

**Sprint 3-4**

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**Presentation Deck**

*FYPJ-2023*

Updated as of 23/5/2023 by Nasrullah

**SPRINT 3**  
**(17-5 May 2023)**



**Power BI**

# Solution

- Business intelligence (BI) tools, such as Power BI, can be used to help track and measure student engagement in online learning. BI tools can be used to collect data from a variety of sources, such as Mentimeter & learning objects (Videos), and then analyze this data to identify trends and patterns. This information can then be used to improve the online learning experience for students.

# Benefits

- **Improved student outcomes:** By identifying trends and patterns in student engagement, BI tools can help educators identify areas where students are struggling and provide them with the support they need.
- **Increased efficiency:** BI tools can help educators save time and resources by automating the process of collecting and analyzing data.
- **Enhanced decision-making:** BI tools can help educators make better decisions about how to improve the online learning experience for students.

# Sprint 3 Schedule

FSP\_LearningAnalyticsTOLE Team ☆ 🔊 April 17 - May 5  
15 work days

Taskboard Backlog Capacity Analytics + New Work Item 🔗 Column Options Sprint 3 (Week 9) Person: All 🔍 ⚙️ 🔗

^ Collapse all

**To Do**

- 6819** PowerBI Analysis  
N NASRULLAH  
State ● New
- 6825** Repeat the process. The process of tracking and measuring student  
N NASRULLAH  
State ● To Do

**In Progress**

- 6823** Analyze the data. Once the data is clean, you can analyze it using a BI tool.  
N NASRULLAH  
State ● In Progress
- 6824** Use the data to improve the online learning experience. Once you have  
N NASRULLAH  
State ● In Progress

**Done**

- 6820** Identify the data sources. What data do you need to collect in order to  
N NASRULLAH  
State ● Done
- 6821** Collect the data. Once you have identified the data sources, you need to  
N NASRULLAH  
State ● Done
- 6822** Clean the data. Once you have collected the data, you need to clean it. This  
N NASRULLAH  
State ● Done

+

# Initial Research & Challenges

MICROSOFT LEARN FOR POWER BI

## Microsoft Power BI

Learn how to connect to and visualize data, growing skills that help drive a data culture so that everyone can make better decisions based on data.

[Browse all Power BI learning paths](#)

### Sign up to listen

To enjoy the high-speed and high-quality listening experience, please create a Speechify account.

[Sign up](#)

Already have an account? [Log in](#)



#### COLLECTIONS

### Design effective reports in Power BI

Learn the process to design and deliver compelling Power BI reports.

[Explore the collection](#)



#### COLLECTIONS

### Become a Data Analyst

Data Analysts enable businesses to maximize the value of their data assets by using Microsoft Power BI. Learn the skills needed to become a Microsoft Certified Data Analyst.

[Explore the collection](#)



#### COLLECTIONS

### Develop with the Power Platform

Learn how to develop with the Power Platform, Microsoft Dataverse, Power Apps, and the Power Apps Component Framework.

[Explore the collection](#)

## Your path to get started

#### LEARNING PATH

### Get started with Power BI

🕒 2 hr 37 min

Microsoft Power Platform • Data Analyst • Beginner



[Save](#)

#### LEARNING PATH

### Get and transform data with Power BI

🕒 3 hr 56 min

Microsoft Power Platform • Data Analyst • Beginner



[Save](#)

