



BRISBANE GRAMMAR SCHOOL

***BGS Learn – leveraging Microsoft technologies to provide targeted learning interventions.***

*Nick Holland – Director of Learning Analytics*

# Some context:

Inner city boys' school population approximately 1000  
Strong tradition of academic achievement

Focused

(academic, wellbeing, cocurricular).

reputations - advanced in terms of Secondary education – far behind  
reputations represented here at CDAO.



rebel



QUT



# So, hopefully today....

You learn something about the use of data in a Secondary Education context.

I leave this afternoon with a suggestion/ solution/ word of warning.



What exams  
do I have  
coming up?

What resources are  
available to me?

How did I perform  
on the recent Mock  
exams?

What has appeared  
on Externals in  
previous years?

What should I  
focus on right  
now?

How do I learn  
best?

# 202X

@BGS create 1.5 hours of revision materials for my upcoming External Exams.

Here is a Maths Methods quiz for the topics you struggled with on the Mock Exam as well as some flip cards for your Biology definitions.

I already did some Maths this morning.

OK. Instead, for Modern History, "Analyse evidence from the sources below to explain the three most important causes of World War II". Paste your answer here so I can provide feedback. Also, Ms Jones will be in ST307 from 12.30 – 1.15 if you need assistance.

People and profiles

Assessment schedule

Formative and summative grades

General wellbeing

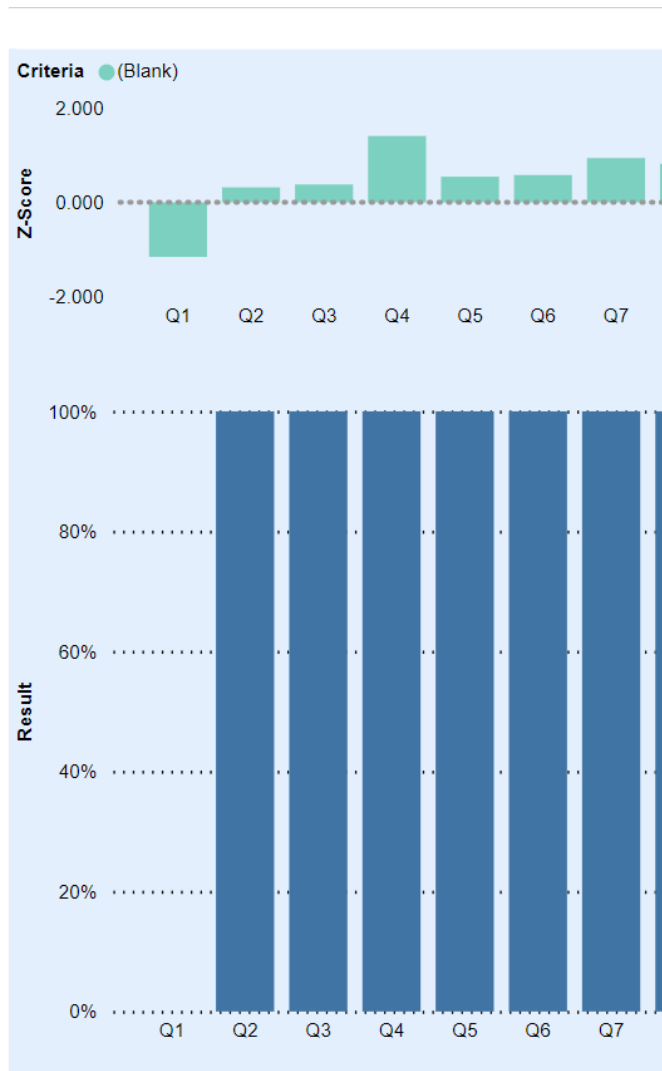
Aptitude

Previous assessment items and rubriks

High quality resources

Individual learning plans

# 2023



## 4.1.2 Applications of integral calculus



### Applications of integral calculus - Syllabus subject matter

**BGS LEARN**

Topic 1: Integration and applications of integration

Applications of integral calculus (9 hours)

In this sub-topic, students will:

- calculate areas between curves determined by functions.
- calculate volumes of solids of revolution about either axis.
- use the exponential integral model of logistic growth, using technology.
- use and apply the probability density function,  $f(x) = be^{-\lambda x}$  for  $x \geq 0$ , of the exponential random variable with parameter  $\lambda > 0$ , and use the exponential random variables and associated probabilities and quantiles to model data and solve practical problems.

