

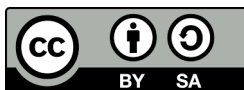
\LaTeX

Open Education Resource: Flipping the classroom with MOODLE

Work done as part of AICTE approved FDP on
FDP201x Pedagogy for Online and Blended Teaching-
Learning Process

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IITBombayX: FDP201x

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Table of Contents

1	Open Education Resource: Flipping the classroom with MOODLE	1
1.1	About the OER	1
1.2	Learning Objectives	2
1.3	Helpful Documentation for Tool Use	2
2	Design Decisions	3
2.1	Nature of Decisions taken	3
2.1.1	Content Decisions	3
2.1.2	Pedagogic Decisions	3
2.2	Technology Decisions	4
3	OER Description	5
3.1	Active OER	5
3.2	Lesson Settings	5
3.3	How to use this OER	7
3.4	Best Practices with Lesson Activity	11
4	Evaluating Effectiveness of OER	12
4.1	Effectiveness at the student level	12
4.2	Effectiveness at consumer level	12
4.2.1	Implementing Survey	12
4.2.2	Survey Questions	13
5	Consolidated Log of Team Work	14
5.0.1	Additional Teamwork Logs	14
6	Building a Community of MOODLE and Flipped Classroom Adopters	16
6.1	Possible Sources for Community Building	16
6.2	Plans for Community Building	16
	Works Cited	17

Section 1

Open Education Resource: Flipping the classroom with MOODLE

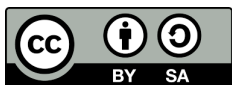
1.1 About the OER

The open education resource is a collection of MOODLE Lesson activities that are useful as out-of-class activity while flipping the classroom. There are three lessons as part of this OER, and each deals with an aspect related to Data Science: Why? What? and How?.

Data science is a method of extracting and analysing hidden knowledge, from eligible sample data using computing devices by deploying statistical and mathematical models for better prediction in any business

The details about this OER is given here:

- OER is downloadable from: <https://vsat2k.wordpress.com/fdp201x/>
- Target Audience: First year Master of Engineering Students (any domain)
- Tags: Flipped Classroom, MOODLE, Data Science: Why? What? and How?, Analytics, Data Mining
- OER developed using MOODLE 2.3, MikTeX 2.9, TEXMAKER 5.0.2 and Google Docs
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1.2 Learning Objectives

After using this OER, learner will be able to:

- Identify the characterizing features of a Data Science
- List down the benefits of Data Science: Why? – As a learner and as a Teacher
- Explain the definition and theory behind Data Science: What?
- Familiarize themselves with prediction of data science
- Apply simple machine learning algorithms in data science for prediction

1.3 Helpful Documentation for Tool Use

The helpful tools used to prepare this documentation and OER is as follow:

- [1] for use and re-use of presentation using MikTeX and TEXMAKER free and open source tool
- [2] for using plugin of WordPress for user who downloads this resource will be asked their email address and as a follow up the survey.
- [3] for design and development of Lesson Activity in MOODLE (an Open Source Tool)
- [4] for understanding how students and teachers interact with Moodle)(MoodleCloud) lessons once they have been created. MoodleCloud is a Free Hosting Services from the makers of Moodle
- [5] for preparing presentation in L^AT_EX[1] in-side and out-side class activity

Section 2

Design Decisions

2.1 Nature of Decisions taken

The design decisions involved in the creation of this OER were of broadly three types:

1. Content Decisions
2. Pedagogic Decisions
3. Technology Decisions

2.1.1 Content Decisions

The content decisions related to:

1. Earmarking specific segment to be covered – Decided on Data science: Why? What? and How?
2. The research papers/publications and other materials to be provided – Data science, machine learning algorithms, Theory Underlying Data Science, Process in Data science
3. Existing standard video from experts (YouTube) to be provided

2.1.2 Pedagogic Decisions

Typically in a flipped classroom strategy, there are two segments –

1. Out-of-class segment and
2. In-Class segment

The out-of-class segment requires student to refer to some given material (Video, LaTeX presentations, Quiz etc) and form an understanding about the concepts that are relevant.