#### LEARNING PATH

### Model data with Power BI

🕒 3 hr 10 min

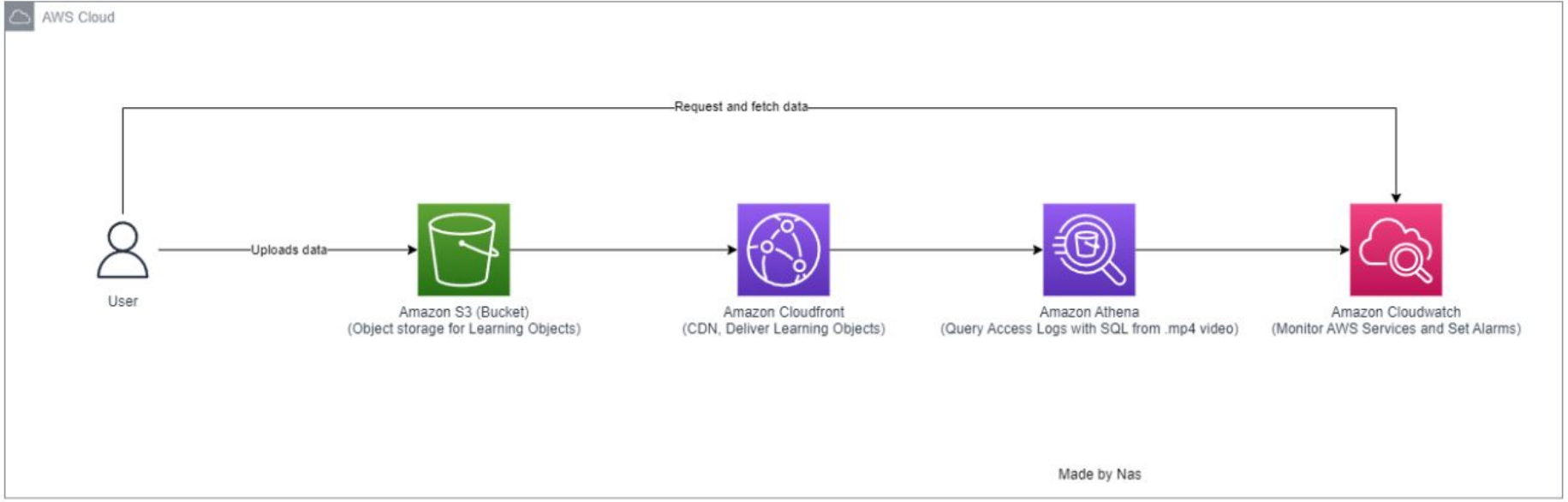
Microsoft Power Platform • Data Analyst • Beginner



[Save](#)

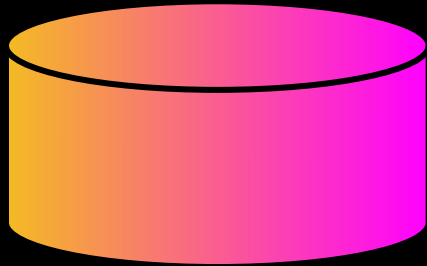
# Successful POC

## Existing Successful POC Architecture



# Extract, Transform, Load

**Get Data**



**Data Source (CSV)**

(AWS & Mentimeter)

**Transform Data**



**PowerBI PowerQuery**

Removed unnecessary columns  
like (location, query\_string,  
cookie, xforwarded\_for,  
file\_status, etc)

**Build & Format Visuals**

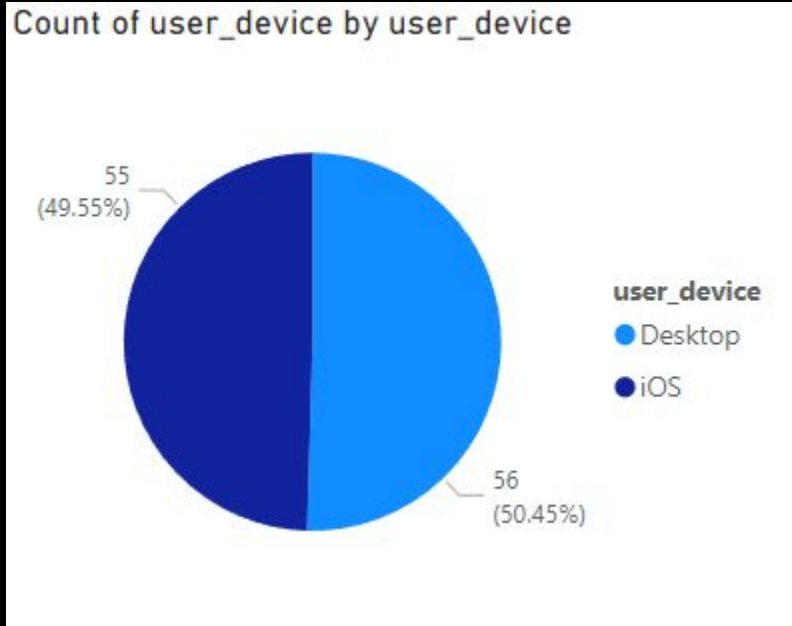


**Target**

Dashboard & Pages



# Charts Used



## Pie Chart

Pie chart is a simple and effective way to visualize categorical data in Power BI and AWS.

