From:	MaryJane Parker
To:	Kevin Hoar; Sue Chalmers
Subject:	RE: Fw: Numeracy achievement
Date:	Thursday, 16 November 2023 9:55:04 AM
Attachments:	image001.png
	image002.png

It is not an easy website to navigate!!

From: Kevin Hoar <xxxxx.xxxx@xxxx.xxxx.xx>
Sent: Thursday, November 16, 2023 9:45 AM
To: Sue Chalmers <xxx.xxxxxxxx@xxxx.xxxx.xx>; MaryJane Parker <MaryJane.Parxxx@xxxx.xxxx.xx>
Subject: Re: Fw: Numeracy achievement

Totally agree.

If it is already on the NCEA.education website, it must be legit and useful.

██

Cheers.

Kevin

Kevin Hoar | National Assessment Facilitator

External Assessment Team

Assessment Division | Wāhanga Aromatawai

New Zealand Qualifications Authority | Mana Tohu Mātauranga o Aotearoa

☎ ██████████

@ xxxxx.xxxx@xxxx.xxxx.xx

🖥 www.nzqa.govt.nz

✉ 125 The Terrace, PO Box 160, Wellington, 6140

He rerekē tatou katoa – awhi i te oranga ki te katoa

We are all different – embrace life to the fullest

From: Sue Chalmers <xxx.xxxxxxxx@xxxx.xxxx.xx>
Sent: Thursday, 16 November 2023 09:38
To: MaryJane Parker <xxxxxxxx.xxxxx@xxxx.xxxx.xx>; Kevin Hoar <xxxxx.xxxx@xxxx.xxxx.xx>
Subject: RE: Fw: Numeracy achievement

Absolutely. Really good to refer them to the existing support material.

From: MaryJane Parker <xxxxxxxx.xxxxxx@xxxx.xxxx.xx >
Sent: Thursday, November 16, 2023 9:29 AM
To: Kevin Hoar <xxxxx.xxxx@xxxx.xxxx.xx >; Sue Chalmers <xxx.xxxxxxxx@xxxx.xxxx.xx >
Subject: FW: Fw: Numeracy achievement

Hi

At [Supporting Teaching and Learning in Te Reo Matatini me te Pāngarau | Literacy and Numeracy | NCEA (education.govt.nz)](#) there is guidance regarding PAT and they give an indication of the level students should be working at. Do you think it would be ok to pass this on to the school querying this?

Regards
Mary Jane

From: MaryJane Parker
Sent: Wednesday, November 15, 2023 2:11 PM
To: Sue Chalmers <xxx.xxxxxxxx@xxxx.xxxx.xx >
Subject: FW: Fw: Numeracy achievement

Hi

We got this from ████ today. Obviously needs some more work. But I am guessing a few schools will ask this question.

Mary Jane

From: ████████████████████████████████
Sent: Wednesday, November 15, 2023 2:06 PM
To: Kevin Hoar <xxxxx.xxxx@xxxx.xxxx.xx >; MaryJane Parker <xxxxxxxx.xxxxxx@xxxx.xxxx.xx >
Subject: Re: Fw: Numeracy achievement

Hi Kevin and MaryJane

PAT and AsTTle vary a bit in style of item. PAT items are more likely to be good indicators of potential success on the Numeracy CAA than AsTTle. PAT has a more applied style.
On the maths teacher Facebook page some teachers have reported using 5B AsTTle or Level 5 on PAT as screening tools for entry of students to the CAA. Those schools are getting 80%+ success rate. We would need to get evidence from the schools to collaborate the stories.

That's all we have at the moment but some research would be a good idea.

Regards

████

On Wed, Nov 15, 2023 at 1:58 PM Kevin Hoar <xxxxx.xxxx@xxxx.xxxx.xx > wrote:

> Hi ████

MaryJane has asked the following about PAT and Numeracy.

Any brief response to her query.

Cheers.
Kevin

Kevin Hoar | National Assessment Facilitator

External Assessment Team

Assessment Division | Wāhanga Aromatawai

New Zealand Qualifications Authority | Mana Tohu Mātauranga o Aotearoa

☎ ▮▮▮▮▮

@ xxxxx.xxxx@xxxx.xxxx.xx

🖥 www.nzqa.govt.nz

✉ 125 The Terrace, PO Box 160, Wellington, 6140

He rerekē tatou katoa – awhi i te oranga ki te katoa

We are all different – embrace life to the fullest

From: MaryJane Parker <xxxxxxxx.xxxxxx@xxxx.xxxx.xx>
Sent: Wednesday, 15 November 2023 12:46
To: Kevin Hoar <xxxxx.xxxx@xxxx.xxxx.xx>
Subject: Numeracy achievement

Hi Kevin

Is there any steer on what the PAT results in Numeracy mean for achievement of the CAA. Similar to e-asTTle?

Mj

Mary Jane Parker | **Workstream Lead – Literacy and Numeracy**

External Assessment **| Aromatawai ā-waho**

Assessment Division | **Wāhanga Aromatawai**
New Zealand Qualifications Authority | Mana Tohu Mātauranga o Aotearoa

☎ ▮▮▮▮▮▮▮

@ xxxxxxxx.xxxxxx@xxxx.xxxx.xx

🖥 www.nzqa.govt.nz

✉ C/- ERO, Eden 4, 14 Normanby Road, Mt Eden, Auckland 1024

--
▮▮▮▮▮▮
▮▮▮▮▮▮▮▮▮▮
▮▮▮▮▮▮▮▮▮▮▮▮▮

▮▮▮▮▮▮   ▮▮▮▮▮▮▮▮▮▮

Kia ora Kevin, ████████ and MaryJane

Thanks for getting back. Below is an invite to the Zoom meeting on Friday 26 July for setting the cut-score.

Topic: ████████ Zoom Meeting about cutscore
Time: Jul 26, 2024 10:00 AM Auckland, Wellington

Join Zoom Meeting
https://us02web.zoom.us/j/89137531968?pwd=M3hqTHdGWEs4K1lnbTg4eVJXNGN2QT09

I've also set up another meeting for Wednesday 31 July at 11:00am.
We may not need that meeting but blocking it out means we will all be available if needed.
Here is the invite.
████████ is inviting you to a scheduled Zoom meeting.

Topic: ████████ Zoom Meeting cutscore follow up
Time: Jul 31, 2024 11:00 AM Auckland, Wellington

Join Zoom Meeting
https://us02web.zoom.us/j/85400619655?pwd=U09Odm02YjNQRUpCY2RCVEZ5cUh6Zz09

Thanks for agreeing to these times. Much appreciated.

