

How can we use  
examiner behaviour data to  
improve exam marking and  
inform decision-making?



IAEA 2019

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Confidential

# Agenda

- 1 A Wealth of Data
- 2 Extracting Meaning
- 3 Turning Meaning into Value
- 4 Real-time Session Optimisation
- 5 Giving Markers Superpowers

**RM<sup>™</sup> Results**



**RM<sup>™</sup> Studio**

# A Wealth of Data



**RM Studio**

**RM Results**

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**RM Studio**



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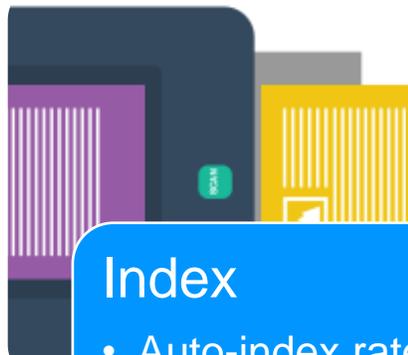


**RM Studio**



### Scan

- Item count
- Rate per centre
- Rate per school
- Errors
- Quality



### Index

- Auto-index rate
- Manual index rate
- Accuracy
- Exceptions



### Data capture

- Items (Optical)
- Items (OCR)
- Items (Digital)
- Items (Other)
- Candidates



### Marking

- Auto-marking rate
- Manual rate
- Accuracy
- Completion
- Exceptions



### Session Progress

- Markers available
- Active markers
- Scripts available
- Speed
- Accuracy



### Quality control

- Image quality
- Rejections
- Performance
- Seed performance
- Escalations
- Penalties