# Charts Used



## Line Chart

Line chart is a simple and effective way to visualize the relationship between two variables in Power BI and AWS.

# Full Chart (In Progress)

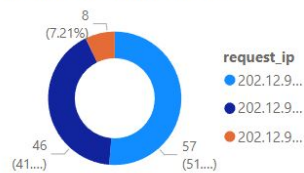
## AWS Learning Analytics for Online Engagement by Nasrullah

200, OK, 206, Partial Content, 304, Refreshed Content

date

- Wednesday, March 22, 2023
- Thursday, March 23, 2023
- Monday, March 27, 2023
- Tuesday, March 28, 2023
- Monday, April 03, 2023

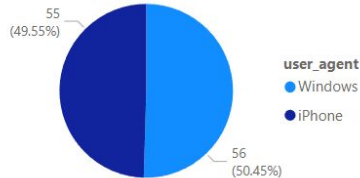
IP Addresses by Result Type



request\_ip uri user\_agent

202.12.94.240	/FYPJ_Video_1.mp4	iPhone
202.12.94.240	/FYPJ_Video_1.mp4	Windows
202.12.95.239	/FYPJ_Video_1.mp4	Windows
202.12.95.98	/FYPJ_Video_1.mp4	Windows

Count of User Devices



90.03

Total MBs Downloaded

68

Total MBs Transferred

0.09

Total MBs Requested

0.19

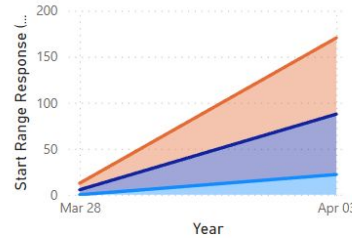
Average Engagement

111

Total Views

Start Range Response (MB), End Range Response (MB) and File Downloaded Size (MB) by Date

Start Range Re... End Range R... File Dow...



KPI of Avg Time Taken to Access Material

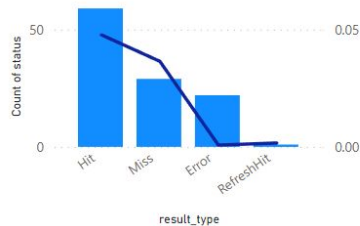
0.11

Goal: 0.00

13 Status 200 C... 17.96 Completion ... 0.14 Average View D...

Status and Total MBs Requested by Result Type

Count of status Total MBs Requested



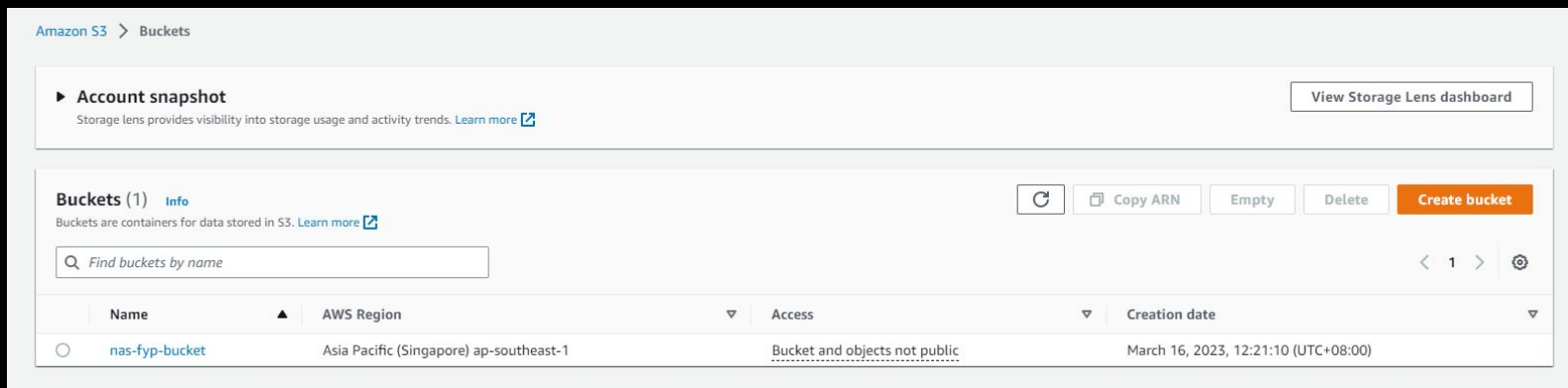
Count of Views by Status

status 200 206 304 Total Views



# Objective

- Proof of concept for deploying **learning objects** (existing videos or storyline content) to the Web using Amazon Web Services (AWS).