In terms of concept marking the pedagogic decisions that were taken for the Out-of-class segment related to:

1. Cognitive Levels of Questions to be asked along with the resources – Mostly Recall to Apply level question for out of class and Create Level question for In-class
2. Assessment Strategies – Multiple choice questions for out of class, Peer Instruction, Team-Pair-Solo strategy, Feedback Form for in-class

2.2 Technology Decisions

While developing the Out-of-Class and In-class activities, the major technology decisions taken were:

1. Tool to be used for creating Presentation – \LaTeX , as it is free and open source, and provided option for creating report, article, book, as .pdf files that can be directly opened from browser.
2. MOODLE Lesson Activity for setting up Out-of-Class segment as it allowed guided self-learning.
3. YouTube existing standard video from industry experts to be used and provided

Section 3

OER Description

3.1 Active OER

For checking the active OER, you may access the Guest Course - FDP201x OER - “Introduction to Data Science” in the Moodle - Satishkumar Varma

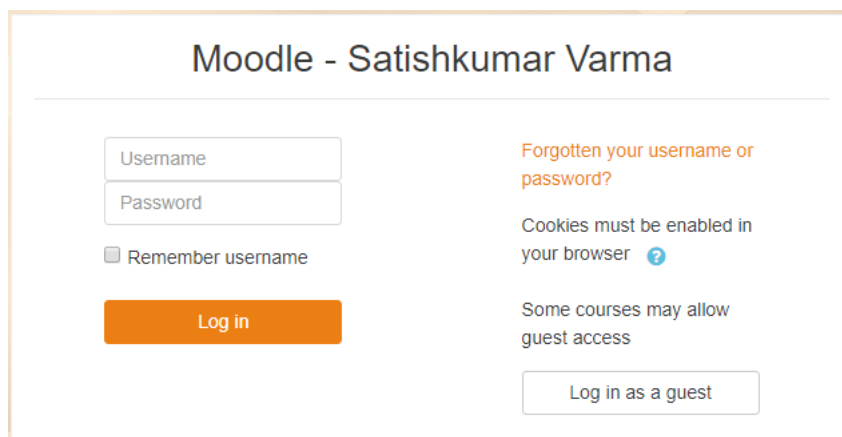
The course link is <https://vsat2k.moodlecloud.com/course/view.php?id=4>

The *guest* password required for exploring the activity is: `guest@vsat2k`

The *student* account password required for exploring the activity is: `student@vsat2k`

3.2 Lesson Settings

Screenshot in Figure 3.1 shows method of login to login into guest click here in to admin account web page in for a course in MOODLE.



Moodle - Satishkumar Varma

Username

Password

Remember username

Log in

Forgotten your username or password?

Cookies must be enabled in your browser ?

Some courses may allow guest access

Log in as a guest

Figure 3.1: Login page in for a course in MOODLE.

Screenshot in Figure 3.2 shows method of creating new course in MOODLE. Screenshot in Figure 3.3 shows the different detail entries about a course.

Screenshots Figure 3.4 to Figure 3.7 shows general settings of different topics of a course in MOODLE. This is same for all the courses and activities. If there are variations, then they are duly noted under each description.

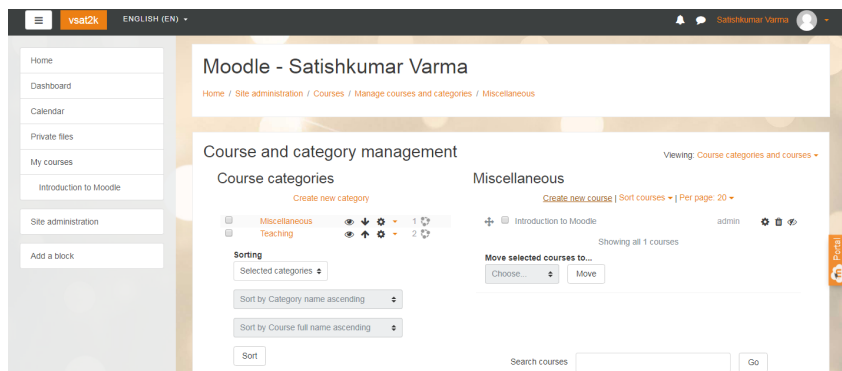


Figure 3.2: General setting of creating course in MOODLE.

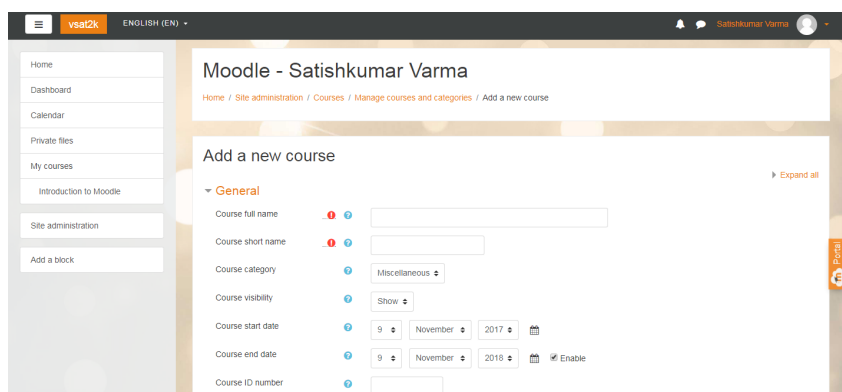


Figure 3.3: General setting of filling details about a course in MOODLE.

