

FAQ as a tool in Asynchronous Mode of Delivery in Blended Learning

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Abstract— This innovative practice work in progress paper presents the use of the FAQ tool in the blended learning model.

The disruption caused by the COVID-19 pandemic has forced educational institutions around the world to shift from the traditional in-person to online mode of teaching. One of the disadvantages of the online mode of teaching is the unavailability of real-time feedback on students' understanding of the course content. During in-person teaching, the faculties will be available to clarify students' immediate doubts. Therefore, it is essential for faculty to understand how the students' online learning experiences could be similar to physical in-person teaching.

KLE Technological University(KLE Tech) has opted for blended mode learning to leverage COVID-19. The blended model involved students in the asynchronous mode of delivery followed by the post-test on the asynchronous content and then the synchronous mode of delivery. During the course delivery, it was observed that there was a gap identified between the asynchronous delivery and post-test. The faculty, therefore, by incorporating students' feedback, designed and introduced FAQs (Frequently Asked Questions) for each asynchronous video.

In this study, we proposed FAQ as a tool to clarify student's doubts while asynchronous learning and explore the influence of FAQs on students learning process in a course. Linear regression analysis showed that viewing the FAQ had influenced students' post-test scores and thematic analysis of the survey data showed that students were satisfied with the FAQ tool which helped them in answering their questions while the asynchronous mode of delivery.

Keywords—Blended Learning, Asynchronous Delivery, FAQs, Linear Regression (keywords)

I. INTRODUCTION

The disruption caused by the COVID-19 pandemic has forced educational institutions around the world to shift from traditional in-person to e-learning. Whatever be the situation, learning is one thing that cannot be stopped. There are different types of e-learning, such as synchronous learning, asynchronous learning, and blended learning. Synchronous learning (live) refers to all forms of learning in which the learner and the teachers are in the same place and at the same time (eg; in-person classes, live online meetings). Asynchronous learning (on-demand) is one in which the learning takes place anytime and anywhere based on the learner's needs. Blended learning is an amalgamation of synchronous and asynchronous learning [1-3]. There are

many flavors of blended learning; however, how we blend varies based on the institutional goals and student outcomes.

KLE Tech has leveraged the COVID-19 situation to begin a new era of learning on campus: a strategic shift from traditional learning to Blended Learning. The blended model adopted at this university involves high-quality digitized video lectures which are available anytime, anywhere (asynchronous) on Moodle Learning Management System(LMS) followed by the post-test and then the interactive live stream classes (synchronous) through web-conferencing tool, Microsoft teams that take the learning to the next level. The asynchronous videos are recorded in the university studios using the light board technology and are uploaded to Vimeo server. These videos are then made available on LMS [4]. The blended model at KLE Tech is as shown in Fig. 1

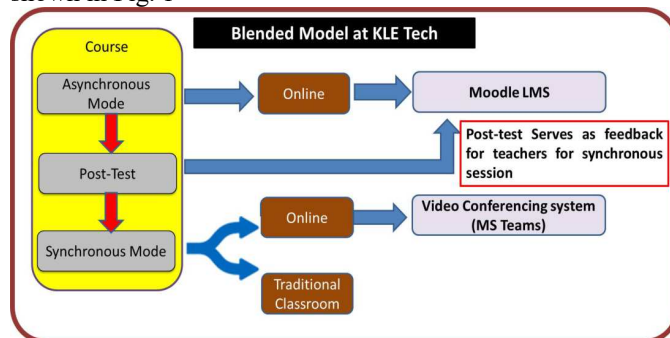


Fig.1 Blended Model of KLE Tech.

After the implementation of blended learning, feedback was taken from students. It was observed from the feedback analysis that most students had raised concerns about their questions not being addressed during the asynchronous mode of learning before attempting the post-test. Thus, a gap was identified between the asynchronous delivery and the conduction of the post-test. In this paper, an attempt has been made by proposing FAQ as a tool to bridge the gap between the asynchronous delivery and post-test. We also aim to examine the effectiveness of FAQ implementation with the following objectives;

1. To evaluate the influence of FAQ on students' post-test scores.
2. To ascertain the students' opinions on using FAQ.

As a case study, the FAQ was implemented on one of the courses Mechanics of Material offered to 3rd-semester

students in blended mode by the School of Mechanical Engineering.