Amazon S3 > Buckets

► **Account snapshot** View Storage Lens dashboard  
Storage lens provides visibility into storage usage and activity trends. [Learn more](#)

**Buckets (1)** [info](#) Refresh Copy ARN Empty Delete Create bucket  
Buckets are containers for data stored in S3. [Learn more](#)

Find buckets by name

Name	AWS Region	Access	Creation date
<input type="radio"/> nas-fyp-bucket	Asia Pacific (Singapore) ap-southeast-1	<u>Bucket and objects not public</u>	March 16, 2023, 12:21:10 (UTC+08:00)

# Amazon S3

## Trends and distributions

Primary metric

Total storage

Secondary metric

Object count

## Trend for Mar 17 - Apr 16, 2023

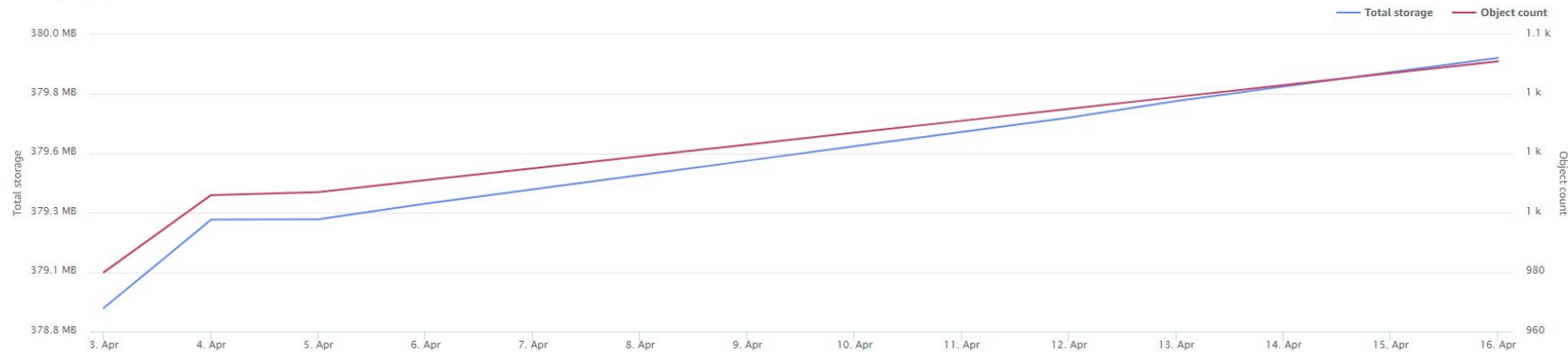
Date range

Last 14 days

Aggregation

Daily total

Mar 17 - Apr 16, 2023



# Amazon Athena for Querying

- Creating a database and table to collect metrics and access real-time logs

## Cloudfront real-time access logs

1. time: The timestamp of the request.
2. x-edge-location: The edge location that served the request.
3. sc-bytes: The number of bytes served by CloudFront to the viewer.
4. c-ip: The IP address of the viewer.
5. cs-method: The HTTP method used for the request.
6. cs(Host): The domain name of the CloudFront distribution.
7. cs-uri-stem: The URI of the requested object.
8. sc-status: The HTTP status code returned to the viewer.
9. cs(Referer): The URL of the page that referred the viewer to the requested object.
10. cs(User-Agent): The user agent string of the viewer's browser.
11. cs-uri-query: The query string of the request.
12. x-edge-result-type: The result type of the request (e.g. Hit, Miss, Error).
13. x-edge-request-id: The unique ID of the request.
14. x-host-header: The value of the Host header in the viewer's request.
15. cs-protocol: The protocol used for the request (e.g. HTTP/1.1).
16. cs-bytes: The number of bytes in the request.
17. time-taken: The time taken for CloudFront to process the request and serve the response.

```
1 • CREATE EXTERNAL TABLE IF NOT EXISTS default.cloudfront_logs (  
2   `date` DATE,  
3   time STRING,  
4   location STRING,  
5   bytes BIGINT,  
6   request_ip STRING,  
7   method STRING,  
8   host STRING,  
9   uri STRING,  
10  status INT,  
11  referrer STRING,  
12  user_agent STRING,  
13  query_string STRING,  
14  cookie STRING,  
15  result_type STRING,  
16  request_id STRING,  
17  host_header STRING,  
18  request_protocol STRING,  
19  request_bytes BIGINT,  
20  time_taken FLOAT,  
21  xforwarded_for STRING,  
22  ssl_protocol STRING,  
23  ssl_cipher STRING,  
24  response_result_type STRING,  
25  http_version STRING,  
26  file_status STRING,  
27  file_encrypted_fields INT,  
28  c_port INT,  
29  time_to_first_byte FLOAT,  
30  x_edge_detailed_result_type STRING,  
31  sc_content_type STRING,  
32  sc_content_len BIGINT,  
33  sc_range_start BIGINT,  
34  sc_range_end BIGINT  
35 )  
36 ROW FORMAT DELIMITED  
37 FIELDS TERMINATED BY '\t'  
38 LOCATION 's3://nas-fyp-bucket/CloudFrontLogs'  
39 TBLPROPERTIES ( 'skip.header.line.count'='2' )
```