**RM Results**

# Extracting Meaning

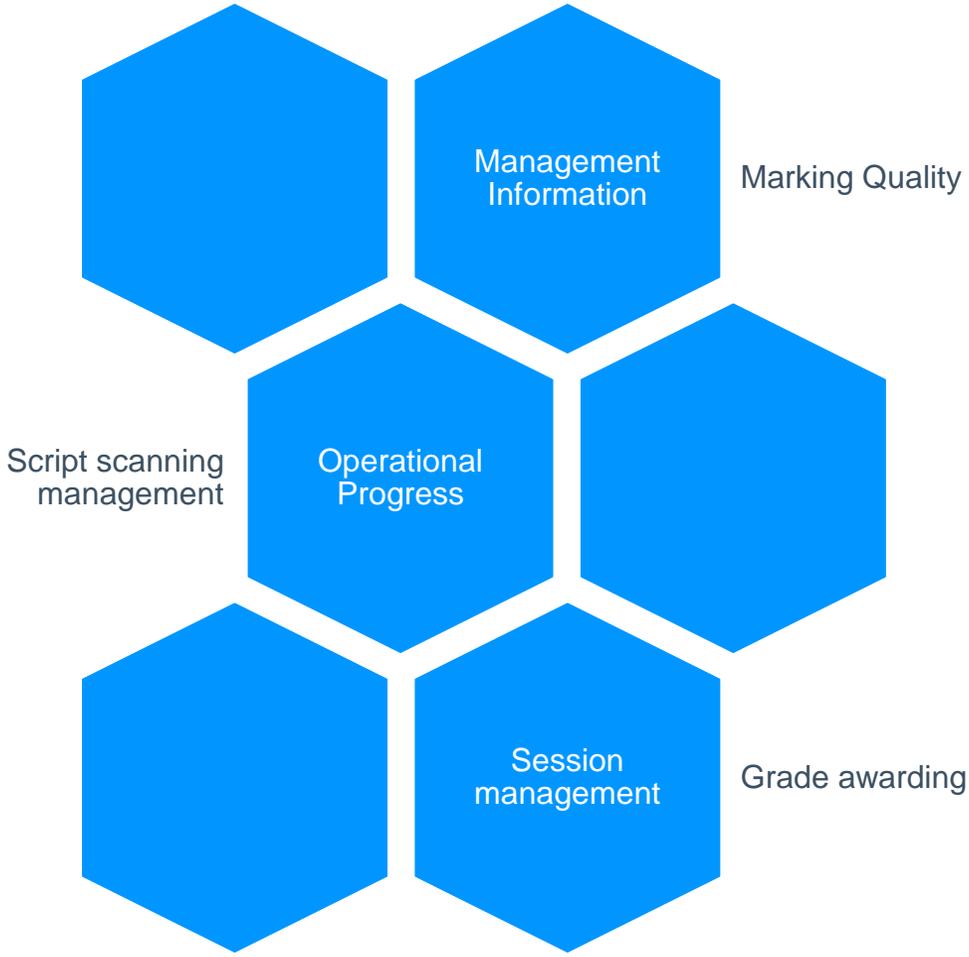
**RM<sup>TM</sup> Results**



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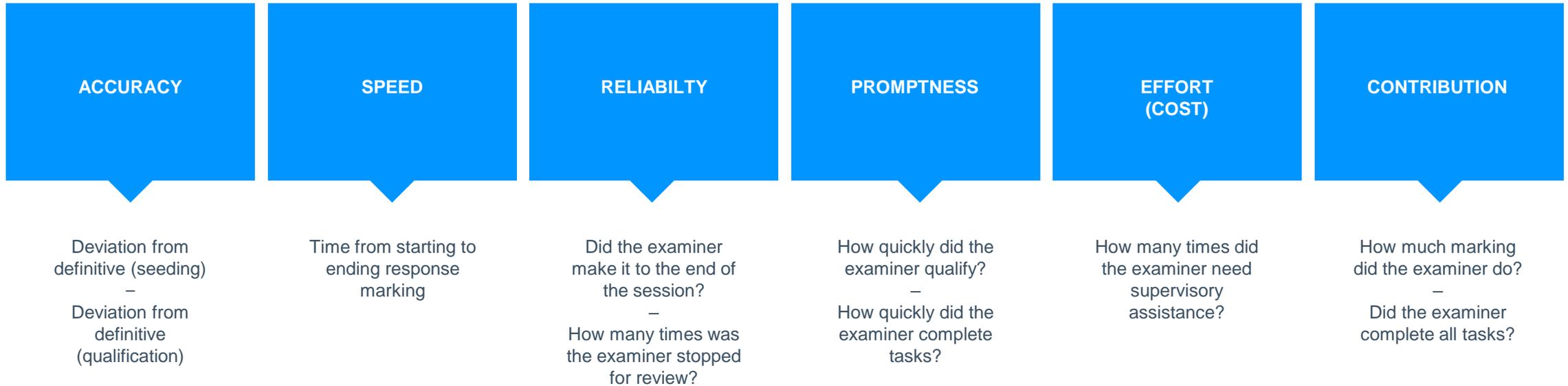
# Managing and tracking progress