In Section II we discuss the past efforts carried out to bridge the gaps in asynchronous learning. The proposed methodology and outcomes in terms of results are presented in Section III and IV respectively. Finally, in Section V we provide the conclusion and future work of this study.

II. LITERATURE REVIEW

Rasheed et al. [3] have conducted a systematic literature review to identify the challenges in the asynchronous component of blended learning from students, teachers, and educational perspectives. The authors demonstrated that online help-seeking was one of the major challenges faced by students. To overcome this issue, researchers [5,6] have used discussion forums and text messages to provide instant feedback while online learning. Also, another problem highlighted by Hardin and Koppenhaver [6] is that students perceive discussion forums as less private and they feel less comfortable in sharing or seeking help and are reluctant in making such inquiries. Merino et.al [7] have evaluated and compared the importance of different LMS functionalities such as a forum, file download, bulk mail, submission management system, groups surveys, assessments, FAQ, etc., and analyzed their effects on student learning. According to the results, FAQ was one among the 6 functionalities which were rated with an average interest upper than 5 and takes the 5th position in survey results. In this study, teachers provided a set of FAQs and their responses, and each FAQ was related to the common doubts asked by students in lab classes or forums. Results also showed that FAQs are a valuable tool in transforming implicit knowledge into explicit knowledge. Worthington et.al [8] have investigated 3 e-learning packages used at Australian National University (ANU): Adobe Connect for synchronous delivery, Moodle, and edX for asynchronous delivery. Brief survey results reported that edX did not have all features to support face-to-face lectures or real-time webinars in which learners cannot ask questions or for clarifications of a pre-recorded videos. Based on the survey results, the authors [8] aimed to produce an online tool to seamlessly integrate both synchronous and asynchronous tools to facilitate communication in e-learning. Highlighting the lack of support for 24 hours' real-time lecturer availability in online learning, Murad et.al [9] have identified, analyzed, and designed a chatbot to support 24 hours of the interactive learning process in all courses. The natural language processing approach is used to generate responses by Chatbots. The analysis is done and used to design chatbots that can maximize LMS work and help student learning activities, especially around the most frequently asked questions.

III. METHODOLOGY

This section of the paper includes the proposed solution to the gap identified in Section I, the process for designing the FAQs, the research question that we intend to answer through this study, followed by the method used to conduct the study. We have also described the data collection and the process of data analysis.

A. Proposed FAQ as a tool:

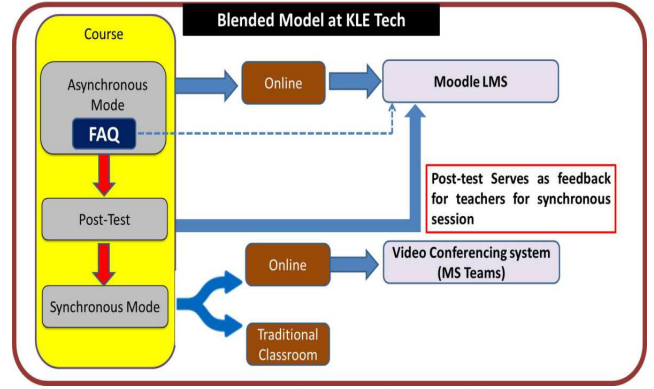


Fig. 2 FAQ as a tool in Asynchronous delivery

Fig. 2 shows the proposed solution. Frequently Asked Questions (FAQs) were added for each of the asynchronous videos and connected every FAQ to the discussion forum to post queries if questions are unanswered through the FAQ. The process used to create FAQ is described in the following section. The FAQs were designed based on possible queries that a student might get while watching the video and the faculty experience of handling the course.