# Cleaning & Transforming

- Removing unnecessary and reiterating columns
- Filtered rows and removed empty rows

APPLIED STEPS

Source	*
Promoted Headers	*
Changed Type1	
Removed Columns	
Changed Type	
Removed Blank Rows	
Renamed Columns	
Replaced Value	*
Replaced Value1	*
Removed Columns1	
Filtered Rows	*
Removed Columns2	*

Table.RemoveColumns(\*Filtered Rows",{"http\_version", "c\_port", "ssl\_cipher"})

	date	time	bytes	request_ip	method	uri	status	referrer
1	22/3/2023	08:44:10	313	202.12.95.239	GET	/FYPI_Video_1.mp4	304	-
2	22/3/2023	08:49:56	470	202.12.95.98	GET	/FYPI_Video_1.mp4	304	https://a2qeufs9waejey.cloudfront.net/FYPI_Video_1.mp4
3	22/3/2023	08:51:24	470	202.12.95.98	GET	/FYPI_Video_1.mp4	304	-
4	22/3/2023	08:51:25	470	202.12.95.98	GET	/FYPI_Video_1.mp4	304	https://a2qeufs9waejey.cloudfront.net/FYPI_Video_1.mp4
5	22/3/2023	08:54:03	470	202.12.95.98	GET	/FYPI_Video_1.mp4	304	https://a2qeufs9waejey.cloudfront.net/FYPI_Video_1.mp4
6	22/3/2023	08:54:03	470	202.12.95.98	GET	/FYPI_Video_1.mp4	304	-
7	22/3/2023	09:49:27	470	202.12.95.98	GET	/FYPI_Video_1.mp4	304	-
8	22/3/2023	09:49:28	470	202.12.95.98	GET	/FYPI_Video_1.mp4	304	https://a2qeufs9waejey.cloudfront.net/FYPI_Video_1.mp4
9	22/3/2023	09:55:43	470	202.12.95.98	GET	/FYPI_Video_1.mp4	304	-
10	22/3/2023	09:55:44	470	202.12.95.98	GET	/FYPI_Video_1.mp4	304	https://a2qeufs9waejey.cloudfront.net/FYPI_Video_1.mp4
11	22/3/2023	07:12:58	352	202.12.95.239	GET	/FYPI_Video_1.mp4	304	-
12	22/3/2023	07:12:59	351	202.12.95.239	GET	/FYPI_Video_1.mp4	304	https://a2qeufs9waejey.cloudfront.net/FYPI_Video_1.mp4
13	22/3/2023	08:46:03	470	202.12.95.98	GET	/FYPI_Video_1.mp4	304	-
14	22/3/2023	08:46:04	470	202.12.95.98	GET	/FYPI_Video_1.mp4	304	https://a2qeufs9waejey.cloudfront.net/FYPI_Video_1.mp4
15	22/3/2023	09:13:22	470	202.12.95.98	GET	/FYPI_Video_1.mp4	304	-
16	22/3/2023	09:13:23	470	202.12.95.98	GET	/FYPI_Video_1.mp4	304	https://a2qeufs9waejey.cloudfront.net/FYPI_Video_1.mp4
17	22/3/2023	09:35:16	470	202.12.95.98	GET	/FYPI_Video_1.mp4	304	-
18	22/3/2023	09:35:16	470	202.12.95.98	GET	/FYPI_Video_1.mp4	304	https://a2qeufs9waejey.cloudfront.net/FYPI_Video_1.mp4
19	22/3/2023	03:05:20	352	202.12.95.239	GET	/FYPI_Video_1.mp4	304	-
20	22/3/2023	03:05:21	351	202.12.95.239	GET	/FYPI_Video_1.mp4	304	https://a2qeufs9waejey.cloudfront.net/FYPI_Video_1.mp4
