Adoption of Proprietary Online Education Software Compared to Free And Open-Source Software in Indian colleges

Shubhraj Sehgal[1], Avinash Gupta[2], Alka Singh[3], Preeti Singh[4]

Babu Banarasi Das Engineering College, Lucknow, India

E-mail: [1]shubhsehgal600@gmail.com, [2]avinashg.mnnit@gmail.com, [3]alkasinghvaranasi@gmail.com, [4]preetis88@gmail.com

Abstract

Adoption of online learning tools is still in the nascent stage in India. Use of such tools has been sporadic and patchy at best. The Covid pandemic of 2020 forced the institutions to shut down which resulted in the sudden adoption of such software. The education market in India is dominated by free & open-source software also known as FOSS while proprietary software solutions take a back seat. This research focuses on the impacts of proprietary education software in easing the learning process for children as well as grad-students, and how these tools impact engagement and learnability. Moreover, a retrospective study of an open-source tool present in the market and the comparison of it with the proposed system have been presented. Further, an example of a proposed system of how a simple system can be created in-house and at minimal cost to serve as a proprietary solution for all online educational needs of the pupils has been demonstrated.

Keywords: Proprietary, Open-source, Education, Software, Covid-19, pandemic, FOSS, BBDLearn

1. Introduction

Educational institutions in India are currently based on traditional models of learning, i.e., they follow the set-up of face-to-face lectures in the class. Although many institutions have also adopted blended learning, still a lot of them are stuck with old methods. The sudden outbreak of Covid-19 shook the world. This situation changed the education scenario across the world and forced educators to shift to an online mode overnight. Many academic institutions that were earlier reluctant to change their traditional approach had no option but to shift to online teaching. According to Moore et al (2011)[2] Online learning can be

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inferred as any method of learning that requires an internet connection and can be done face-to-face in the form of webinars or using distribution of recorded media.

There was a somewhat sporadic adoption of online learning tools earlier as well in India, but that was limited to mostly private schools and institutions as inferred from Kumar, and Tiwari (2018)[5]. Most of these institutions used proprietary software solutions for teaching which were licensed from different developers and providers. What happened after the pandemic was that access to such proprietary software was not present with everyone so people turned to free tools provided by the likes of Google, Microsoft etc. While some got their students licenses to learning systems that were paid to use. But in a country like India, FOSS has been very dominant post-Covid.

There has been a considerable amount of development in this area already, from Google Classroom, to Microsoft Teams, to Zoom etc. The problem arises when the information is not in one place, i.e., notes are taken here, assignments are submitted there, and video lectures are found somewhere else etc. This sort of vertical integration is what is lacking in such FOSS alternatives which makes life difficult for students to navigate their way to different apps and websites to complete their work. This can lead to lower adoption rates, lesser attendance, overall a far grimmer academic picture. That's where a proprietary platform comes into play, this software can help eliminate the friction that exists in using FOSS alternatives. As said earlier, online learning solutions were adopted by educational institutions, tailored to their own pedagogy even before pandemic was a thing, but the pandemic made its adoption ubiquitous.

This paper sheds light on what proprietary and open-source software are, their respective examples and what are the pros and cons of adoption of such solutions. Moreover, there is a proposed system that can be adopted by institutions in the form of a simple application which can either be created in-house promoting better research and hands-on practical experience among pupils or can be developed at a minimal cost.

1.1 What is Proprietary and Open-source software?

Geeksforgeeks defines Proprietary and Open-source Software as:

Proprietary Software:

Proprietary software is a computer software of which the source codes are not publicly available; only the company which has developed it is able to modify it. In this case, the

software is created and tested by the individual or organization which owns it, not by the public. This software is managed by a closed group of stakeholders or the groups that developed it. It has to be paid to get this software and its commercial support if it's eligible for maintenance. The company gives a valid license to the buyers to use this software. This license entails some restrictions on users also.

Free and Open-source software:

Open source software is a computer software of which the source code is available openly on the internet and programmers can modify it to add new features and capabilities without any cost. Here the software is developed and tested through open collaboration. This software is maintained by a community of developers. It provides general user support as well as organizational support if available for maintenance.

It can be obtained for free without paying anything most of the time. This software also sometimes comes with a license and sometimes does not. This license provides some rights to users of the software. Some free software might not be open-source i.e. they are developed by organizations to use for free by consumers but they cannot modify the source code of such software to suit their needs.

1.2 Pros and cons of Free and Open-Source Software

Andra Picincu[4] in their article enumerate some advantages to using an open-source solution, these are enumerated below:

1. It is free of cost that can help people try new things without committing or paying up-front.
2. It gives users full access to its source code, which encourages creative work as well as promotes customization according to different needs.
3. For most of the proprietary tools on the market there is some open-source version, for example- Ubuntu is a good alternative for Microsoft Windows, or LibreOffice in comparison to Microsoft Office.
4. Open-source apps are supported by many developers and adopters worldwide who can offer support and help for free when someone gets stuck.
5. Moreover, these communities help keep the platforms up-to-date and more secure as compared to a locked proprietary system.