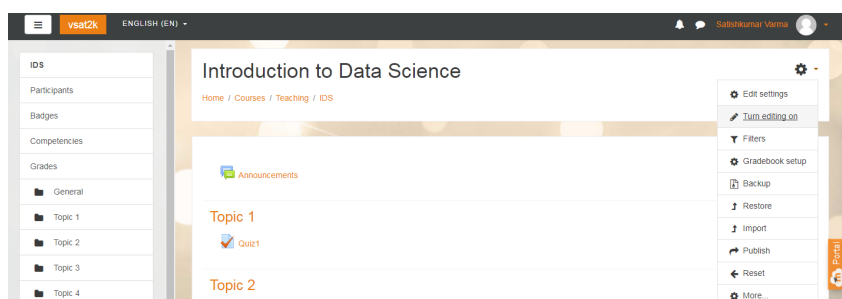


Figure 3.4: Turn editing on in a course in MOODLE.

Screenshots Figure 3.9 to Figure 3.12 shows general settings of different activities under a topics of a course in MOODLE. This is same for all the activities under a topics. If there are variations, then they are duly noted under each description.

Screenshots Figure 3.9 to Figure 3.12 shows general settings of adding users or students and their activities under a topics of a course in MOODLE. This is same for all the activities under a topics. If there are variations, then they are duly noted under each description.

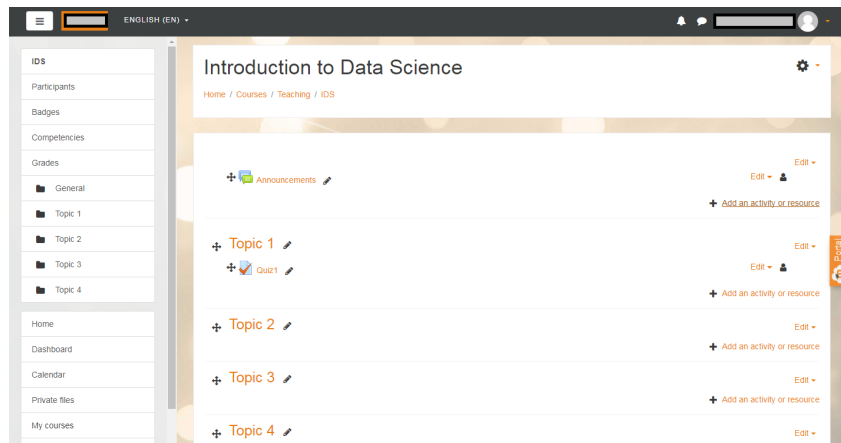


Figure 3.5: General setting of adding activity under a course in MOODLE.

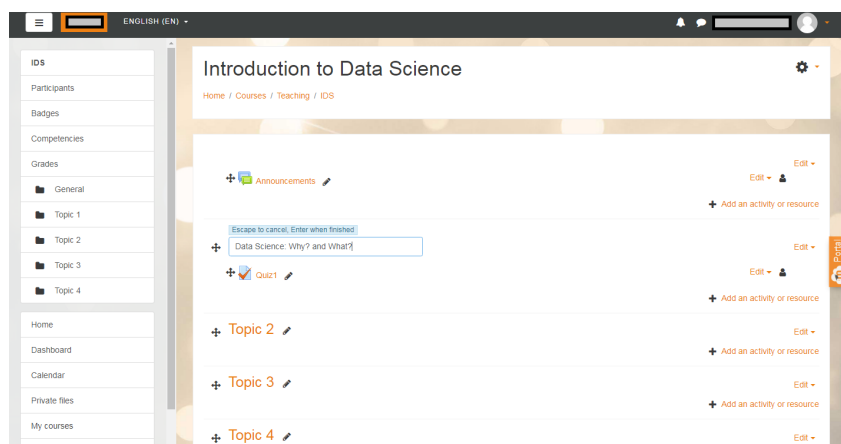


Figure 3.6: General setting of edit activity under a course in MOODLE.

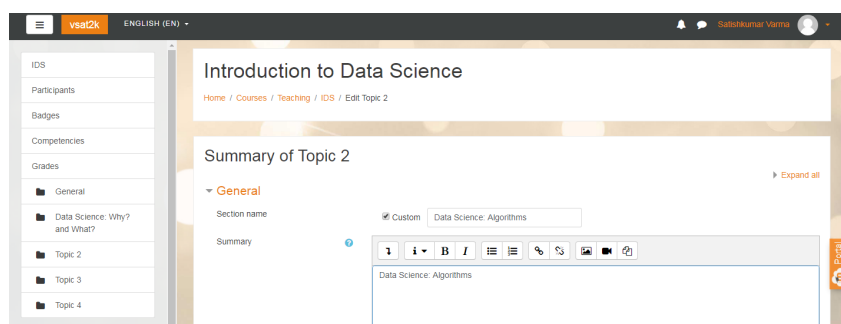


Figure 3.7: General setting of edit topic details under a course in MOODLE.