21	28/3/2023	08:06:58	2510552	202.12.94.240	GET	/FYPI_Video_1.mp4	200	-
22	28/3/2023	08:06:59	50201	202.12.95.98	GET	/FYPI_Video_1.mp4	206	https://a2qeufs9waejey.cloudfront.net/FYPI_Video_1.mp4
23	28/3/2023	08:06:59	116988	202.12.94.240	GET	/FYPI_Video_1.mp4	206	https://a2qeufs9waejey.cloudfront.net/FYPI_Video_1.mp4
24	28/3/2023	08:06:59	2341797	202.12.95.98	GET	/FYPI_Video_1.mp4	206	https://a2qeufs9waejey.cloudfront.net/FYPI_Video_1.mp4
25	28/3/2023	08:06:59	50202	202.12.95.98	GET	/FYPI_Video_1.mp4	206	https://a2qeufs9waejey.cloudfront.net/FYPI_Video_1.mp4
26	3/4/2023	01:13:33	2510552	202.12.95.239	GET	/FYPI_Video_1.mp4	200	-
27	3/4/2023	01:13:34	677862	202.12.95.98	GET	/FYPI_Video_1.mp4	206	-
28	3/4/2023	01:13:34	470	202.12.95.98	GET	/FYPI_Video_1.mp4	304	-
29	3/4/2023	01:13:34	976503	202.12.95.98	GET	/FYPI_Video_1.mp4	206	https://a2qeufs9waejey.cloudfront.net/FYPI_Video_1.mp4
30	3/4/2023	01:13:34	50231	202.12.95.98	GET	/FYPI_Video_1.mp4	206	https://a2qeufs9waejey.cloudfront.net/FYPI_Video_1.mp4
31	3/4/2023	01:13:34	470	202.12.95.98	GET	/FYPI_Video_1.mp4	304	https://a2qeufs9waejey.cloudfront.net/FYPI_Video_1.mp4
32	3/4/2023	01:13:34	2510753	202.12.95.239	GET	/FYPI_Video_1.mp4	206	https://a2qeufs9waejey.cloudfront.net/FYPI_Video_1.mp4
33	3/4/2023	01:13:35	446	202.12.95.98	GET	/FYPI_Video_1.mp4	304	-
34	3/4/2023	01:16:08	312	202.12.95.239	GET	/FYPI_Video_1.mp4	304	-
35	3/4/2023	01:16:09	1080	202.12.95.98	GET	/FYPI_Video_1.mp4	206	https://a2qeufs9waejey.cloudfront.net/FYPI_Video_1.mp4
36	3/4/2023	01:16:09	517	202.12.95.98	GET	/FYPI_Video_1.mp4	304	https://a2qeufs9waejey.cloudfront.net/FYPI_Video_1.mp4
37	3/4/2023	01:24:47	471	202.12.95.98	GET	/FYPI_Video_1.mp4	304	https://a2qeufs9waejey.cloudfront.net/FYPI_Video_1.mp4

# Conclusion for Sprint 3



**Difficulty in  
querying and  
cleaning data**

(Can just use Athena or S3  
Dashboard)



**Not enough data**

(Not enough requests in data to  
perform analysis)



**Inability to collect  
key metrics**

(Cannot use SQL queries like  
athena to query and create  
tables)



**SPRINT 4**  
**(8 May - 26 May)**  
**WRAP UP & CONCLUDE**

# Objectives

- Summarize the key findings from your sprints and identify any areas for improvement.
- Make recommendations for future work based on your findings and areas for improvement.