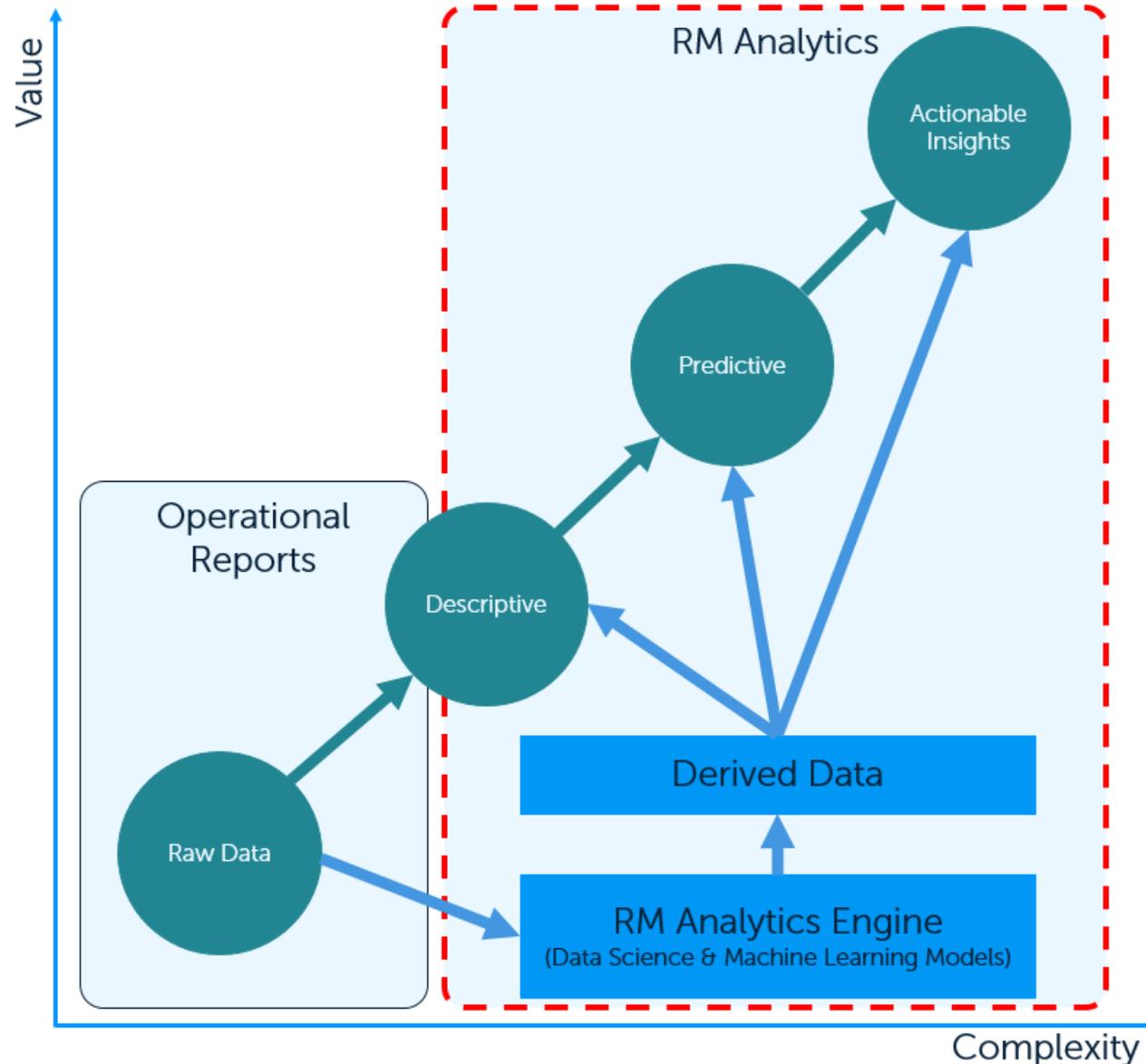
# Managing and tracking progress



# Turning data into meaning



# An escalator of Value and Complexity



## Marker Performance

- What makes a good marker?
- How can marking speed & accuracy be improved?

## Session Progress

- When will marking complete?
- How can we finish earlier?
- How can we identify risk and prevent issues?

# Turning Meaning into Value

**RM<sup>™</sup> Results**



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# Case study: Real-time session optimisation



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# The problem

Our customers tell us that marking sessions can be very stressful due to a combination of

- Work under time pressure – how do we accelerate sessions?
- Recruitment and training challenges
- An aspiration to feel *in control* of the process