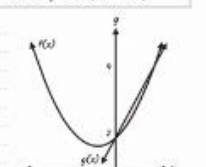
### Applications of integral calculus - Solids of revolution - Atomi video

The diagram below shows the area enclosed by the functions  $f(x) = x^2 + x + 2$  and  $g(x) = 2x + 2$ . Find the volume of the solid generated by rotating the enclosed area about the y-axis. (4 marks)

2. Express the functions in terms of y

Working with  $g(x)$ :  $y = 2x + 2$   
 $2x = y - 2$   
 $x = \frac{y-2}{2} = \frac{y}{2} - 1$   
 $\therefore g(y) = \frac{y}{2} - 1$

Working with  $f(x)$ :  $y = (x + \frac{1}{2})^2 + \frac{7}{4}$   
 $(x + \frac{1}{2})^2 = y - \frac{7}{4}$   
 $x + \frac{1}{2} = \pm \sqrt{y - \frac{7}{4}}$   
 $x = -\frac{1}{2} \pm \sqrt{y - \frac{7}{4}}$   
 $\therefore f(y) = -\frac{1}{2} \pm \sqrt{y - \frac{7}{4}}$



### Applications of integral calculus - Atomi test (self marked)



### Applications of integral calculus - QCAA Questions


QCAA EX-SOLUTIONS: Applications of integral calculus

Complete these questions under test conditions. Allow approximately 2 minutes per mark (eg 6 Mark Questions should take 12 minutes)

2021 Test: Solution: Multiple-Choice

40.5 (10 Marks)

Express the area of the shaded region between the curves  $y = \sqrt{x}$  and  $y = x^2$  as an integral.






# Somewhere between this..

What should I  
study right  
now?



# ...and this.

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I already did some Maths this morning.

OK. Instead, for Modern History, "Analyse evidence from the sources below to explain the three most important causes of World War 1". Paste your answer here so I can provide feedback.