# Sprint 4 Schedule

The screenshot displays a Jira board for the team 'FSP\_LearningAnalyticsTOLE Team'. The board is titled 'Sprint 4 (Week 12)' and shows a schedule from May 8 to May 26, with 4 work days remaining. The board is organized into three columns: 'To Do', 'In Progress', and 'Done'. A sidebar on the left shows a task '6826 Wrap up & Conclude' assigned to 'NASRULLAH' with a state of 'New'. The 'To Do' column is currently empty. The 'In Progress' column contains two tasks: '6828 Identify any areas for improvement' and '6829 Make recommendations for future work', both assigned to 'NASRULLAH' and in the 'In Progress' state. The 'Done' column contains one task: '6827 Summarize the key findings from your sprints', assigned to 'NASRULLAH' and in the 'Done' state. The board includes navigation options like 'New Work Item' and 'Column Options', and various filters and settings icons.

FSP\_LearningAnalyticsTOLE Team

May 8 - May 26  
4 work days remaining

Taskboard Backlog Capacity Analytics | + New Work Item Column Options

Sprint 4 (Week 12) Person: All

Collapse all

**To Do**

**In Progress**

**Done**

6826 Wrap up & Conclude  
NASRULLAH  
State: New

6828 Identify any areas for improvement.  
NASRULLAH  
State: In Progress

6829 Make recommendations for future work.  
NASRULLAH  
State: In Progress

6827 Summarize the key findings from your sprints.  
NASRULLAH  
State: Done

# Mentimeter Downsides

- Data exported from sessions are structured **poorly**, layout and design is **messy** at best.
- Student engagement during sessions are **lacking**.
- With a lack of engagement, commitment to any Mentimeter sessions **decreases** to almost a negligent rate.
- There is no guarantee of students **cheating** through copying of answers.
- Sessions are well designed to look **attractive** but no original use cases.
- **Complicated** to use, there are better alternatives (Slido/Kahoot)

# Unstructured Data

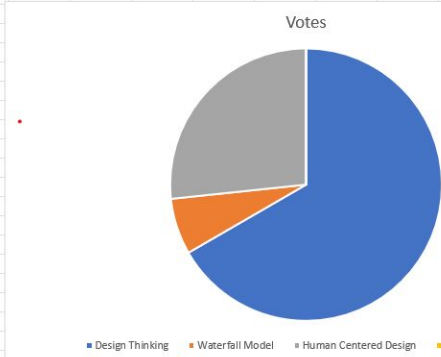
Question 1				
<b>Date</b>	2023-01-17			
<b>Session</b>	4			
<b>Type</b>	quiz			
<b>Question</b>	What methodology should you use to create innovative and human-centric applications to solve real life problems?			
<b>Respondents</b>	15			
<b>Choices</b>	<b>Votes</b>		<b>Correct answer</b>	
Design Thinking	10		True	
Waterfall Model	1		False	
Human Centered Design	4		False	
Interaction Design	0		False	
<b>Position</b>	<b>Name</b>		<b>Emoji</b>	<b>Score</b>
1	ana's mother		:fire:	957
2	Magical Rhino		:unicorn_face:	942
3	早上好中国 现在我有冰淇淋		:volcano:	937
4	mr kck		:watermelon:	929
5	jun hao		:the_horns:	928
6	bbbbbbbbbbbbbbbbbbbbnbbbb		:crocodile:	919
7	Rohanaldo SIUUUUUU		:crown:	916
8	asyks father		:crab:	913
9	Black bick		:flag-se:	887
10	I'm not here		:angel:	559
11	ben dover		:four_leaf_clover:	0
12	chooongster		:ghost:	0
13	Tigerbaby		:tiger2:	0
14	Tigermommy		:snowflake:	0
15	D		:articulated_lorry:	0

# Attempt for Structure

Position	Name	Emoji	Score
1	ana's motl	:fire:	957
2	Magical RI	:unicorn_f	942
3	????? ????	:volcano:	937
4	mr kck	:waterme	929
5	jun hao	:the_horn	928
6	bbbbbbbt	:crocodile	919
7	Rohanald	:crown:	916
8	asyks fath	:crab:	913
9	Black bick	:flag-se:	887
10	I'm not he	:angel:	559
11	ben dover	:four_leaf	0
12	chooongs!	:ghost:	0
13	Tigerbaby	:tiger2:	0
14	Tigermom	:snowflak	0
15	D	:articulate	0

Choices	Votes	Correct answer
Design Th	10	TRUE
Waterfall	1	FALSE
Human Ce	4	FALSE
Interactio	0	FALSE