**RM Results**



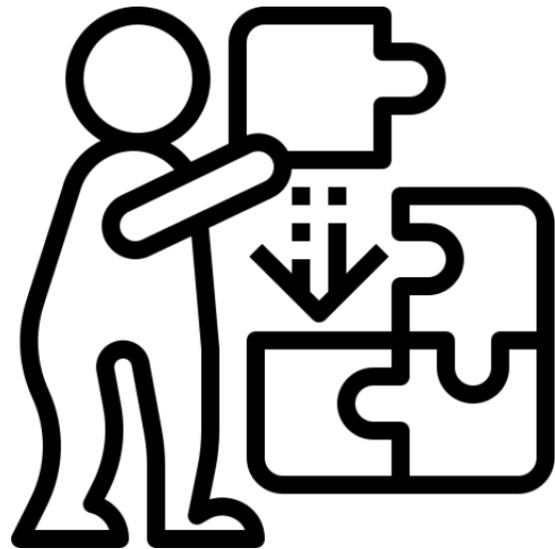
**RM Studio**



# The solution (I)

Deliver a rich set of real-time marketing session data to customers in order to satisfy core reporting requirements

- Simple and flexible
- Integrates with their BI processes and platform
- We'll help them get the most out of it



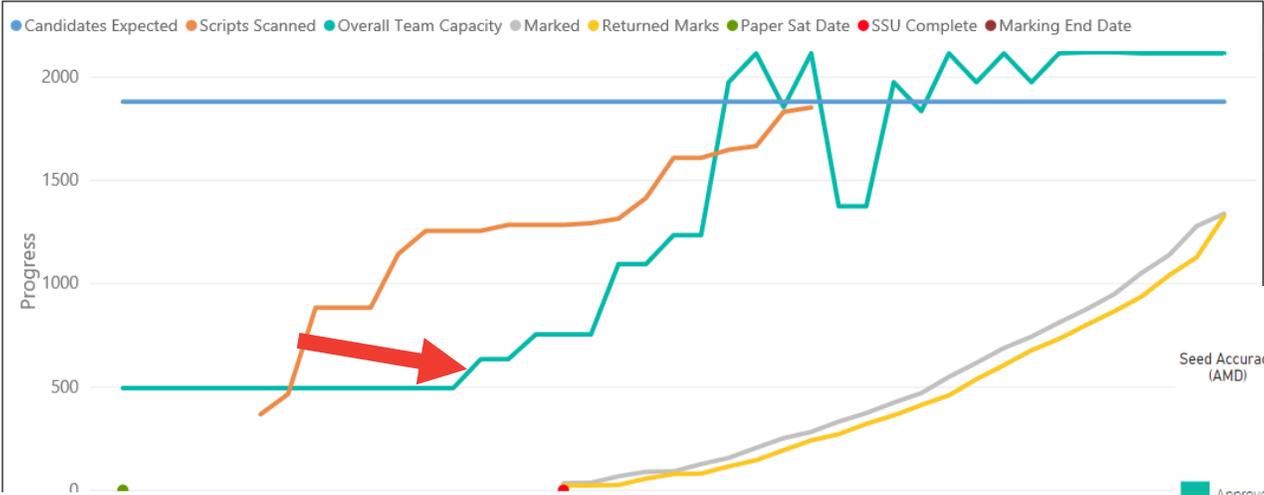
**RM<sup>™</sup> Results**



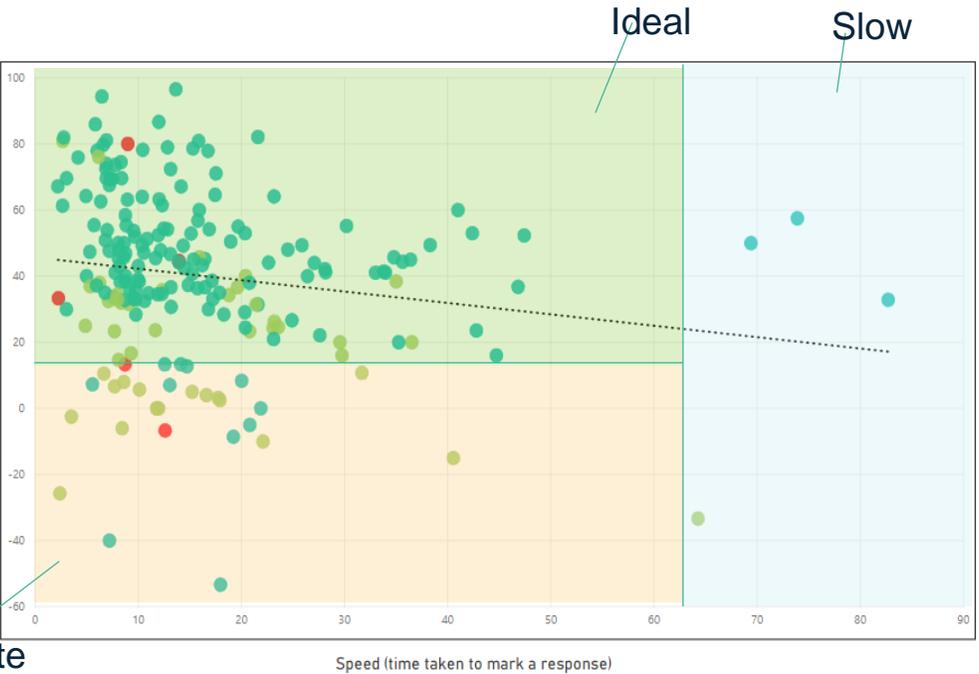
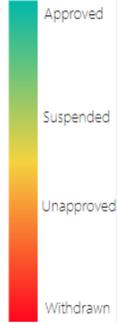
**RM<sup>™</sup> Studio**



# Actionable data insights



Seed Accuracy (AMD)



# Connected reports

The screenshot displays the Microsoft Excel interface. At the top, the ribbon includes File, Home, Insert, Page Layout, Formulas, Data, Review, View, Add-ins, and Power Pivot. The Home ribbon is active, showing options for Font (Calibri, size 11), Alignment (Wrap Text, Merge & Center), and Numbers. A yellow security warning banner is present, stating "SECURITY WARNING: Some active content has been disabled. Click for more details." with an "Enable Content" button highlighted by a red box. The main workspace shows a data table with columns A through I. The data includes session names, dates, and various performance