options : 1. The language of the video 2. English 3. Auto Generated
Variety Of Study Material	Only Videos/ No Reading Material	The study material provided should be in multiple formats like, videos, pictures, PDFs, links to external content etc. The creation of this content can be another service that the product can provide to the teachers.
Competitive Exams For Free Subscription	Scholarship Exams For Free Subscriptions	Competitive exams should be conducted for each course. The toppers of that exam can be awarded with a free subscription to that course. This can be a great opportunity for the product to generate some buzz and receive some mouth publicity.
Schedule / Calendar	Schedule Notification Problem	The product should feature a function where the user can see all the upcoming classes and assignments due in the format of a calendar.
Use Of HQ Visualizations	Lack Of Visualizations, Video With Visualizations	The videos should include high quality visualizations for better understanding of users. The company can hire animation artists and graphics designers in order to provide visualizations as a service to the teachers on the platform.
Segregation Of Mediums	Segregation Of Mediums	The courses should be classified on the basis of medium attribute. Example : English Medium, Marathi Medium, Gujarati Medium etc.
Variety Of Video Lengths	Short Video Length	There should be a variety of video lengths available on the platform. It has been observed that, the videos of shorter length are easily understandable and less intimidating.



Seamless UX	Ambiguity About Use, User Experience	The user experience of the platform should be seamless. The information architecture & user flow should be intuitive.
Social Media Functionality	Add Social Media Functionality	Users should be able to network with other users and teachers like a social media platform.
Resume From Last Watched/ Restart Option	Resume From Last Watched/ Restart Option	There should be a function that plays the video from where you stopped it last time. There should also be an option to restart the video.
Practical Knowledge	Show Science Experiments, Practical Knowledge, Lack Of Examples, Real-Life Application Examples	The teachers should include more real life examples and show experiments for better understanding of students. An example can explain any concept quicker than mere theory.
Library Of Old Recordings	No Recordings Of Live Classes	The recording of old live classes should be saved and accessible by the users.
Flashcards Gearation Feature	Flashcards Revision	Users should be able to generate their own flashcards along with some preset flashcards on each topic. Flashcards Revision is one of the most widely used methods for revision.
Picture Uploading Option In Doubts	Picture Uploading Option In Doubts	There should be a feature where users can upload pictures along with their doubts. This feature can be useful to ask doubts in subjects like mathematics.
21 Expected & Previous Year Questions	Important Questions & Tips For Exam, Add Previous Year Questions	Like the Navneet 21 set, there should be a feature that can let a teacher provide most expected questions in exams, a list of tips to write the exam in a better way & previous year's solved question paper.
Extra Reading Option	Extra Reading Option	There should be a list of extra readings provided by the app in a separate section. Students can explore the other material on the internet after completing the content on the app.
Screen Sharing	Add Chromecast/ Screen Sharing Option	There should be a function where a user can use Screen Sharing Technology to watch videos on a bigger TV screen.
Screen Time Limiter	Parent Forcing Children To Spend More Time On App	There should be a feature that a parent can use to put a screen time limit on the student's app usage.

In-Built Dictionary	In-Built Dictionary	A user should not need to go outside of the platform to find the meaning of a certain word. There should be an in-built dictionary, where a user can simply select a word and look up the meaning and its use in a sentence.
NCERT Standardization	Needs NCERT-Based Content	The content being taught should comply with NCERT norms.
YouTube Channel	Needs YouTube Channel	There should be a YouTube channel of the app that features some of the basic concepts of various subjects.
Easy Enrollment Process	Complicated Enrolling Process	The user should be able to enroll in a class hassle free and with fewer clicks.
Make learning desirable	Fun In Learning	Learning by nature is a painstaking process. The product should try to make it interactive, interesting and attractive. This can be done by introducing games, competitions, fun facts etc.
Revision Section	Exam Preparation Functionality	There should be a section in the product that will let users choose the content and revise it. This feature can include various multiple choice questions, shuffled questions and hidden answers etc.
Analytics Dashboard	Performance Analytics	A user should be able to see his own progress over time in a format of a dashboard. This dashboard can show the performance of a user in terms of quiz scores, test scores, attendance, screen time etc.
Marketing Idea : Advertise as the best gift option	Marketing Idea	Advertisements can show that it is the best gift a student can receive. Show how perfumes and clothes are low value gifts and courses are high value gifts.
Marketing Idea: Send birthday gifts like stationary items to users.	Marketing Idea	This will help the company to position the product in the minds of the users and maintain healthy relations with them.
Cheat Sheets/ Mind Maps	Cheat Sheets	The product should offer cheat sheets of each subject where all the important points are mentioned in the form of points to remember.

## Conclusion

The research talked about customer reviews of using BYJU's app. It is one of a kind in how it looks at reviews written by customers on Google Play. Using web scraping, the study's data were

extracted from the Google Play Store and saved in a structured format. Both natural language processing and manual content analysis were used in the analysis. Word clouds were created by performing sentiment analysis on a sample of the 30,000 reviews that displayed strong emotions. The research output is a list of suggestions and features that the new players in the Ed-Tech market should take into consideration.

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