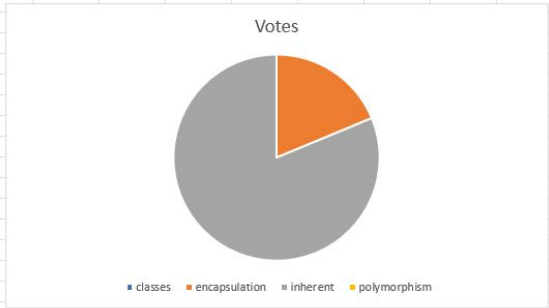
Question 1  
Date #####  
Session 4  
Type quiz  
Question What methodology should you use to create innovative and human-centric applications to solve real life problems?  
Response 15



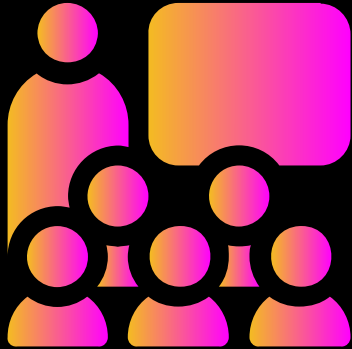
Position	Name	Emoji	Score
1	ana's motl	:fire:	5559
2	bbbbbbbt	:crocodile	5401
3	mr kck	:waterme	5235
4	????? ????	:volcano:	4682
5	Rohanald	:crown:	4672
6	jun hao	:the_horn	4617
7	Magical RI	:unicorn_f	4609
8	issac	:penguin:	4600
9	asyks fath	:crab:	4502
10	Black bick	:flag-se:	4445
11	I'm not he	:angel:	4219
12	Tigerbaby	:tiger2:	3638
13	ben dover	:four_leaf	3518
14	Tigermom	:snowflak	3517
15	D	:articulate	2733
16	chooongs!	:ghost:	1818

Choices	Votes	Correct answer
classes	0	FALSE
encapsula	3	FALSE
inherent	13	TRUE
polymorp	0	FALSE

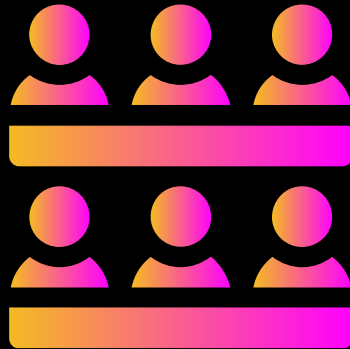
Question 11  
Date #####  
Session 4  
Type quiz  
Question The following is not related to object-oriented programming in software development  
Response 16



# Conclusion for Sprint 4



**Business intelligence (BI) tools can be used to help track and measure student engagement in online learning.**



**BI tools can be used to collect data from a variety of sources, such as Mentimeter & learning objects (Videos), and then analyze this data to identify trends and patterns.**



**This information can then be used to improve the online learning experience for students.**

# The Importance for this FYPJ

## Potential Deployment

- **Real-life scenarios**, good case studies for data analysis, learning analytics and visualisation-related teaching modules
- **Developing online quizzes** and can be adapted and reused as formative assessment of future teaching modules
- **Empirical research** can also be conducted by combining both data analytics approach and the quantitative/qualitative survey approaches to measure online learning engagement



# What I learnt

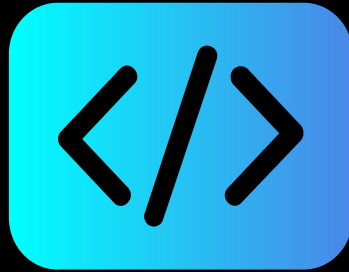
- **Hands-on experience** deploying learning objects (videos, storyline content) to the web using AWS
- **Practical experience** acquiring requirements, user testing, and implementing e-quizzes via Mentimeter cloud-based gamification tools for formative assessment
- **Develop competencies** in designing and creating interesting visualisation by using many different colours, and adding learning objects in the quizzes
- **Understanding** and **extracting** learning analytics (collection, cleaning, transformation, and modelling) from various online environments

# Challenges for Sprint 3-4



## Data Issues

Very hard to find resources to structure data accordingly



## Technical challenges

Searching everywhere for resources and tutorials for PowerBI & AWS and for Mentimeter



## Mentimeter

Mentimeter is a bad source of data as it is unstructured. It is better to view it on the web

 **Thank You**   
**Any Questions?**