metrics. A "Workbook Queries" pane on the right lists five queries: "Adjudication Re-Mark" (30 rows), "Practice vs Standardisation Mark" (19,851 rows), "Edited Scripts in Grace period" (106 rows), "Marking Per Login" (15,235 rows), and "Marking Duration" (523 rows). The "Practice vs Standardisation Mark" query is currently selected.

Session Name	Summer 2017							
20	CB1/01	9042136	Approval	2	19(iii)	1	0	-1
21	CB1/01	9565584	Approval	1	19(iii)	1	0	-1
22	CB1/01	9565584	Practice	3	20(iii)	1	0	-1
23	CB1/01	9054846	Approval	1	14	0	0	0
24	CB1/01	9054846	Approval	1	2	0	0	0
25	CB1/01	9054846	Approval	1	3	0	0	0
26	CB1/01	9054846	Approval	1	5	0	0	0
27	CB1/01	9054846	Approval	1	7	0	0	0
28	CB1/01	9054846	Approval	3	7	0	0	0
29	CB1/01	9054846	Approval	1	8	0	0	0
30	CB1/01	9054846	Approval	1	9	0	0	0
31	CB1/01	9054846	Practice	3	10	0	0	0
32	CB1/01	9054846	Practice	1	13	0	0	0
33	CB1/01	9054846	Practice	3	14	0	0	0
34	CB1/01	9054846	Practice	3	2	0	0	0
35	CB1/01	9054846	Practice	3	3	0	0	0
36	CB1/01	9054846	Practice	1	5	0	0	0
37	CB1/01	9054846	Practice	1	7	0	0	0
38	CB1/01	9054846	Practice	3	7	0	0	0
39	CB1/01	9575305	Approval	3	14	0	0	0
40	CB1/01	9575305	Approval	3	2	0	0	0
41	CB1/01	9575305	Approval	3	3	0	0	0