B. How a Specific FAQ was designed?



Fig.3 Process for FAQ Creation

A team of 4 faculties was involved in the process. One faculty member is the course coordinator, and the other three faculties are the module/chapter in charge. A systematic approach followed to create a specific FAQ is shown in Fig. 3. The process of FAQ creation is described as follows;

- **Divide:** The course coordinator divides the chapter topics (concepts) among the other three faculty members through initial discussions and their interests.
- **Identify:** Once the topics are assigned, each of the three faculty members identifies 4-5 questions for FAQ based on the experience of handling the course, most asked doubts from students during synchronous sessions, and questions posted on a discussion forum.
- **Prepare:** After the questions are identified, each faculty member prepares the questions and their answers by involving other faculty members and referring to other sources of information.
- **Review:** All four faculty members come together to discuss, review and critique the preparedness of the FAQ.
- **Finalize:** During the meeting, the questions and answers are finalized along with the course coordinator.

- **Combine:** In this phase, faculty members consolidate all questions for their respective topics.
- **Submit:** The final consolidated FAQs are submitted to the module in-charge
- **Release:** Module in-charges will release the FAQ to LMS and be made available to students for viewing.

C. Case Study :

The course Mechanics of Materials has a total of 7 chapters whose delivery in blended mode is spread across 9 weeks. On LMS, every student has a feature to comment and rate the video based on the video quality, audio quality, and content quality. It is observed that the rating for video content in this course is above 4 out of 5. FAQ was implemented on every asynchronous video of chapters 3, 4, and 5 to examine its effectiveness, as shown in Fig 4. Accordion tool available as a part of H5P interactive content on Moodle LMS was used to create each FAQ which provides an easy user interface as shown in Fig. 5 for students to read and navigate through content.

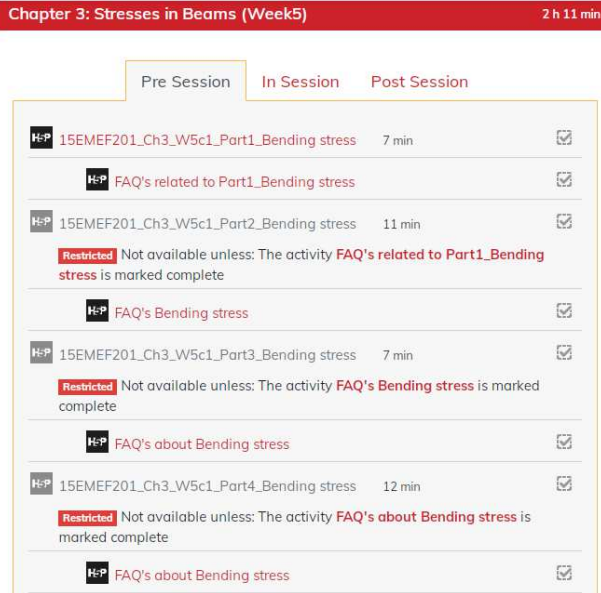


Fig. 4 FAQ for every asynchronous video

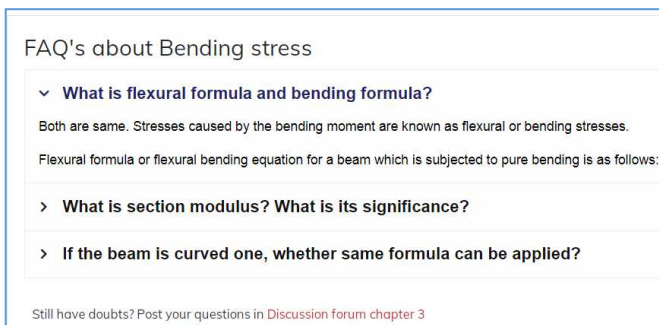


Fig. 5: User Interface for FAQ

D. Research Question :

In this study, we explore the role of FAQ on students learning process in a course that was taught using the blended model of teaching with the following research questions;

1. What is the influence of FAQs on student's post-test scores?
2. How FAQs have influenced student's satisfaction in clarifying their doubts during asynchronous online delivery?