Regards

████████

On Wed, May 22, 2024 at 3:40 PM Kevin Hoar <xx@xxx_____> wrote:

> Hi ████████ and MaryJane.
>
> That day and time suits me as well.
>
> ████ - will you send a Zoom invitation?
>
> Cheers.
> Kevin
>
> **Kevin Hoar |** National Assessment Facilitator
> External Assessment Team
> Assessment Division | Wāhanga Aromatawai
> **New Zealand Qualifications Authority | Mana Tohu Mātauranga o Aotearoa**
>
> ☎ ████████
> @ xxxxx.xxxx@xxxx.xxxx.xx
> 🖥 www.nzqa.govt.nz
> ✉ 125 The Terrace, PO Box 160, Wellington, 6140

He rerekē tatou katoa – awhi i te oranga ki te katoa
We are all different – embrace life to the fullest

From: Charles Darr ████████████████████ >
Sent: Wednesday, 22 May 2024 15:37
To: vince.wright.3.14 ███████████████████████ Kevin Hoar <xxxxx.xxxx@xxxx.xxxx.xx   >;
MaryJane Parker <xxxxxxxx.xxxxxx@xxxx.xxxx.xx   >
Subject: Re: Booking a meeting with you.

Kia ora ████

Yes, I can meet that day. Does 10:00 AM suit.

It would be great to have a Winsteps analysis for the mathematics items showing the Rasch stats and the percentage correct for each item. It would also be good to have the score conversion table that Winsteps produces from raw scores to logits. Elson has provided these before.

Best,

████

From: ████████████████████████████████
Sent: Wednesday, May 22, 2024 2:39 PM
To: ████████████████████████████ Kevin Hoar <xxxxx.xxxx@xxxx.xxxx.xx   >; MaryJane Parker
<xxxxxxxx.xxxxxx@xxxx.xxxx.xx   >
Subject: Booking a meeting with you.

> CAUTION: This email originated from outside of NZCER. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello ████

I am trying to get ahead of the game regarding the Term 2 Numeracy CAA.
Are you available for a meeting anytime on Friday 26 July?
That will be our first run at a cut score setting though we may not have all data by then.

Please let me know of any data analysis that would be useful for that meeting.
Results are due out to students in the week beginning 5 August so time is tight.
It might also be worthwhile pencilling in another meeting time on Wednesday 31 July to follow up, even if it turns out not to be needed.

I look forward to hearing from you.
Regards

████

--

Hi Alana

15 July might be okay for a data analysis but it won't be until 21 July for all digital marking to be complete. Given 64,000 students are enrolled we should have a dataset of about 25,000 by then.
Given the size of the dataset we get a pretty good idea of how the assessment is tracking after the first week. The distributions don't appear to change much after that.

If Eldon is pressed for time he could run the Winstep analysis in the week of 15 July. If you can produce the usual spreadsheet of complete results before our meeting on 26 July we should have confidence in the data.
How does that sound?

Regards

███████

On Thu, May 23, 2024 at 5:14 PM Alana Saunders <xxxxx.xxxxxxxx@xxxx.xxxx.xx> wrote:

> Hi ███████
>
> Can I clarify what dates you would be wanting information from us? We have data extraction scheduled for the week of 15 July. Would this be too soon?
>
> I'll continue to produce the generic spreadsheet I have produced in the past (unless you don't need it). Eldon does the winsteps stuff and currently we don't have that scheduled so I will need to touch base with him. He will be on leave from 22 July which might make things difficult.
>
> If you let us know when you'd need data, Eldon and I can touch base on Monday when he is back from his current leave and figure out what to do. Don't let me deter you if you need data closer to the 26th – we'll find a way to make something work.
>
> Thanks,
>
> Alana
>
> ---
>
> **From:** ████████████████████

Hi Eldon and Alana

It was nice to catch up at our virtual meeting.

This is a "heads up" about stats we will need to set the Numeracy cutscore for Term 2 CAA, 2024.

Kevin, Charles and I have a Zoom meeting set for 10am Friday 26 July to discuss the setting. Marking should be near-complete by Monday 22 July.

Last year you provided a Winstep analysis for the Numeracy items that gave a Rasch scale logit and percentage correct for each item. That was extremely helpful to us in setting and justifying the placement of the cutscore.

Are you able to provide this again?

If you can please schedule that in.

Thanks and regards

██

█

████████

██████████████

███████████████████████

████████████   ████████████████████

****

--

Hi all,

Had a couple of typos pointed out that change meanings. Here are updated copies.

Thanks,
Alana

From: Alana Saunders
Sent: Friday, June 14, 2024 11:56 AM
To: Hamsa Lilley <x@xx>; Catherine Edser
<x@xx>; Sue Chalmers <x@xx>; Susan Henry
<x@xx>; Kevin Hoar <x@xx>; MaryJane Parker
<x@xx>; Rose Cole <x@xx>; Kirsten Shaw
<x@xx>; Melissa Mead <x@xx>
Cc: Eldon Paki <x@xx>
Subject: RE: Predicting the Literacy Reading, Literacy Writing and Numeracy achievement rate based on cohort characteristics

Hi all,

Here are the presentation slides and the paper I wrote. Thank you all for the discussion

Alana

-----Original Appointment-----
From: Hamsa Lilley <x@xx   >
Sent: Tuesday, June 11, 2024 3:58 PM
To: Catherine Edser; Alana Saunders; Sue Chalmers; Susan Henry; Kevin Hoar; MaryJane Parker; Rose Cole; Kirsten Shaw; Melissa Mead
Subject: Predicting the Literacy Reading, Literacy Writing and Numeracy achievement rate based on cohort characteristics
When: Friday, 14 June 2024 11:30 AM-12:00 PM (UTC+12:00) Auckland, Wellington.
Where: Microsoft Teams Meeting

Kia ora Lit Num people

Alana has developed a model to predict the achievement rate for the June assessments based on the cohort characteristics (gender, ethnicity and school EQI) and our knowledge of how the cohort performed in 2023. We wanted an opportunity to take you through the

model's predictions, including how different (or not) the May 2024 cohort is compared with the 2023 June and October cohorts in terms of gender, ethnicity and school EQI.
There will be a paper if you can't make the session. We just wanted to squeeze it in before Alana goes on leave.

Hamsa

_____

Microsoft Teams

Join the meeting now

Meeting ID: 498 947 362 064

Passcode: 9jKFd3

_____

_____

Hello Kevin

Eldon sent a provision data set on Friday and did some excellent Rasch analysis by item. He is on leave this week so the work before he left was much appreciated. We owe him a coffee. The data is from well over 90% of the students so it is pretty stable.

Alana will provide the full spreadsheet on Monday that allows us to play with the Outcome sufficiency requirements. At present, without imposing those sufficiency requirements this is what the results look like:

Cutscore	pass rate
15	53%
16	48%
17	43%
18	38%

It seems Alana's modelling was very close. I got the feeling from Check Marking that the data would not be great.
Can you please find out what the literacy data looks like and how their team is responding to it?

Most markers should be complete by the end on Sunday. The exception is ████████ ████████ who had computer problems, lost his AM login, and got no response from system support at NZQA. Nearly all of his scripts are not marked.
It is an easy fix with so many others prepared to mark. I will deal with that tomorrow.