# Results

- Time saved: 30 minutes a day
  - 130 hours a year, or
  - 16 days a year  
(evergreen session)
- Other benefits
  - User Satisfaction
  - Breadth and depth of reporting
  - Frequency of use
    - Core report frequency up 100% (twice a day now)



**RM Studio**

**RM Results**

# Case study: Giving Markers Superpowers



RM Studio

RM Results



# The problem

Our customers tell us that marking sessions can be very stressful due to a combination of

- Work under time pressure – how do we accelerate sessions?
- Recruitment and training challenges
- An aspiration to feel *in control* of the process

Additionally, we believe there is a great untapped opportunity to

- improve marker performance
- retention and
- job satisfaction

by enabling markers to improve their performance and skills

**RM<sup>™</sup> Results**



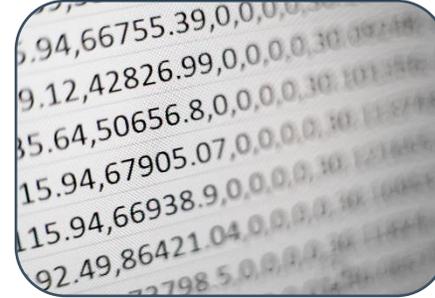
# Market and Product Trends



Gamification



Collaborative Filtering



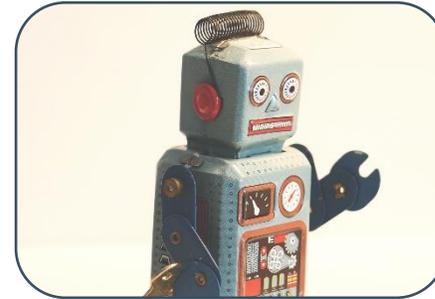
Machine Learning and AI



Continuous Learning and Self-Actualisation



Social and Community Learning

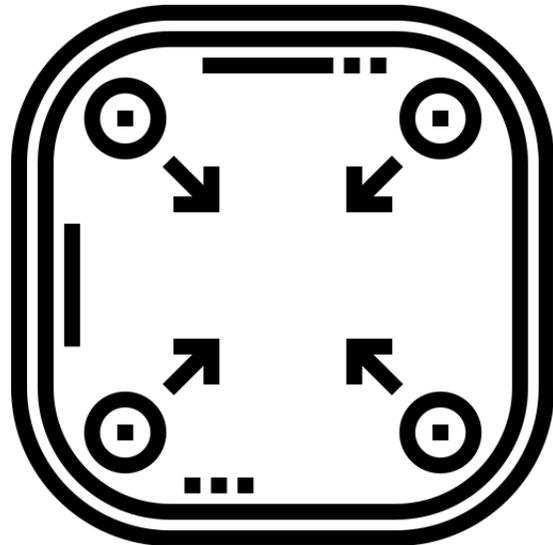


Assisted and Augmented Work

# The solution (II)

Build a series of data-driven widgets and components in RM Assessor 3, enabling end users –managers, operations and markers- to instantly track and improve their performance, as an integral part of the marking session experience

- Always up-to-date estimation of session progress and quality
- Marker cues to help them improve performance themselves
- AI for optimal outcomes i.e. matching markers to scripts



**RM<sup>TM</sup> Results**



**RM<sup>TM</sup> Studio**



# How am I doing?



RM Studio

Home / Worklist Response 621897 1 of 20 in worklist Inbox Menu

Files

ExampleToK  
Sequence : 1  
Coursework confirmation : Yes  
Declaration : Yes  
Title : Title 1  
Word count : 1551

Velocity: 75%  
Accuracy: 45%

Annotations ON

10  
9  
8  
7  
6  
5  
4  
3  
2  
1  
0  
NR

Total Mark  /10  
Reset

0% Total marks 0/10

“Humans are pattern seeking animals and we are adept at finding patterns whether they exist or not” (adapted from Michael Shermer). Discuss knowledge questions raised by this idea in two areas of knowledge.