3.3 How to use this OER

For using this OER, please ensure that you have admin permission in your MOODLE course (needed for importing activities). Else ask your administrator to restore this backup in your course.

Step 1: Download the set of 3 lessons (OER) from <https://vsat2k.wordpress.com/fdp201x/>

Step 2: Go to the MOODLE course where you want to import this lesson. In the

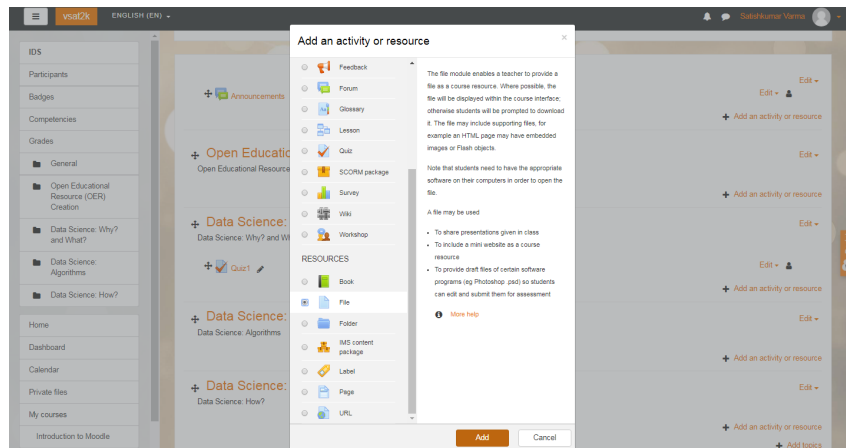


Figure 3.8: General setting of adding a file under a topic in a course in MOODLE.

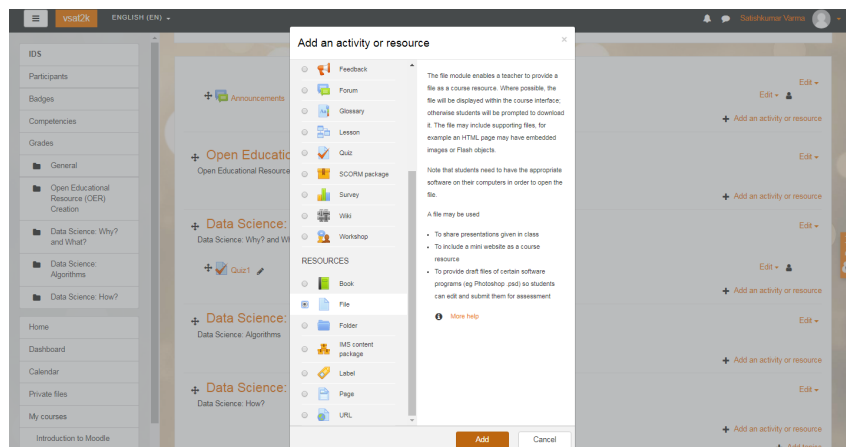


Figure 3.9: General setting of adding a file under a topic in a course in MOODLE.

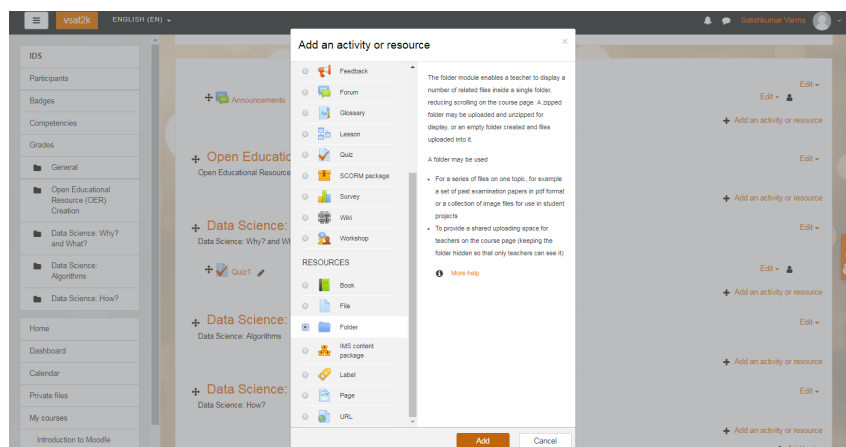


Figure 3.10: General setting of adding a file under a topic in a course in MOODLE.