But, as with anything there are also downsides to using such open and public solutions, some of these downsides are:

1. Most of these solutions are not as easy to use for beginners as they require you to visit several forums to solve a problem and get a hang of it.
2. Many of these services are ad supported for revenue which collects unnecessary user data and can dampen the user experience.
3. Some of the free software is not open-source so it can only be used and not modified by the end-user.
4. Such software lacks the vertical integration that a proprietary product has, a famous example can be Apple Inc. which has a walled garden approach but incredible integration between devices and services.

1.3 Some FOSS tools for online learning:

According to Singh et. al. (2010) [1], Open-source online learning tools are broadly of five types namely:

1. Staging tools - These tools help provide a method to manage the online delivery of courses. Example- Moodle, Sakai, ILIAS.
2. Course delivery tools - These tools are helpful in actual dissemination of courses in various formats. Example - Youtube, Udemy, Coursera.
3. Course collaboration tools - Allows students, their peers, and their instructors to collaborate on various topics. Example - Blogger, Wordpad, Google Jamboard.
4. Interactive communication tools - Provides a method of communication between instructors and students. Example - Google Classroom, Google meet, Zoom, Cisco Webex.
5. Assessment and learning tools - Assists in testing the students against benchmarks to gauge how well they’ve understood and learned. Example - Remote Proctor, PlagiarismDetect, GoogleDocs.

1.4 Why adopt proprietary software in place of FOSS for education?

Proprietary software in education, as in any other domain brings with it certain benefits of better vertical integration, you do not need to get your subject notes from someplace, then stream videos of lectures from someplace else and appear for a quiz at a totally different platform.

This is a major problem solved by a custom-made proprietary software. Although there are some drawbacks as well; the cost of licensing can add up if a platform with more features is used. Users need to rely on developers for regular updates and maintenance, and some features might not be used by many people but still they are paid for adding unnecessary cost. But as an overall package, proprietary software lends a better control and integration for learning systems that can be adopted by institutions as well as students themselves. These solutions can be very helpful in learning, teaching, upskilling and reskilling the masses both during and after the age of the pandemic.

2. Proposed System

A simple content delivery system can be developed at minimal cost for use by any institution, the development of this system can be outsourced to a third party in case of any non-technical institute whereas technical institutes can strive to build their own in house solution that will promote both research and practical hands-on experience for the students and faculty alike.

2.1 BBDLearn - One such system

BBDLearn, an android application, is a vivid example of one such system. Built on open source technologies, BBDLearn can significantly ease the learning process for college students. This app can integrate various facilities into one place such as streaming online lectures, class notes, question papers etc.

Although several solutions like Google Classroom already exist and are widely popular, it is just a matter of time before such facilities cease to be free-to-use and return to a paywall. When that happens most institutes would return to traditional offline mode. That is where BBDLearn can be very helpful for our institution as it is made in-house, and all the control lies within the organization so that the mercy of any outside organization is not required.

3. Proposed Methodology

On review of the existing technologies available in the market like Google Classroom, it is found that it will be effective to provide text format notes and previous year papers to the students so that they can study from them, so that became the first cornerstone for the project. Next up, some functionality from platforms like Udemy i.e., streaming video lectures are added.

The project is proposed to complete one module at a time, developing functionality and then moving on to the next module.

The modules will be namely:

1. Notes
2. Lectures
3. Papers
4. Notices

This step by step approach helped in creating a bug-free application which then went through a series of tests to make sure it delivers upon the stringent reliability standards and performs well.

The working of the app is in a way that is both simple and fast. Admins can upload study materials on the app server from where it can be fetched by the app to display relevant information to the end-user i.e. the student.

3.1 Some Modules of BBDLearn

1. Notes-

   This feature would help users view the notes available specifically for the semester they are in.These are stored as pdf files
2. Lectures-

   This feature would help users view the lectures available specifically for the semester they are in. Such lectures will be stored in video format that can be streamed from the server on demand.
3. Question Papers-

This feature would help users view the past year papers for the subjects of their semester.Like notes, these are also stored on the storage server as pdf files that can be accessed on demand

4. Notices-

   This feature would intimate users of all the new developments in the college that can be pushed to the app. A virtual noticeboard is created containing all notices in one place.

3.2 Visualization of the Proposed System

A schematic representation of a proposed system containing some modules like notes, lectures etc. and its working can be found in the flowchart in figure 1.