From the moment the first homosapiens emerged on this planet, our tendency to find patterns whether they exist or not has become a key to survival and the development of civilisation, as we know it today. Michael Shermer in his claim implies that humans find patterns whether they exist or not instinctively as he mentions us being “pattern seeking animals”, highlighting how this ability has become hardwired into our brains developed over the evolution of our species. From the beginning we would identify patterns of the movements of the sun, moon, and seasons, and the habit of how animals respond. Humans are adept at producing knowledge through pattern recognition- by connecting the dots and creating meaning by what we observe, we are able to find a connection between certain

# How do I recover?



RM Studio

The screenshot shows the RM Studio interface. At the top, there's a navigation bar with "Home / Worklist", "Response 621897", and "1 of 20 in worklist". On the left, a sidebar shows a file named "ExampleToK" with details: "Sequence : 1", "Coursework confirmation : Yes", "Declaration : Yes", "Title : Title 1", and "Word count : 1551". Below this, there's a red sad face icon and performance metrics: "Velocity: 75%" and "Accuracy: 45%". Three blue buttons are visible: "Repeat Practice" (with a mouse cursor), "Review Mark Scheme", and "Take a break". The main content area displays a text document with two paragraphs. The right sidebar shows "Annotations" (ON), a vertical list of numbers 10 through 0, and a "Total Mark" section with a dropdown set to 10 and a "Reset" button. At the bottom right, it shows "Total marks 0/10" and a "NR" button.

# How am I doing?



RM Studio

Home / Worklist Response 621897 1 of 20 in worklist

Files

ExampleToK  
Sequence : 1  
Coursework confirmation : Yes  
Declaration : Yes  
Title : Title 1  
Word count : 1551

Annotations ON

10  
9  
8  
7  
6  
5  
4  
3  
2  
1  
0

Total Mark  /10  
Reset

0% Total marks 0/10 NR

?

✓

SEEN

+

😊 Velocity: 70%  
😊 Accuracy: 85%

“Humans are pattern seeking animals and we are adept at finding patterns whether they exist or not” (adapted from Michael Shermer). Discuss knowledge questions raised by this idea in two areas of knowledge.

From the moment the first homosapiens emerged on this planet, our tendency to find patterns whether they exist or not has become a key to survival and the development of civilisation, as we know it today. Michael Shermer in his claim implies that humans find patterns whether they exist or not instinctively as he mentions us being “pattern seeking animals”, highlighting how this ability has become hardwired into our brains developed over the evolution of our species. From the beginning we would identify patterns of the movements of the sun, moon, and seasons, and the habit of how animals respond. Humans are adept at producing knowledge through pattern recognition- by connecting the dots and creating meaning by what we observe, we are able to find a connection between certain

# How do I recover?



RM Studio

The screenshot shows the RM Studio interface. At the top, there's a navigation bar with 'Home / Worklist', 'Response 621897', and '1 of 20 in worklist'. On the left, a sidebar contains a 'Files' section with a document 'ExampleToK' (1551 words) and a performance summary: 'Velocity: 70%' and 'Accuracy: 85%'. Below this are three buttons: 'Review Training' (with a play icon), 'Upgrade your screen' (with an Amazon logo), and 'Find a coach' (with a mouse cursor pointing to it). The main area displays a document with the following text:

“Humans are pattern seeking animals and we are adept at finding patterns whether they exist or not” (adapted from Michael Shermer). Discuss knowledge questions raised by this idea in two areas of knowledge.