E. Methods

The first research question analyzed through quantitative method is used to study the effect of FAQ on student performance in post-test by using linear regression between the number of views on FAQs and post-test scores. Thematic analysis is used to analyse the second research question, using the survey data collected through feedback.

F. Data Collection

A total of 206 students participated in this study. Data about student's views of FAQs were collected from Moodle LMS logs of chapters 3 to 5. The logs were cleaned and filtered to obtain the students and their respective number of views for the FAQ. The scores for the chapter-wise post-test were taken from the grades section on LMS. Students who did not attempt any of the post-tests were excluded from the data.

The survey was conducted through google forms with a set of 7 questions, as shown in Table 1. It consisted of 4 Likert scale questions and 3 open-ended questions. The survey was administered remotely after the implementation of the FAQ. The open-ended questions are considered for qualitative analysis.

Table 1: Survey Questions

| Sl.No | Questions |
|-------|---|
| 1. | What is your opinion about the FAQs included for the module post Unit I? •I did not read them. •I read, but I did not understand it. •Not useful at all •Helped me to understand the videos |
| 2. | How useful were the FAQs in clarifying your immediate doubts after asynchronous delivery (video watching)? •Extremely Useful •Very Useful •Not so useful •Not at all useful |
| 3. | Overall, how do you rate the FAQs? •Very good •Good •Poor •Very poor |
| 4. | Should we roll out FAQs to other courses as well? Yes /No |
| 5. | Specific things about the FAQs that helped to improve your learning |
| 6. | List specific recommendations for improving these FAQs |
| 7. | Any other |

G. Quantitative Data Analysis

Linear regression analysis is a statistical method used to elucidate the relationship that may exist between the two variables. In this study, linear regression is applied separately for each of the chapters, between the number of views on the FAQs and the post-test scores. IBM SPSS v22.0 is used. Table 2 shows the information about each chapter and the number of FAQ. For analysis, the sum of the number of views on all FAQs are considered for each student.

H. Qualitative Data Analysis

Thematic analysis is a method to identify, analyze and report patterns within the data. It also describes the data which helps in interpreting various aspects of the research question [10]. In this study, thematic analysis is performed on the open-ended questions of the survey data, to understand the influence of FAQ on student's satisfaction as mentioned in the second research question. Nvivo v10.0 is used for coding and identifying themes. The analysis is performed in 5 phases as reported in the work of Braun and Clarke [10]. The data was read to identify repeated patterns and was open coded according to the 3 open-ended

questions in the survey and the initial codes generated are as shown in Fig 6.

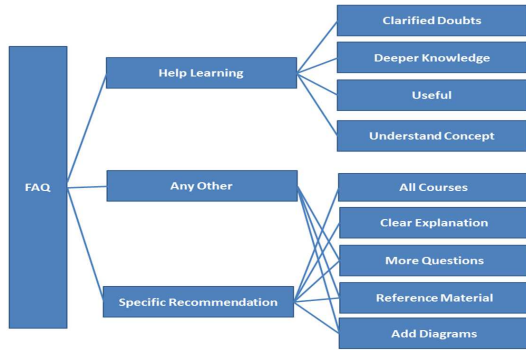


Fig. 6: Initial Codes

IV. RESULTS

A. Quantitative Results

The results of linear regression that is calculated to describe the relationship between independent variable *No of views on FAQs* and the dependent variable *Post-test scores of Chapters 3 to 5* is shown in Table 3. The normality and homoscedasticity assumptions hold good for the data. The result of the normality assumption is shown in Fig 7.