I'll try to catch up tomorrow when you are back from leave.

Regards

Mathematics Education Consultant

Hi Kevin

The 'fringe' items are interesting.
Personally I think a numerate student at the end of level 4 should get 80% of those items.
So the standard is likely to be a bit lower than I would like.
However, we have to be pragmatic as well.

Regards

████

On Tue, Jul 23, 2024 at 2:31 PM Kevin Hoar <xxxxx.xxxx@xxxx.xxxx.xx> wrote:

> Thanks ████
>
> I think it is just yourself, myself and ███████
> Is there anyone else you would like to attend?
>
> I will do my homework and look over the attached document *assuming* my ferocious guard cats don't eat it!
> Actually, no problem - I am in Welly, plus the homework is electronic.
>
> Cheers.
> Kevin
>
> **Kevin Hoar |** National Assessment Facilitator
> External Assessment Team
> Assessment Division | Wāhanga Aromatawai
> **New Zealand Qualifications Authority | Mana Tohu Mātauranga o Aotearoa**
>
>
>
> ☎ ████████
> @ xxxxx.xxxx@xxxx.xxxx.xx
> 🖥 www.nzqa.govt.nz
> ✉ 125 The Terrace, PO Box 160, Wellington, 6140
>
> *He rerekē tatou katoa – awhi i te oranga ki te katoa*
> *We are all different – embrace life to the fullest*
>
> ---
>
> **From:** ████████████████████
> **Sent:** Tuesday, 23 July 2024 14:14
> **To:** Kevin Hoar <xxxxx.xxxx@xxxx.xxxx.xx >
> **Subject:** Cut score prep
>
> Hi Kevin
>
> I am getting prepared for the cut-score meeting. Currently my thinking is a total of 16/30 to pass with sufficiency requirements of 5, 5, 2 for the outcomes. That is a 45% pass rate. Raising

Outcome 3 requirement to 3 drops the pass rate to 39%.
A cut score of 15 with 5, 5, 2 gives 48% pass rate.

Firstly, I'll check with █████ that he is still booked in for this Friday. Is anyone else supposed to be there?

Second, take a look at the attached document. It gives 8 examples of critical questions in terms of students passing. In an ideal world these items should be all answered correctly. But they are not.

Please let me know what you think.

Regards

████

--
████████████
Mathematics Education Consultant
███████████████████████████

███████████████   ████████████████████

███

--
████████████
Mathematics Education Consultant
███████████████████████████

███████████████   ████████████████████

From: ███ ███ Kevin Hoar
Subject: Re: Meeting on Friday
Date: Thursday, 25 July 2024 3:25:12 PM

Hi ███ and Kevin

Look forward to seeing you tomorrow.
Here is an invite to the Zoom tomorrow.

Join Zoom Meeting
https://us02web.zoom.us/j/89137531968

Meeting ID: 891 3753 1968

Regards

███

On Thu, Jul 25, 2024 at 3:21 PM ███████████████ wrote:

> Kia ora ███
>
> Yes, that will work for me.
>
> Best,
>
> ███
>
> ─────────────────────────
>
> **From:** ████████████
> **Sent:** Wednesday, July 24, 2024 9:23 AM
> **To:** ████████████████
> **Subject:** Meeting on Friday
>
> CAUTION: This email originated from outside of NZCER. Do not click links or open attachments unless you recognize the sender and know the content is safe.
>
> Hello ███
>
> Are we all good for our Friday meeting at 10:00 am regarding the cut score?
> Please let me know and I'll send out a Zoom invite.
>
> Regards
>
> ███
>
> ███████████

--

Hi Kevin

Definitely needs Alana's data. Alana might do an analysis based on decile band profiles, e.g. 1-3, 4-6, 7-10, though that is less useful for secondary schools. That would compare the proportions of schools by decile band with those from last year. I suspect her modelling of 47% was based on that analysis.
I think one cut-score was 17 (CAA 1) and 16 (CAA 2) last year so it is not a substantial change.

Then we can tell a more complete picture.
▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮

Regards

▮▮▮

On Mon, Jul 29, 2024 at 9:26 AM Kevin Hoar <xx@xx_____> wrote:

> Hi ▮▮▮.
>
> I received the following email from Sue Chalmers:
>
> *Thank you! This is a drop from 17 to 16 in the cutscore, and the lowest achievement rate to date. Any further insights* ▮▮▮ *might have would be helpful as we will be asked for this when we release results – for the Minister, sector and media.*
>
> Any further thoughts or do you need Alana's data for that?
>
> We can chat later.
>
> Cheers.
> Kevin
>
> **Kevin Hoar |** National Assessment Facilitator
> External Assessment Team
> Assessment Division | Wāhanga Aromatawai
> **New Zealand Qualifications Authority | Mana Tohu Mātauranga o Aotearoa**
>
>
>
> ☎ ▮▮▮▮▮▮
> @ xxxxx.xxxx@xxxx.xxxx.xx
> 🖥 www.nzqa.govt.nz
> ✉ 125 The Terrace, PO Box 160, Wellington, 6140
>
> *He rerekē tatou katoa – awhi i te oranga ki te katoa*
> *We are all different – embrace life to the fullest*
>
>
> **

--

Hi Catherine.

Attached is the Numeracy CSR, signed off by Sue Chalmers.

The cuts are at the top of page one, in colour.

Cheers.
Kevin

Kevin Hoar | National Assessment Facilitator
External Assessment Team
Assessment Division | Wāhanga Aromatawai
New Zealand Qualifications Authority | Mana Tohu Mātauranga o Aotearoa

☎
@ xxxxx.xxxx@xxxx.xxxx.xx
🖥 www.nzqa.govt.nz
✉ 125 The Terrace, PO Box 160, Wellington, 6140

He rerekē tatou katoa – awhi i te oranga ki te katoa
We are all different – embrace life to the fullest

From:	Kevin Hoar
To:	Stephen Mair
Subject:	Re: Student reporting thresholds for the May July 2024 Numeracy assessment
Date:	Wednesday, 31 July 2024 12:31:57 PM
Attachments:	image001.png

Yes, that is correct.
Cheers
Kevin

Get [Outlook for Android](#)

From: Stephen Mair <xxxxxxx.xxxx@xxxx.xxxx.xx>
Sent: Wednesday, July 31, 2024 11:26:48 AM
To: Kevin Hoar <xxxxx.xxxx@xxxx.xxxx.xx>
Subject: RE: Student reporting thresholds for the May July 2024 Numeracy assessment

Yes, sorry, found them eventually.
I have run the calculation in test and get the following Pass rate, is this what you are expecting:

Achieved = 25,137 = 45%
Not Achieved = 30,567 = 55%

From: Kevin Hoar <xxxxx.xxxx@xxxx.xxxx.xx>
Sent: Wednesday, July 31, 2024 11:21 AM
To: Stephen Mair <xxxxxxx.xxxx@xxxx.xxxx.xx>
Cc: Uma Muthukrishnan <xxx.xxxxxxxxxxxxx@xxxx.xxxx.xx>; Sue Chalmers <xxx.xxxxxxxx@xxxx.xxxx.xx>; MaryJane Parker <xxxxxxxx.xxxxxx@xxxx.xxxx.nz>
Subject: Re: Student reporting thresholds for the May July 2024 Numeracy assessment

Hi Stephen.