Administration section click “Restore” as shown in Figure 3.16.

Step 3: Drag and drop the three files into the “Files” area and click restore as shown in Figure 3.16.

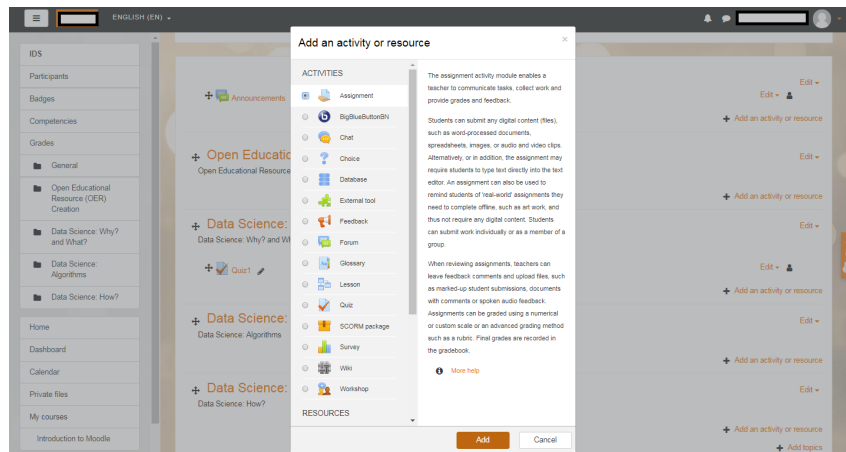


Figure 3.11: General setting of adding assignments under a topic in a course in MOODLE.

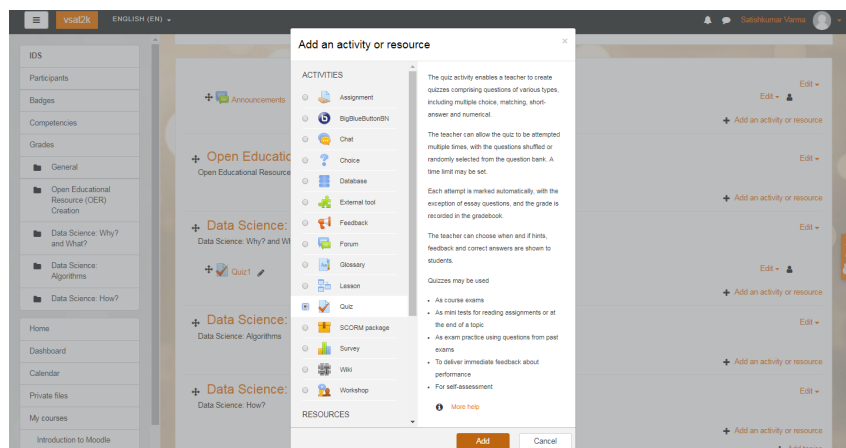


Figure 3.12: General setting of adding a quiz under a topic in a course in MOODLE.

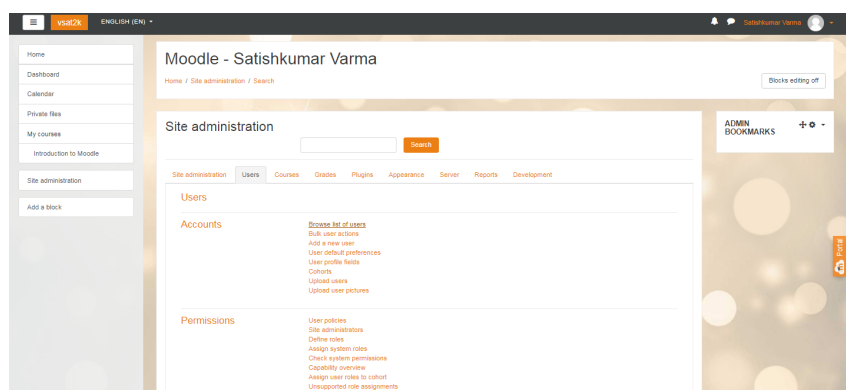


Figure 3.13: General setting of creating and adding users under a course in MOODLE.

Step 4: Verify the contents of the restore by going back to the lesson

Step 5: After verifying, post the instructions to your students to complete the lesson activity before the next class using MOODLE forums.

Step 6: Before start of the next class please go and check the reports (see Figure 3.17 to see how students performed).