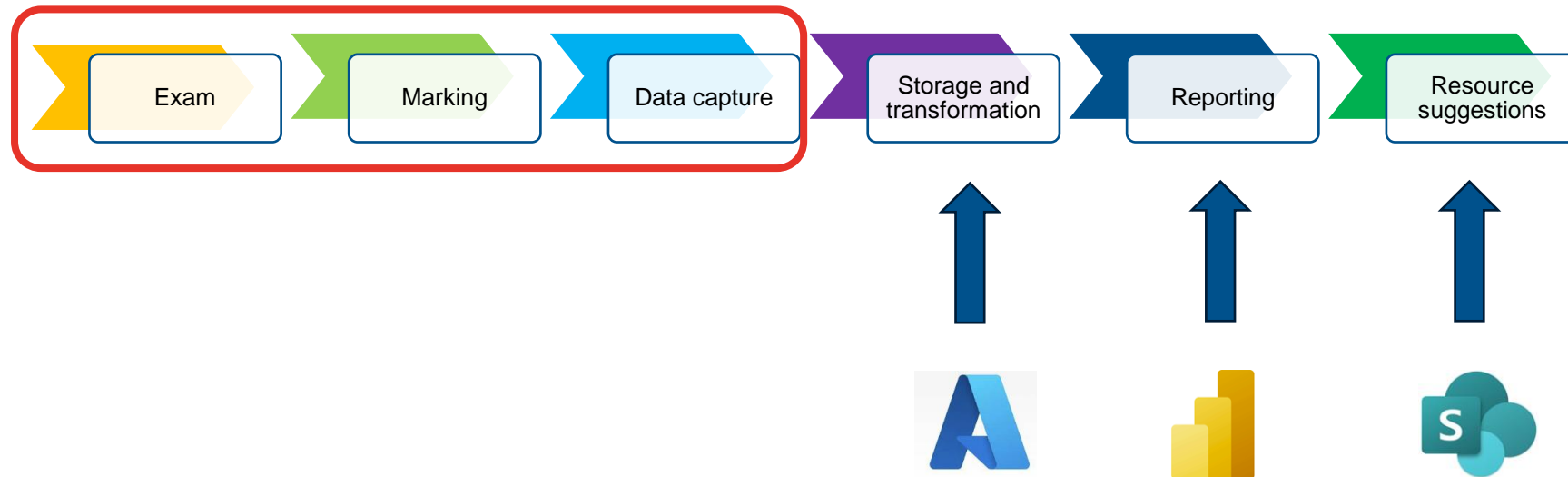




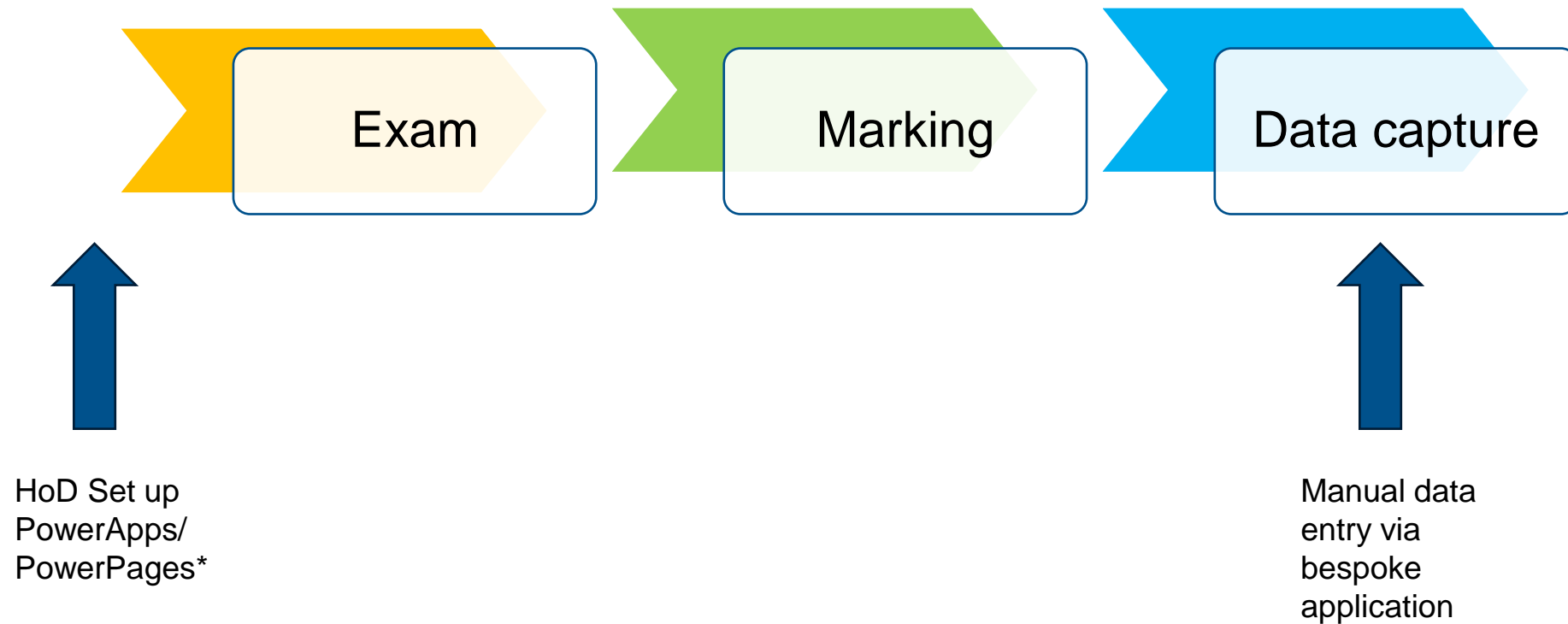
# Short term problem

How do you efficiently ingest data created under paper based examination conditions?