Table 2: Number of FAQs

| Chapter Number | Number of Topics | Number of FAQs |
|----------------|------------------|----------------|
| 3 | 12 | 43 |
| 4 | 4 | 19 |
| 5 | 3 | 16 |

A significant regression equation for chapter 3 was found at ($F(1,198) = 5.381, p < 0.05$), with $R^2 = 0.026$. The equation is $5.278 + 0.037(\text{FAQ3})$. A significant regression equation for chapter 4 was found at ($F(1,198) = 5.849, p < 0.05$) with an $R^2 = 0.029$. The regression equation is $4.304 + 0.133(\text{FAQ4})$. A significant regression equation for chapter 5 was found at ($F(1,198) = 40.391, p < 0.000$) with $R^2 = 0.169$. The results show that student's scores increased by 0.037 points for each view on FAQ of chapter 3 with 2.6% of the variance in scores is influenced by FAQ3. Scores increased by 0.13 points for each view on FAQ of chapter 4 with 2.9% of the variance in scores is influenced by FAQ4 and scores increased by 0.24 points for each view on FAQ of chapter 5 with 16.9% of the variance in scores is influenced by FAQ5.

B. Qualitative Results

A set of 4 themes emerged from the data as the result of thematic analysis. These themes represent the student's views on using the FAQs. Each theme is described with suitable quotes extracted from the data. Fig. 8 shows the distribution of initial codes from which the 4 themes were generated.

Theme 1: Students expressed that FAQs are useful in clarifying immediate doubts.

One of the major challenges of asynchronous learning is the lack of immediate feedback for the queries. This theme describes that FAQ has played its role in clarifying student's doubts and this can be observed from some of the statements written by students as shown below,

"Defines the topics efficiently... Reading them makes us feel as if we are questioning the teachers and getting back answers as in live campus sessions..."

"It gives us answers to doubts that occur after we complete a particular topic"

"For me, it clarified the exact doubts what I had."

Also, few other students mentioned that FAQ acted as additional resources which are helping them to clarify doubts while watching the video. One student mentioned that *"Something that we can't understand while watching the video which is more important will be clarified in FAQs"*. Another student said that- *"FAQs were like notes to me, they gave clear clarification and justification of the topics"*. One student expressed the usefulness of FAQ by stating that – *"FAQs summarize the lecture compactly. So I don't have to go through the video again to revise."*

Table 3: Linear Regression

| Chapter No | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|-------------------|----------|-------------------|----------------------------|
| 3 | .163 ^a | .026 | .022 | 2.086 |
| 4 | .169 ^a | .029 | .024 | 2.176 |
| 5 | .412 ^a | .169 | .165 | 2.221 |
| a. Predictors: (Constant), No of FAQ Views (FAQ3, FAQ4, FAQ5) | | | | |
| b. Dependent Variable: Post-Test Scores | | | | |

Theme 2: FAQs help understand the concept and gain deeper knowledge

One aspect of FAQ was to clarify the immediate doubts while asynchronous learning and other aspects of FAQ that emerged from student's views was to help students gain a better understanding of the topic. This theme describes how FAQs helped students to understand the topic and gain deeper knowledge from some of the student's statements - *"It helped in learning more"*, *"In-depth learning"*, *"It explains why the things are like that"*, *"FAQs helped me to know the concept perfectly"* and *"Gives clarity to the topic"*. Apart from understanding the topics one of the students also mentioned that FAQ helped to boost confidence - *"It helped me to gain more confidence about the topic"*.

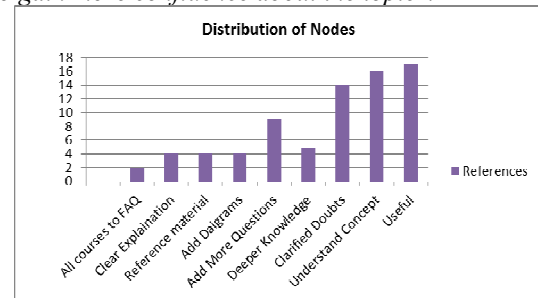


Fig. 8: Distribution of Nodes

Theme 3: Students suggested adding more questions to FAQ, reference material, and representing the answers using diagrams.