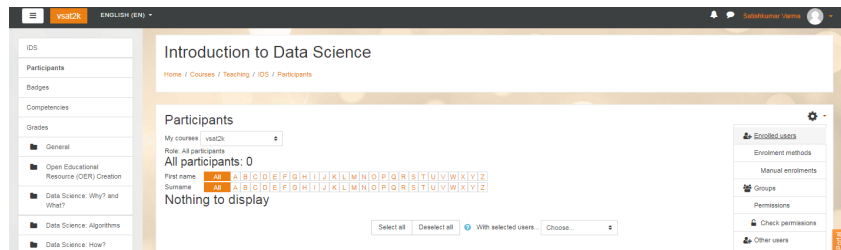


Figure 3.14: General setting of creating and adding users under a course in MOODLE.

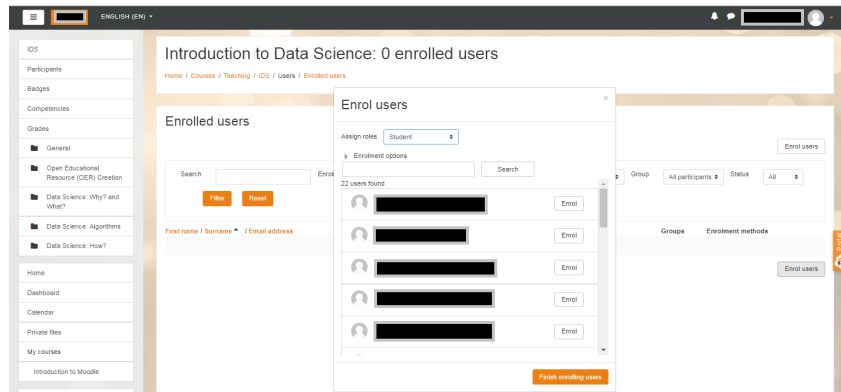


Figure 3.15: General setting of enrolling a user in a course in MOODLE.

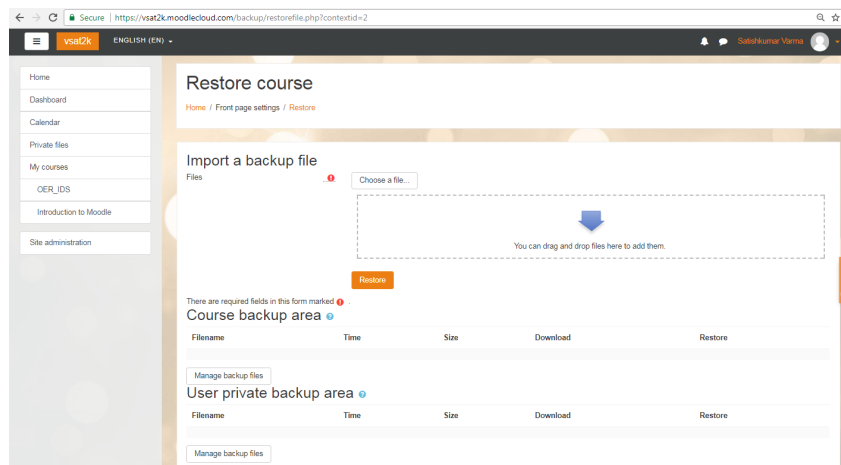


Figure 3.16: Screenshot of restore course.

There are two Flipped Classroom Activity Using Existing Video Content. PDF is prepared in LaTeX. Video content is used from YouTube (Standard YouTube License)

Additionally, if there are some common file errors made by students, you may start the face-toface session with a Peer Instruction question to elicit the misconception and resolve it.

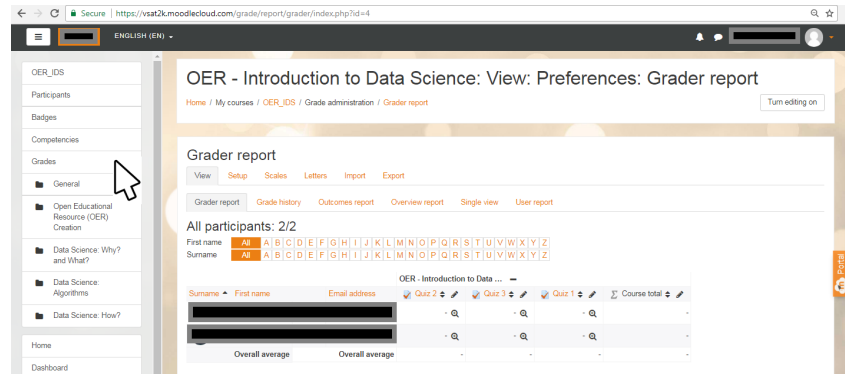


Figure 3.17: Screenshot of grade report.