The signed-off cuts (signed off by Sue Chalmers yesterday) are:

Numeracy - Term 2 Assessment 2024.

Total cut score is **16** of the 30 possible items.

Outcome cuts:
Outcome 1 = **5**
Outcome 2 = **5**
Outcome 3 = **2**

Hope that helps.

Cheers.

Kevin

Kevin Hoar | National Assessment Facilitator

External Assessment Team

Assessment Division | Wāhanga Aromatawai

New Zealand Qualifications Authority | Mana Tohu Mātauranga o Aotearoa

☎ ▮▮▮▮▮▮▮▮

@ xxxxx.xxxx@xxxx.xxxx.xx

💻 www.nzqa.govt.nz

✉ 125 The Terrace, PO Box 160, Wellington, 6140

He rerekē tatou katoa – awhi i te oranga ki te katoa

We are all different – embrace life to the fullest

From: Stephen Mair <xxxxxxx.xxxx@xxxx.xxxx.xx>
Sent: Wednesday, 31 July 2024 10:50
To: Kevin Hoar <xxxxx.xxxx@xxxx.xxxx.xx>
Cc: Uma Muthukrishnan <xxx.xxxxxxxxxxxx@xxxx.xxxx.xx>; Sue Chalmers <xxx.xxxxxxxx@xxxx.xxxx.xx>; MaryJane Parker <xxxxxxxx.xxxxxx@xxxx.xxxx.xx>
Subject: RE: Student reporting thresholds for the May July 2024 Numeracy assessment

Hi Kevin,
Apologies if you have already sent them through and I have misplaced them, please can you let me know the cut-scores for Numeracy for each Outcome and Total

Thanks,
Stephen

From: Kevin Hoar <xxxxx.xxxx@xxxx.xxxx.xx>
Sent: Tuesday, July 30, 2024 2:23 PM
To: Stephen Mair <xxxxxxx.xxxx@xxxx.xxxx.xx>
Cc: Uma Muthukrishnan <xxx.xxxxxxxxxxxx@xxxx.xxxx.xx>; Sue Chalmers <xxx.xxxxxxxx@xxxx.xxxx.xx>; MaryJane Parker <xxxxxxxx.xxxxxx@xxxx.xxxx.xx>
Subject: Student reporting thresholds for the May July 2024 Numeracy assessment

Hi Stephen.

I think I am supposed to send this document to you.

Cheers.
Kevin

Kevin Hoar | National Assessment Facilitator

External Assessment Team

Assessment Division | Wāhanga Aromatawai

New Zealand Qualifications Authority | Mana Tohu Mātauranga o Aotearoa

☎ ▮▮▮▮▮▮▮▮

@ xxxxx.xxxx@xxxx.xxxx.xx

🖥 www.nzqa.govt.nz

✉ 125 The Terrace, PO Box 160, Wellington, 6140

He rerekē tatou katoa – awhi i te oranga ki te katoa

We are all different – embrace life to the fullest

Numeracy Assessment Cut Score – Term 2 2024 (May - July)

Numeracy 2024 – Assessment Event One (May - July)

Total cut score of **16** of the 30 items.

Outcome 1 – **5** of the 12 items.

Outcome 2 – **5** of the 11 items.

Outcome 3 – **2** of the 7 items.

This produces an Achievement rate of **45%.**

Background:

At the beginning of the marking round, the Lead marker (Panel Leader) had the following preliminary cuts (based on the final cut score for the Term 4 2023 assessment):

> Outcome 1 = 5 of 12
>
> Outcome 2 = 5 of 11
>
> Outcome 3 = 3 of 7

Plus, an overall total of 17 out of the possible 30 items.

As common practice now, during the bench marking meeting, the senior marking team of thirteen completed a preliminary 'Angoff Test' on the results that they had 'benchmarked' by the second half of the second day. Consideration of the cuts above were used during the bench marking process. There was debate about the initial cut for Outcome 3, should it be 3 or 2.

From the preliminary Angoff Testing the total was revised up to 19. This also happened in 2023.

The senior marking team did know that it is most likely that the final cut would be revised downwards once the marking was completed.

At the conclusion of the marking process, a cut score meeting was held with the Lead marker (Panel Leader), ████████ NZCER and the National Assessment Facilitator, Kevin Hoar on Friday 26 July 2024. The data from almost all of the digital results was used to carry out analysis to recommend the post marking cut score. This represented about 55,500 results.

From this meeting it was recommended that to gain Achievement for this assessment, students needed to:

1. Gain at least a total mark of **16** of the 30 question items
2. Gain a minimum of:
    -   **5** of the 12 possible Outcome One question items
    -   **5** of the 11 possible Outcome Two question items
    -   **2** of the 7 possible Outcome Three question items.

There was support for the use of the Angoff Procedure and Rasch Analysis Data (from Eldon Paki). █████ did suggest that the Bookmark method could also be entertained in the future. The panel leader wondered if the Bookmark method, when compared it to the Angoff procedure, would produce the same outcome – he thought it would.

Rationale:

A cut score total of 16 across all items gives sufficient evidence that the candidate demonstrated an adequate proficiency with Numeracy. This setting is lower than the preliminary cut-score estimated through the Angoff procedure with Lead Markers during the bench marking process.

The Outcome criteria give assurance that the student has achieved the total score across all three outcomes. Given the small number of items used to assess each outcome, and the correspondingly large Standard Error of Measurement, setting the minimum totals too high would disadvantage a significant proportion of students. That is particularly true for Outcome 3, which was assessed by 7 items and has proved to be difficult for students in previous testing, and even though some students showed promise this assessment round, other students are still not at that level yet.

The recommended cut score settings give a achievement rate of **45%** for the cohort. That percentage is the lowest of all Numeracy assessments to date.

In summary:

Numeracy 2024 – Assessment Event One (May - July)

Total cut score of **16** of the 30 items.

Outcome 1 – **5** of the 12 items.

Outcome 2 – **5** of the 11 items.

Outcome 3 – **2** of the 7 items.

This produces an Achievement rate of **45%.**

Of note, changing the Outcome 3 cut from 2 to 3 decreased the overall achievement rate from 45% to 38%, thus showing that Outcome 3 is still the most challenging of all three outcomes.

Also, changing the total cut score from 16 to 15 would increase the achievement rate to 50%, but both the Panel Leader and ██████████ were concerned that 15 of the possible 30 was too low to represent a reliable achievement rate.