# Data - process map

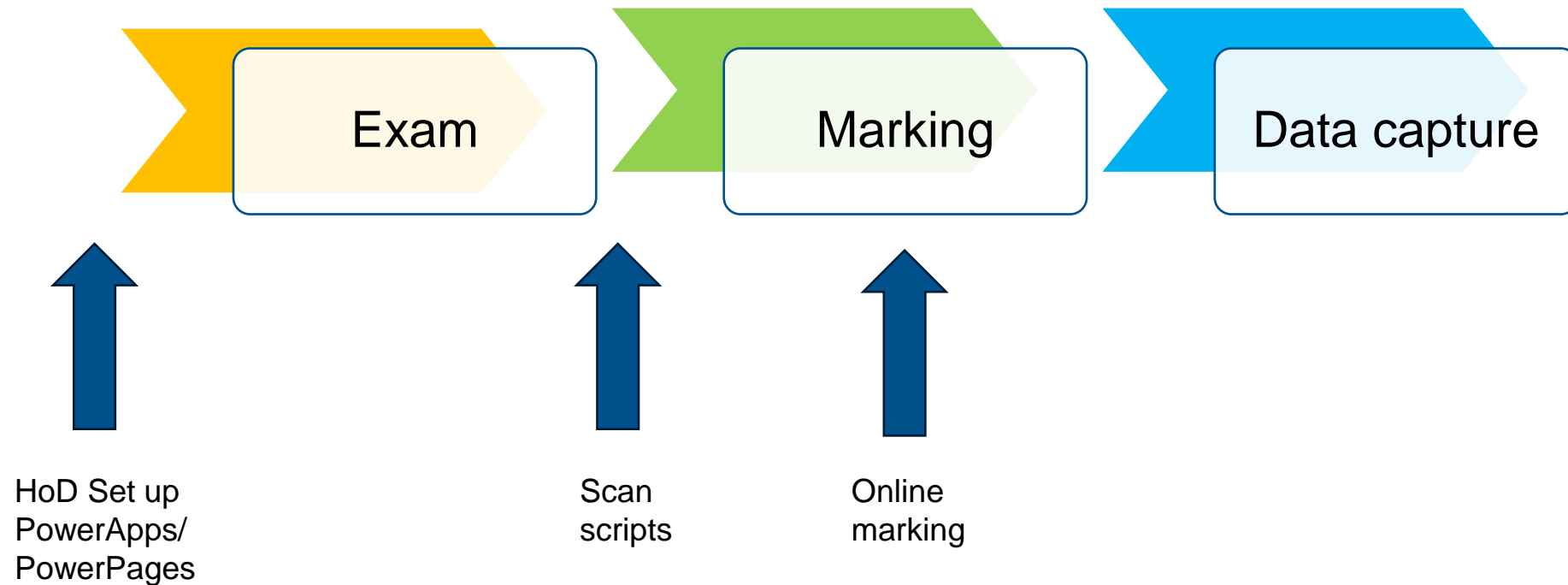


# Option 1 – manual teacher input

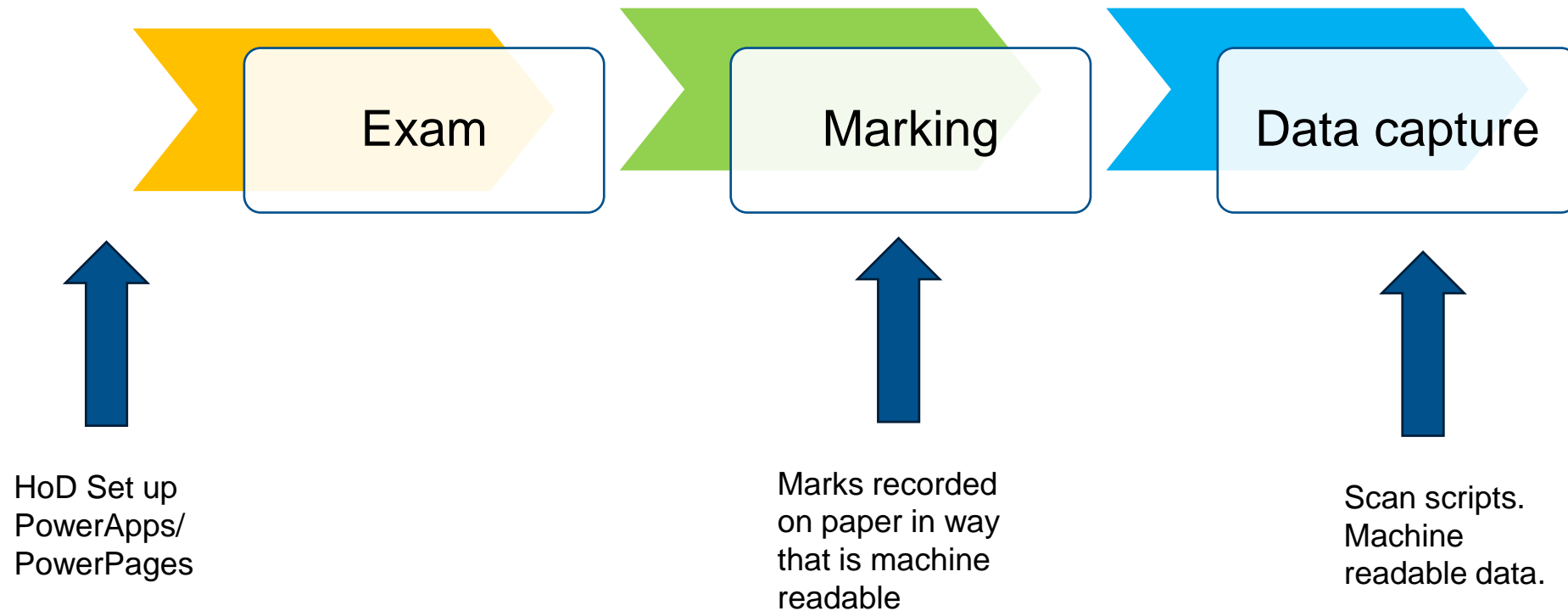




## Option 2 – digitise scripts prior to marking



# Option 3 – machine readable marking



# Where to next?

Solve the “paper to digital” problem. Gen AI has made paper based assessments more, not less, likely.

Lay the data foundations to take advantage of future developments in AI

- Quantitative data sets
- Resource data sets





# Thank you