From the moment the first homosapiens emerged on this planet, our tendency to find patterns whether they exist or not has become a key to survival and the development of civilisation, as we know it today. Michael Shermer in his claim implies that humans find patterns whether they exist or not instinctively as he mentions us being “pattern seeking animals”, highlighting how this ability has become hardwired into our brains developed over the evolution of our species. From the beginning we would identify patterns of the movements of the sun, moon, and seasons, and the habit of how animals respond. Humans are adept at producing knowledge through pattern recognition- by connecting the dots and creating meaning by what we observe, we are able to find a connection between certain

On the right, there's a sidebar for 'Annotations' (ON) and a vertical list of numbers from 10 to 0, with a 'Total Mark' section showing '0/10' and a 'Reset' button.

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# How am I doing?



RM Studio

Home / Worklist Response 621897 1 of 20 in worklist Inbox Menu

Files

ExampleToK  
Sequence : 1  
Coursework confirmation : Yes  
Declaration : Yes  
Title : Title 1  
Word count : 1551

Velocity: 120%  
Accuracy: 95%

Annotations ON

10  
9  
8  
7  
6  
5  
4  
3  
2  
1  
0  
NR

Total Mark  /10  
Reset

0% Total marks 0/10

“Humans are pattern seeking animals and we are adept at finding patterns whether they exist or not” (adapted from Michael Shermer). Discuss knowledge questions raised by this idea in two areas of knowledge.

From the moment the first homosapiens emerged on this planet, our tendency to find patterns whether they exist or not has become a key to survival and the development of civilisation, as we know it today. Michael Shermer in his claim implies that humans find patterns whether they exist or not instinctively as he mentions us being “pattern seeking animals”, highlighting how this ability has become hardwired into our brains developed over the evolution of our species. From the beginning we would identify patterns of the movements of the sun, moon, and seasons, and the habit of how animals respond. Humans are adept at producing knowledge through pattern recognition- by connecting the dots and creating meaning by what we observe, we are able to find a connection between certain

# How do I benefit?



RM Studio

The screenshot shows the RM Studio interface. At the top, there's a navigation bar with 'Home / Worklist', 'Response 621897', and '1 of 20 in worklist'. On the left, a sidebar contains a 'Files' section with a document 'ExampleToK' and its details: 'Sequence : 1', 'Coursework confirmation : Yes', 'Declaration : Yes', 'Title : Title 1', and 'Word count : 1551'. Below this is a green smiley face icon and performance metrics: 'Velocity: 120%' and 'Accuracy: 95%'. Three blue buttons are stacked: 'Request harder scripts', 'Increase your quota' (with a mouse cursor), and 'Record training video' (with a play button icon). The main area displays a document with the text: "Humans are pattern seeking animals and we are adept at finding patterns whether they exist or not" (adapted from Michael Shermer). Discuss knowledge questions raised by this idea in two areas of knowledge. From the moment the first homosapiens emerged on this planet, our tendency to find patterns whether they exist or not has become a key to survival and the development of civilisation, as we know it today. Michael Shermer in his claim implies that humans find patterns whether they exist or not instinctively as he mentions us being "pattern seeking animals", highlighting how this ability has become hardwired into our brains developed over the evolution of our species. From the beginning we would identify patterns of the movements of the sun, moon, and seasons, and the habit of how animals respond. Humans are adept at producing knowledge through pattern recognition- by connecting the dots and creating meaning by what we observe, we are able to find a connection between certain. On the right, there's an 'Annotations' panel with a toggle switch set to 'ON', a vertical list of numbers 0-10, and a 'Total Mark' section showing '0/10' and a 'Reset' button. At the bottom right, it says 'Total marks 0/10' and 'NR'.

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# (Expected) Results

- Time saved: 2 hours a day
  - 522 hours a year, or
  - 65 days a year!  
(evergreen session)
- Other benefits
  - User Satisfaction
  - Staff Retention and Development
  - Session end date acceleration
  - Platform opportunities



**RM Studio**

**RM Results**

The future has already arrived. It's just not evenly distributed yet.

William Gibson



RM Studio

Every Result Matters™

**RM**<sup>™</sup>  
Results



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**You  
Tube**