Process for setting Numeracy Cut Score June 2024

Phase one: Consideration of the assessment instrument

Phase two: Consideration of marking candidate responses

Phase three: Consideration of candidate performance

Phase four: Evaluation of the assessment to decide upon a cut score

Phase One: Consideration of the assessment instrument

Development Team	*Highlight any issues from development that could have impacted upon scores*
Experience and background of development team	Same team of four – highly experienced (secondary and adult teaching), all had NZCER training.
Changes in development team	No changes
Issues with development due to authoring tool	Limitations of AM – team produce each item as a power point slide. Editor finds this difficult as the slides are in landscape by default, but the assessment in AM is in portrait. This results in scrolling for students sitting on AM. *Action: will change future assessments into portrait.*
Changes/continuities in the instrument from previous years	Assessment structure same as November 2023. 30 items each including a visual literacy element.
Rationale for any changes	Designed to reduce the high literacy demand for students.
Number of objective and subjective items	23 objective items, containing 8 multiple-choice responses (two required two answers for the point), 9 single number responses and 6 items that accepted a range of responses. 7 subjective items.
Format of the assessment	Most responses completed digitally on AM. 791 submitted on paper via Google drive. Disadvantages for those completing the assessment on paper (see comments in Phase 4).
Identification of the construct through a matrix that relates the curriculum and achievement objectives (written form) at the relevant level to question/items. Including intended assessment outcome for each item	*Attached as appendix*

Number of question items	30
Scoring format per item	0 or 1
Weighting attached to items	None
Rationale for weights	NA
Estimate of the difficulty of assessment relative to difficulty in previous years	Assessment comparable to the 2023 Numeracy assessments. Comments in marker reports state that the assessment was appropriate and valid for any student who was ready to sit the assessment.

Phase Two: Consideration of marking candidate responses (Writing 32405 and Numeracy 32406 only as reading auto marked)

Marking Team	*Highlight any issues from marking that could have impacted upon scores*
Composition of team	102 markers from around New Zealand.
Previous experience of team	Same PL, seven previous CMs + five new CMs (but previous markers). 59 previous markers + 30 new markers. Many teach Mathematics as well as Numeracy, some teach Science and a couple teach other Numeracy-rich subjects.
Changes to team from previous years	Biggest team so far at 102. New markers required to make up the numbers.
Changes to marking process	Very little change to marking processes from 2023. Just a change in scale.
Impact of the number of entries and responses on marking	A new challenge marking over 55,500 responses. Last assessment round we marked 34,000 responses. With 102 on the panel, most marked about 580 responses.
Marking duration	5 weeks.
Marker reliability and validity process	Thorough training, extensive and ongoing check marking. Responses were reallocated from two markers who had serious health issues – both pulled out during week one of the marking period. Responses were reallocated to other markers and check markers. Check marking of all markers by the team of 12 check markers to ensure reliability. All reporting to the Panel Leader.

Frequency of marker quality control sampling	Daily, although a good proportion of check marking occurred in the first 3 weeks of the marking period.
Ratio of accurate to inaccurate sampled responses (for panel and per marker)	*NAF still awaiting feedback from the PL about this.*
Monitoring process and data available during marking	Marking timelines for all markers. Communication between check markers, the Panel Leader and the NAF about check marking. Paper responses (including Google drive) were not check marked (time and data management).
SOP for each marker for each question item desirable but may not be possible	NA
Issues noted regarding the fit of the student responses to expected response	It was noted by senior markers that schools who have been taking part in the Numeracy assessments over the last two years have shown a general improvement in student responses, especially in Outcome 3 responses. Unfortunately, it was also noted that many schools who took part for the first time in 2024, put students into the assessment who appeared to be no where near ready. Many students from first time schools were using 'IDK' or leaving the responses blank.
Changes to schedule and weighting during marking	Only changes made to the marking schedule was the addition of a couple of extra (but viable) responses. No responses were removed or altered during the marking process. Further notes about Outcome 3 responses were added when needed.
Estimate of the difficulty of the assessment relative to previous years	Comparable to that of 2023. Markers were making comments in their reports that the assessment was fit for purpose for a typical year 10 student who was at upper level 4 and lower level 5, but many students were clearly NOT at that stage.

Phase three: Consideration of candidate performance

NAF in consultation with SME	
Issues from authoring, sitting, or marking application that could have impacted results	All question parts conformed to the new version of US32406, which reflects upper L4 or lower L5 of the NZC. There will always be very simple question parts (upper L4) and difficult question parts (lower L5) when authoring. Risk was minimised thorough the panel meeting, which included practice tasks of Outcome 3

	responses, a lengthy list of N and A exemplars for each Outcome 3 response in the assessment, and check marking throughout the process. The majority of check marking occurred over the first two weeks. There is the risk of 'unconscious bias' when marking in Assessment Master, as whole schools are allocated to markers. This will be eliminated when we move to marking in RMA.
Entries, voids, and absences for assessment	2024 Entries = 65,125. Actuals = 55,500 2023: November entries = 46,792
Question/item data, percentage of candidate subs that responded, percentage at score	See data analysis, once available.
Students	

Students (continued)

Equity Index	2023	2024
More	7%	14%
Moderate	55%	57%
Fewer	31%	23%
Unassigned	7%	6%

A larger number of students from a higher equity index sat the assessment this round, matched by a drop in the students from a lower equity index. This may have been reflected in the year 11 and higher results (still to receive data on this).

Ethnicity	2023	2024
Asian	18%	19%
European	57%	45%
Māori	16%	24%
Pacific	3%	3%
Other	5%	10%

A higher proportion of students of Māori ethnicity sat the assessment this time, along with students from other ethnicities. The proportion of European ethnicity dropped by over 10%.

Year level	2023	2024
Below Yr 10	5%	2%
Yr 10	84%	54%
Above Yr 10	11%	44%

The most apparent difference from 2023 to 2024 is the proportion of student year levels shifting. In 2022 and early 2023, by far the majority of students sitting Numeracy were year 10 students.

	In 2024, this is changing – although the mode is still year 10, the number of year 11 and higher students (re)sitting the assessment has increased by 33%.

Gender	2023	2024
Female	46%	50%
Male	54%	50%
Unassigned	0%	0%

Angoff analysis data	

Phase four: Evaluation of the assessment to decide on cut-score

State the claim NZQA makes for the assessment, and highlight any issues from instrument development, marking, or candidate performance that the National Assessment Facilitator considers could have impacted upon scores.

Cut-score Team	
Changes in cohort Year 9 = 1,498 Year 10 = **29,455** Year 11 = **19,900** Year 12 = 2,573 Year 13 = 1,079	Given the varied nature of the cohort (different year levels, repeating students, schools entering whole year levels instead of students they think 'are ready', it is challenging to assess the impact of this.
Changes in characteristics of the submission	NA
Effects of instrument on scores	Paper responses – evaluation of results could help determine possible disadvantages for students responding on paper. Two things noted by markers: 1. Poly (text to speech) is not available for students using paper (unless a student had a 'reader'). 2. Poor handwriting hampered many.
Relationship of assessment instrument to the construct and the claim	Concerns remain about the two-week window of the assessment. Knowing the assessment material (students telling other students from other schools) could give some students an advantage.
Distributions and variances of results in the current year and previous years	Results for this assessment were lower than in past years.