3.4 Best Practices with Lesson Activity

Here are some of the best practices from our experience on using this Lesson Activity in classroom:

1. Provide this activity at least 1 week in advance.
2. Provide minor incentive (marks) for completion of the activity.
3. Ensure that there is a tangible output at the end of out-of-class activity to ensure learners are interested (E.g. For the lesson “Data Science – How?” students had to create data science for two videos.)
4. It would be good if the screencasts and resources were separately available in a “Resources” folder in the MOODLE course itself. This will take care of common cribs related to “website not available”, “resources not accessible” etc.

Section 4

Evaluating Effectiveness of OER

The OER effectiveness can be assessed at two levels:

1. At the student level
2. At the consumer level

4.1 Effectiveness at the student level

Effectiveness at the student level involves metrics related to student access of the resource and student learning.

The Moodle lesson report can be used to evaluate this effectiveness, with the report showing the total number of students who accessed the reports (along with time) and their marks (based on their answers to MCQs). Additionally there is an option for teacher to grade essays and these marks also will be calculated if needed.

4.2 Effectiveness at consumer level

OER consumers are typically teachers who want their students to learn data science: Why?, What? and How?

Linking a survey (see Survey Questions in Table 4.1 on three main constructs – Ease of Use, Concept Coverage and Concept Complexity, can help in identifying the effectiveness of this OER at consumer level. This has to be done as a follow-up activity.

4.2.1 Implementing Survey

Thus every user who downloads this resource will be asked their email address and as a follow up the survey will be send to their email address.

To achieve this a simple plugin <https://wordpress.org/plugins/mail-subscribe-list/> that allows visitors to enter their name and email address is added on my website, the visitors details are then added to the subscribers list which is available to view and modify in the WordPress admin area.

This plugin can be used not only for Mailing List subscriptions but can be used generally for collecting email address and/or peoples names that are visiting your website.

Table 4.1: Details of survey questions.

SN	Construct	Question	Scale
1	Ease of Use	1 I found it easy to download the Lesson Activity	Strongly Disagree to Strongly Agree (5-point Likert Scale)
		2 I found the instructions to setup the Lesson Activity useful in setting the activity in my	
		3 I was able to successfully create Lesson in my own course	
2	Concept Coverage	1 The Lesson covers the required concepts related to data science that I need for my	
3	Concept Complexity	1 The content inside the Lesson is too complex for my students to understand	

4.2.2 Survey Questions

The survey questions are given in Table 4.1. The [2] is used for adding plugin in my WordPress Website for user who downloads this resource will be asked their email address and as a follow up the survey.

Section 5

Consolidated Log of Team Work

The consolidated log of team work is as shown in Table 5.1.

Table 5.1: Details of survey questions.

Activity	Team Member	Member Name	Amount of Time	Additional Logs if any
Discussion	Team Leader	Satishkumar Varma	(15 + 10 + 15 + 5 + 5) min	Discussion and Comments in Whatsapp
	Team Member 1	Dhiraj Amin		
	Team Member 2	Vinod Kadam		
Tool Exploration	Team Leader	Satishkumar Varma	More than one week	Plan discussed and snapshot given
	Team Member 1	Dhiraj Amin	More than one week	
	Team Member 2	Vinod Kadam	More than one week	
OER Creation	Team Leader	Satishkumar Varma	More than one week	Quiz created in google spreadsheet
	Team Member 1	Dhiraj Amin	More than one week	
	Team Member 2	Vinod Kadam	More than one week	
OER Documentation	Team Leader	Satishkumar Varma	More than one week	Review Comments in Whatsapp
	Team Member 1	Dhiraj Amin	More than one week	
	Team Member 2	Vinod Kadam	More than one week	
Individual Reflection (Diary Logging)	Team Leader	Satishkumar Varma	120 min	Review Comments in Whatsapp (Snapshot given)
	Team Member 1	Dhiraj Amin	90 min	
	Team Member 2	Vinod Kadam	40 Min	
OER Evaluation	Team Leader	Satishkumar Varma	More than One Day	Shared in Google Docs
	Team Member 1	Dhiraj Amin		
	Team Member 2	Vinod Kadam		

5.0.1 Additional Teamwork Logs

The log of Goodle Spreasheet used to collect and form Quiz questions for Out-Side Classroom activity is shown in Figure 5.1.

Some snapshot (see Figure 5.2) are given here for documentation and additional logs. See recorded video here as a team work log <https://goo.gl/ANmkJY>.