A blended learning environment can be designed in many ways with different activities and interactions based on the student's learning experiences and feedback [11]. This theme describes the feedback from students for improving the FAQ. Three main suggestions were most provided by students. The first one is, to add more questions which are observed in statements made by students – *"Adding some more questions regarding each topic"*, *"I think there must be some more questions including practical applications"*. The second is, to represent the answers to the FAQ with diagrams. This is observed from the student statements – *"If possible diagrams must be added"*, *"the*

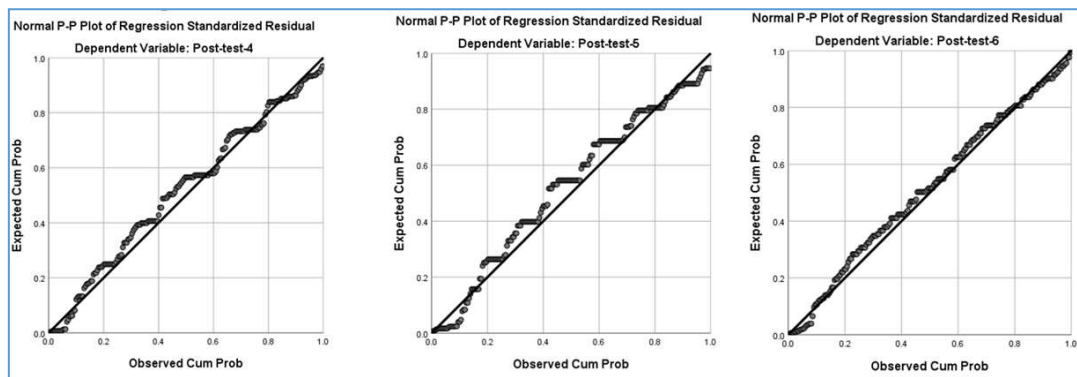


Fig.7 Normality Assumption

solutions to those can include diagrammatic representations wherever required". The third is, to add reference material which makes it easier for students to access the required material. "Theory Notes should be provided in LMS", "if possible please add the reference material, for example, the textbook pages related to that chapter"

Theme 4: Suggestions to improve sentence formation and adding FAQs to all other courses

This theme describes student's views on improving the FAQ. From the literature, it has been observed that designing learning content plays an important role in student learning. FAQ is also one such content that needs to be designed and formulated that helps students understand the content easily.

One of the students said that- "Only the sentence framework is needed to be improved ". Another student said that- "The questions framed can be made a bit clearer to understand". Few other students mentioned that FAQs are helpful and thus should be rolled out to other courses. This observation was made from students' statements- "Make them for every course" and "All courses should have FAQs"

V. CONCLUSION

KLE technological university adopted the blended learning model which consisted of asynchronous delivery through Moodle LMS followed by the post-test on the asynchronous content on LMS and then the synchronous delivery. The feedback from the students on this blended model highlighted that there was a gap between the asynchronous mode of learning and the post-test. Students had concerns about attempting the post-test without their doubts being clarified. Therefore, to overcome this issue, Frequently Asked Questions (FAQs) were introduced on LMS for every asynchronous video content.

In this study, we aimed to examine the effectiveness of FAQ on student's post-test scores and students' satisfaction with using FAQ. The results of the quantitative analysis showed that FAQ has moderately influenced student's post-test scores. A qualitative analysis reported that students were satisfied with the FAQ which helped them in clarifying doubts, gain in-depth knowledge, and provided suggestions to improve the FAQ such as adding more questions, representing answers through diagrams, and provision for notes.

However, some limitations of this study are discussion forum was not used effectively by students to post their queries that were unanswered through the FAQ. This may

be due to a lack of motivation for students to use the discussion forum. Students' experiences and satisfaction are gathered from the open-ended survey questions, no specific questions were framed to understand their satisfaction with FAQ. Therefore, in further study, we intend to implement FAQ on all courses, including student feedback on the grammatical understanding of the FAQs prepared by the teachers during the review phase of the process of FAQ generation shown in Fig. 3, and make discussion forums a graded activity and study the influence of FAQ on student learning. It is also interesting to study the effect of the quality of the video content on the amount of access in the FAQ which can be taken by researchers.

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