Impact of the assessment and possible cut-scores on student outcomes	The more detailed psychometric analysis that is to follow will allow us to analyse this.

Final cut-score confirmed	**Numeracy 2024 – Assessment One (May - July)**
	Total cut score of **16** of the 30 items.
	Outcome 1 – **5** of the 12 items.
	Outcome 2 – **5** of the 11 items.
	Outcome 3 – **2** of the 7 items.
	This produces an Achievement rate of **45%.**

Cut scores approved

Signed: Sue Chalmers   **Date: 30 July 2024**

Key items regarding claim of Numerate

On average, with a cut-score of 16, students who pass get 6 out of these 10 items correct.

Pooled Angoff percentage across the 10 items is 65.5% so the cut-score matches senior marker expectations of these items.

2a   46% Correct   Angoff 65%

Nicole creates this growing tree design.

Pattern 1   Pattern 2   Pattern 3   Pattern 4
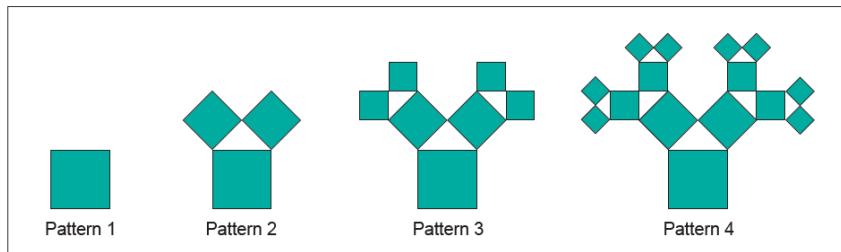
(a)   To create **Pattern 5**, how many squares would Nicole need, in total?
Include all squares of different sizes.

1b   48% Correct   70% Angoff

Tuatara eat small animals, such as wētā, worms, beetles, and spiders.

The tuatara weighs one kilogram.

The wētā weighs 25 grams.

(b)   How **many times heavier** is the tuatara than the wētā?

_____ times heavier

Wētā

A tuatara eating a wētā

1c   49% Correct   65% Angoff

Tuatara are endangered.

A breeding programme for tuatara has been set up.

A female tuatara lays 6–10 eggs every four years. The eggs take 11–16 months to hatch.

(c)   If all the eggs survive, about how many tuatara would you expect to get from **one** female in 10 years? Show the calculations you used to get your answer.

_____

A tuatara hatching from an egg

2b   50% correct   65% Angoff

Ariana's design is shown below.
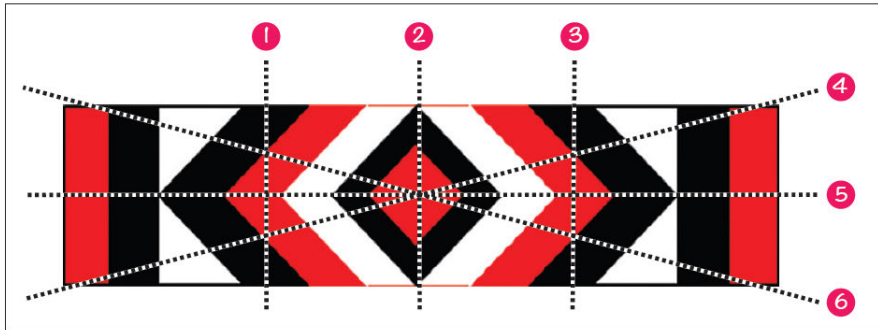
Tīpare or kōpare (headband)

(b)   Which numbers show lines of **reflection** symmetry in Ariana's design?

Tick (✓) the circle next to the correct numbers below. There is more than one answer.

① ◯   ② ◯   ③ ◯   ④ ◯   ⑤ ◯   ⑥ ◯

5d   50% Correct   60% Angoff

In Rugby 7s, players can score extra points by drop-kicking a goal.
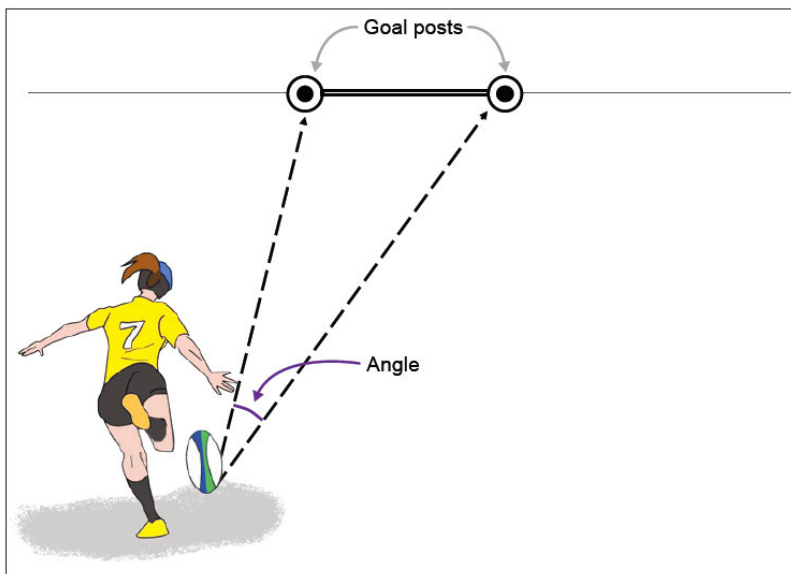
Rugby 7s player drop-kicking a goal between goal posts

(d)   Estimate the angle this player must work with to get the ball between the goal posts.

_____ °

QUESTION ONE: Tuatara

New Zealand is home to the last surviving dinosaur – the tuatara.

Tuatara first lived about 225 million years ago.

The oldest rocks show New Zealand is about 500 million years old.

(a)   On the timeline below, **circle** ◯ **the arrow** that shows 225 million years ago.

A tuatara on a log
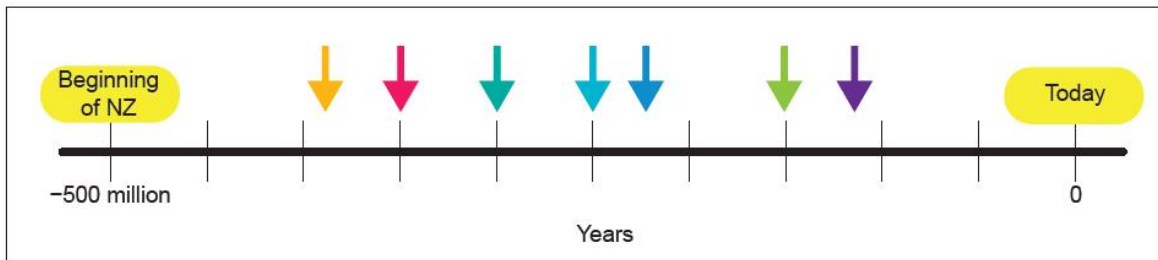
Michaela played all **14 minutes** of a Rugby 7s game and ran a total of **1,540 metres**.