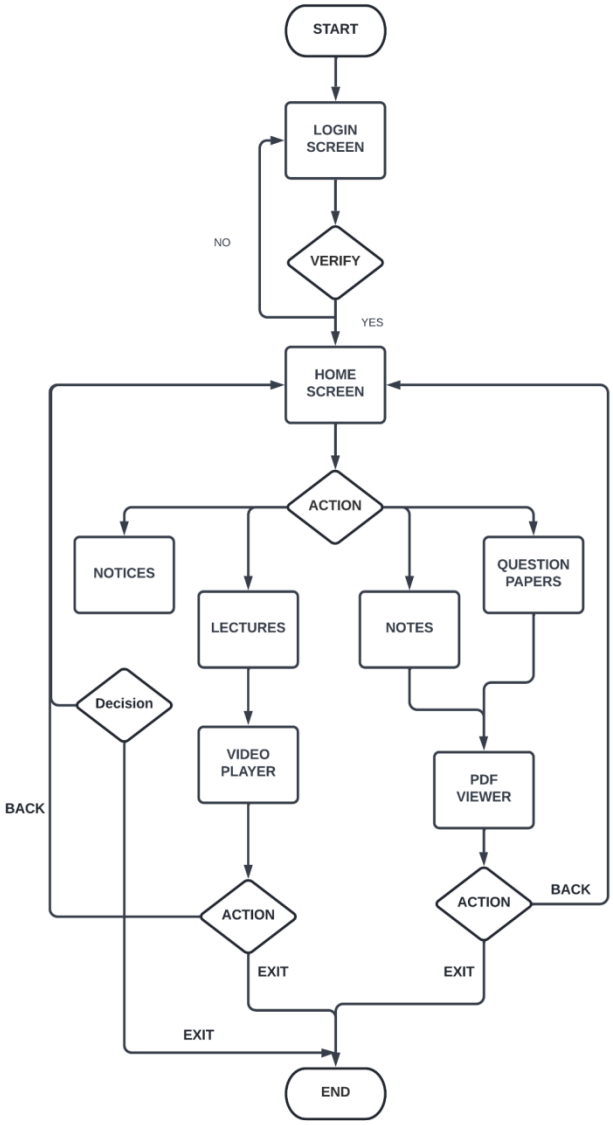

Figure 1. Visualization of the Proposed System

3.3 Salient Features of the Proposed System

Some salient features of the proposed design are:

1. Based on open-source technologies-
   Being based on open-source technologies itself, this system is very cost-effective and can be developed by a team of developers at minimal cost
2. Safe and secure design-
   The system can be hosted on an encrypted server, in this case it was hosted on firebase which makes it secure,
3. Individually Licensable-
   This system can be alternatively created as a blueprint which can then be individually licensed to different institutions at minimal cost.
4. One-stop solution for academic needs-
   All the academic needs of students can be found at one place from notes to lectures to question papers and so on.
5. Easy to use interface-
   The interface is easily usable by both beginners and kids.
6. Easy to manage and deploy-
   The system is deployed using any off the shelf hosting service so it becomes easier to deploy and manage users and data.

3.4 Cost effectiveness of the solution

This solution can be relatively cost effective in contrast to both traditional offline learning models as well as licensing some other proprietary solution. Some cost benefits of this system are:

1. This system can be developed and hosted for free by any novice software developer. It was created as a final year project by a team of one student in a span of 30 days
2. Compared to offline mode of learning where the exposure is limited. i.e., once a lecture is delivered its upto the students' memory to remember it. Whereas the materials stay on the system forever
3. System is developed using free and open-source technologies such as android and firebase. But instead of the user having to use a different solution this is a one stop solution for their needs.

4. If in future the demand rises beyond the scope of free service, incremental hosting plans from firebase are quite inexpensive to host the entire application.

5. Another benefit can be that technical graduation students can get significant training and exposure building and/or maintaining the application made by their institution which can save training and skilling costs if they can be trained in house.

Thus, the solution appears very cost-minimal in terms of both development and maintenance costs. Additionally, it can increase productivity as students would not need to switch between different programs nearly as much to get their work done which will save time. Furthermore, it provides excellent learning potential of any institute decides to go ahead and develop it in-house which can also help keep their proprietary study materials secure and also created a good system for students to use in case they are not able to attend regular classes.

4. Conclusion

All in all, proprietary software provides better user-experience coupled with regular updates, tailor-made features, better technical support and a wider range of tools. Moreover, these systems do not rely on the mercy of the provider of open-source software as they are licensed by the firm and are more secure than an open-source system.

In the context of classroom learning as well as at home learning during the time of pandemic or otherwise, these systems provide an edge over their open-source counterparts, provided, the organization or the institution can bear the cost of licensing or development. Lastly, this can be a good opportunity for integrating online education to the very fabric of the Indian educational model so that it can become the de facto mode of learning as envisioned by Adedoyin and Soykan (2020)[3].

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