Algorithms: Questions data science answers		Options			
SN	Quiz Question	A	B	C	D
1	Question "Is this X or Y?" uses	classification algorithms	anomaly detection algorithms	regression algorithms	clustering algorithms
2	Question "How is this organized?" uses	reinforcement learning algorithms	anomaly detection algorithms	regression algorithms	clustering algorithms
3	Reinforcement learning	flags unexpected or unusual events or behaviors and gives clues where to look for problems.	is a good fit for automated systems that have to make lots of small decisions without human guidance.	it separates data into natural "clumps," for easier interpretation.	is a machine learning to numerical predict the answer to How much or how many.
4	Match the following: [a-clustering, b-anomaly detection, c-regression, d-reinforcement learning] and [1-clumps, 2-numerial prediction, 3-no human guidance, 4-weird]	a-1, b-2, c-4, d-3	a-1, b-4, c-2, d-3	a-3, b-1, c-2, d-4	a-2, b-4, c-1, d-3
5	Anomaly detection	flags unexpected or unusual events or behaviors and gives clues where to look for problems.	is a good fit for automated systems that have to make lots of small decisions without human guidance.	it separates data into natural "clumps," for easier interpretation.	is a machine learning to numerical predict the answer to How much or how many.

Figure 5.1: Google Spreadsheet used to collect and form Quiz questions

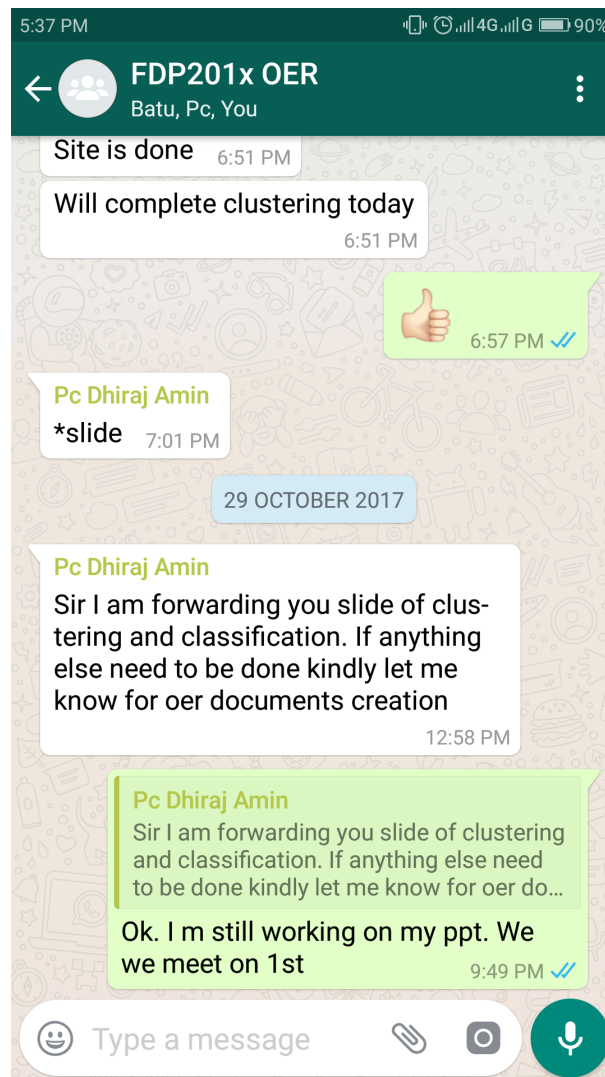


Figure 5.2: Details of survey questions.

Section 6

Building a Community of MOODLE and Flipped Classroom Adopters

6.1 Possible Sources for Community Building

Some of the viable sources for building a community are:

- Teachers who are using MOODLE
- Teachers who plan to use Flipped Classroom
- Teachers and student who are using LaTeX for preparing technical report and presentations.

6.2 Plans for Community Building

The resource is already available in the webpage and its access requires the users to provide their email id. Thus there will be a list of interested users whom we can follow up using email.

All the interested users can then be connected using a local Wordpress or <https://vsat2k.moodleclo> or <https://www.sites.google.com/site/vsat2k/> Google website.

Works Cited

- [1] Aaron Cocker. (2017, june). a introduction to creating documents in latex. <https://opensource.com/article/17/6/introduction-latex>. [Online; accessed 21-September-2017].
- [2] Richard Leishman. (november, 2016). leishman, download mail subscribe list, version: 2.1.3. <https://wordpress.org/plugins/mail-subscribe-list/>. [Online; accessed 25-September-2017].
- [3] MOODLE. (2015, october). moodle docs. https://docs.moodle.org/29/en/Lesson_activity. [Online; accessed 5-November-2017].
- [4] MOODLE. (2017, may). moodle docs. https://docs.moodle.org/32/en/Using_Lesson. [Online; accessed 5-November-2017].
- [5] Satishkumar Varma. (2017, july). technical report writing using latex. <https://www.sites.google.com/site/vsat2k/latex>. [Online; accessed 10-September-2017].