Ani says that, on average, Michaela ran over **100 metres** for every minute that she played.

(c)   Is Ani's claim reasonable?

Use the measurements provided to explain your answer.

Michaela running

3d   53 % Correct   55% Angoff

In some cities, people pay for the amount of water they use.

Here is Cindy's water bill for **one month**.

Wai Mā Services		
Amount used (m³)	**Rate ($/m³)**	**Charge ($)**
24.8	?	$35.96

(d) How much does Cindy pay for each cubic metre (m³) of water used?
   Note: $/m³ means dollars per cubic metre.

   $ _____

5e   53% Correct   70% Angoff

In a coin toss, Sarah usually picks "heads".

But the last three tosses have all come up "tails".

(e) Should Sarah choose "heads" or "tails" for the fourth toss, or is either choice alright?

   Explain your answer using ideas about probability.

   _____

   _____

   _____

   _____
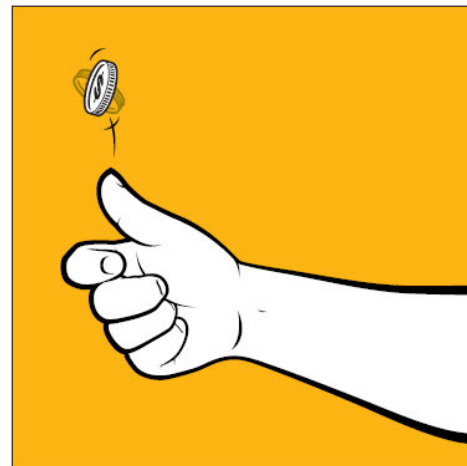
Sarah tossing a coin

4a   54% Correct   70% Angoff

Polyfest is a festival. It has music, dances, costumes, and speeches from different Pacific cultures.

Here is a graph of people attending Polyfest over time.
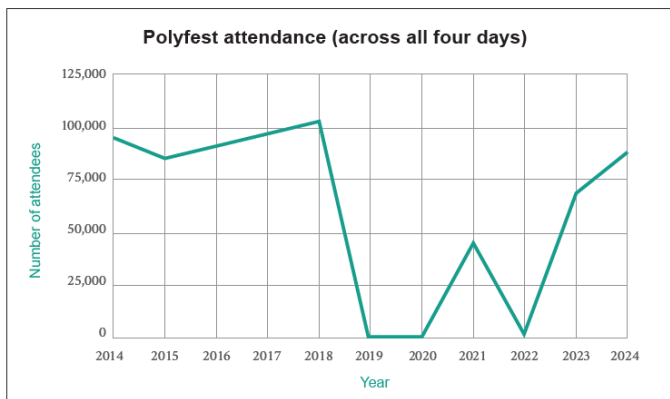
(a) How many more people attended Polyfest in 2015 than 2021?

   _____ people

Predicting Literacy and Numeracy 2024 Pass Rates

Alana Saunders

14/06/2024

Contents

Introduction and Motivation

The Literacy and Numeracy assessments are in their third official iteration. At this point, we have two sessions worth of data about both the students and the assessments.

The question was raised whether we would be able to predict Literacy and Numeracy pass rates based on what we already know about the students entered for 2024 and how similar cohorts performed in the past.

Note that these predicted pass rates are based on many assumptions we know will be violated eg. students in a given cohort will perform the same as they did in the past.

Data

Data has been extracted for Reading, Writing, and Numeracy. Pāngarau sample sizes were too small for modelling and Te Reo Matatini assessments in 2024 are new. Data from both iterations of 2023 was used. This has then been applied to 2024 assessed students to predict a pass rate.

Previous iterations

Data was extracted for 32403 (Reading), 32405 (Writing), and 32406 (Numeracy) separately. The following variables were taken:

Gender – F (Female) or M (Male)

Ethnicity – A (Asian), E (European), M (Māori), P (Pacific), O (Other)

MoE Year Level – Grouped into "Below Year 10", "Year 10", and "Above Year 10"

Region – Grouped into "North Island", "South Island" and "Pacific Islands"

EQI Group – "More", "Moderate", and "Fewer"

Assessed Students – Number of results with an N or an A.

Achieved Students – Number of results with an A.

Pass Rate – Achieved Students/Assessed Students

Current iteration

Gender – F (Female), M (Male), U (Unassigned)

Ethnicity – A (Asian), E (European), M (Māori), P (Pacific), O (Other)

MoE Year Level – Grouped into "Below Year 10", "Year 10", and "Above Year 10"

Region – Grouped into "North Island", "South Island" and "Pacific Islands"

EQI Group – "More", "Moderate", and "Fewer"

Entries – Number of students entered.

Model

The model chosen for each standard was the same. It involved putting in all characteristic variables into the model as all were significant predictors of pass rate. The chosen model is:

$$Pass\ Rate_i = \beta_0 + \beta_1\ Gender_{\square} + \beta_{2,j}\ Ethnicity_j + \beta_{3,k}\ Year\ Level_k + \beta_{4,l}\ Region_l + \beta_{5,m}\ EQI_m + \epsilon_i$$

where

$Pass\ Rate_i$ is the proportion of students with the given characteristics that passed.

$Gender_{\square}$ is value β_1 for female and 0 for male

$Ethnicity_j$ is value $\beta_{2,j}$ for the jth ethnicity A, M, P, or O, with 0 for E (European).

$Year\ Level_k$ is value $\beta_{3,k}$ for the kth year level group, with 0 for "Year 10".

$Region_l$ is value $\beta_{4,l}$ for the lth region South Island or Pacific Islands, with 0 for the North Island.

EQI_m is value $\beta_{5,m}$ for the mth EQI Group Fewer, Moderate, or Unassigned, with 0 for More.

ϵ_i is the residual term of the ith group of characteristics.

Each distinct combination of variable then had their pass rate calculated. This was applied to the number of students in each cohort to estimate an overall pass rate.

Results

Reading

$$Pass\ Rate_i = 0.509 + \begin{bmatrix} 0.000\ \textit{if Male} \\ 0.054\ \textit{if Female} \end{bmatrix} + \begin{bmatrix} 0.000\ \textit{if European} \\ -0.136\ \textit{if Asian} \\ -0.169\ \textit{if Māori} \\ -0.271\ \textit{if Pacific} \\ -0.068\ \textit{if Other} \end{bmatrix} + \begin{bmatrix} 0.000\ \textit{if Year 10} \\ -0.057\ \textit{if Below Year 10} \\ -0.050\ \textit{if Above Year 10} \end{bmatrix}$$

$$+ \begin{bmatrix} 0.000\ \textit{if Region = North Island} \\ -0.048\ \textit{if Region = South Island} \\ -0.314\ \textit{if Region = Pacific Islands} \end{bmatrix} + \begin{bmatrix} 0.000\ \textit{if EQI = More} \\ 0.155\ \textit{if EQI = Moderate} \\ 0.276\ \textit{if EQI = Fewer} \\ 0.362\ \textit{if EQI = Unassigned} \end{bmatrix}$$

We can then apply this to 2024 data to predict the percentage of students that will pass in each group and apply this to the number of assessed students in each group. Doing this gives 32,261 students out of 53,396 entries passing the reading exam or 60.4%.

The model shows:

- The pass rate for Females is 0.054 points higher than Males.
- The pass rate for Pacific students is 0.271 points lower than for European students.
- The pass rate for students above Year 10 is 0.050 points lower than students in Year 10.
- Students in the Pacific Islands have a pass rate that is 0.314 points lower than students in the North Island.
- Students with an Unassigned EQI have the highest pass rate, being 0.362 points higher than students in the More EQI group.
- The biggest influence on a student's pass rate for Reading is the Equity Index of their school.

Imagine a Female, Pacific, Year 10 student from the North Island in a school with Fewer Socioeconomic Barriers to Achievement. The estimated pass rate is:

Pass Rate = 0.509 + 0.054 – 0.271 + 0.000 + 0.000 + 0.276

= 0.568

Now imagine that student was Below Year 10 when entered. We expect the pass rate to decrease.

Pass Rate = 0.509 + 0.054 – 0.271 – 0.057 + 0.000 + 0.276

= 0.511

Writing

$$Pass\ Rate_i = 0.349 + \begin{bmatrix} 0.000\ \textit{if Male} \\ 0.141\ \textit{if Female} \end{bmatrix} + \begin{bmatrix} 0.000\ \textit{if European} \\ -0.044\ \textit{if Asian} \\ -0.117\ \textit{if Māori} \\ -0.118\ \textit{if Pacific} \\ -0.004\ \textit{if Other} \end{bmatrix} + \begin{bmatrix} 0.000\ \textit{if Year 10} \\ -0.090\ \textit{if Below Year 10} \\ -0.042\ \textit{if Above Year 10} \end{bmatrix}$$

$$+ \begin{bmatrix} 0.000\ \textit{if Region = North Island} \\ -0.028\ \textit{if Region = South Island} \\ -0.163\ \textit{if Region = Pacific Islands} \end{bmatrix} + \begin{bmatrix} 0.000\ \textit{if EQI = More} \\ 0.161\ \textit{if EQI = Moderate} \\ 0.289\ \textit{if EQI = Fewer} \\ 0.308\ \textit{if EQI = Unassigned} \end{bmatrix}$$

We can then apply this to 2024 data to predict the percentage of students that will pass in each group and apply this to the number of assessed students in each group. Doing this gives 26,526 students out of 50,634 entries passing the writing exam or 52.4%.

The model shows:

- The pass rate for Females is 0.141 points higher than Males. This difference is more pronounced than in the Reading paper.
- The pass rate for Pacific students is 0.118 points lower than for European students. For all ethnicities, the difference is less pronounced than Reading.
- The pass rate for students above Year 10 is 0.042 points lower than students in Year 10.
- Students in the Pacific Islands have a pass rate that is 0.163 points lower than students in the North Island. This is less pronounced than Reading.
- Students with an Unassigned EQI have the highest pass rate, being 0.308 points higher than students in the More EQI group.
- The biggest influence on a student's pass rate for Writing is the Equity Index of their school.

Imagine a Female, Pacific, Year 10 student from the North Island in a school with Fewer Socioeconomic Barriers to Achievement. The estimated pass rate is:

Pass Rate = 0.349 + 0.141 – 0.118 + 0.000 + 0.000 + 0.308

$\qquad$ = 0.680

Now imagine that student was Below Year 10 when entered. We expect the pass rate to decrease.

Pass Rate = 0.349 + 0.141 – 0.118 – 0.090 + 0.000 + 0.308

$\qquad$ = 0.590

Numeracy

$$Pass\ Rate_i = 0.459 + \boxed{\begin{array}{l} 0.000\ \textit{if Male} \\ -0.063\ \textit{if Female} \end{array}} + \boxed{\begin{array}{l} 0.000\ \textit{if European} \\ 0.020\ \textit{if Asian} \\ -0.176\ \textit{if Māori} \\ -0.271\ \textit{if Pacific} \\ -0.098\ \textit{if Other} \end{array}} + \boxed{\begin{array}{l} 0.000\ \textit{if Year 10} \\ -0.008\ \textit{if Below Year 10} \\ -0.110\ \textit{if Above Year 10} \end{array}}$$

$$+ \boxed{\begin{array}{l} 0.000\ \textit{if Region = North Island} \\ -0.030\ \textit{if Region = South Island} \\ -0.326\ \textit{if Region = Pacific Islands} \end{array}} + \boxed{\begin{array}{l} 0.000\ \textit{if EQI = More} \\ 0.140\ \textit{if EQI = Moderate} \\ 0.287\ \textit{if EQI = Fewer} \\ 0.423\ \textit{if EQI = Unassigned} \end{array}}$$

We can then apply this to 2024 data to predict the percentage of students that will pass in each group and apply this to the number of assessed students in each group. Doing this gives 25,543 students out of 54,338 entries passing the numeracy exam or 47.0%.

The model shows:

- The pass rate for Females is 0.063 points lower than Males. This is the only English Medium exam where the pass rate for Females is lower than Males.
- The pass rate for Pacific students is 0.271 points lower than for European students. For most ethnicities, this is similar as Reading. The Asian ethnicity has a positive impact on the pass rate in Numeracy unlike the other English Medium standards.
- The pass rate for students above Year 10 is 0.110 points lower than students in Year 10. This is the highest difference amongst English Medium standards. This is also a higher drop than for students below Year 10.
- Students in the Pacific Islands have a pass rate that is 0.326 points lower than students in the North Island. This is a higher drop than Reading and Numeracy.
- Students with an Unassigned EQI have the highest pass rate, being 0.423 points higher than students in the More EQI group. This is higher than other English Medium standards.
- The biggest influence on a student's pass rate for Numeracy is the Equity Index of their school.

Imagine a Female, Pacific, Year 10 student from the North Island in a school with Fewer Socioeconomic Barriers to Achievement. The estimated pass rate is:

Pass Rate = 0.459 – 0.063 – 0.271 + 0.000 + 0.000 + 0.287

= 0.412

Now imagine that student was Below Year 10 when entered. We expect the pass rate to decrease.

Pass Rate = 0.491 – 0.062 – 0.274 – 0.008 + 0.000 + 0.276

= 0.404

Summary

The estimated pass rate for Literacy Reading is 60.4% with a 90% confidence interval of [43.7,77.1]. We are 90% confident that the pass rate for Reading will be between 43.7% and 77.1%, estimating it will be 60.4%.

The estimated pass rate for Literacy Writing is 52.4% with a 90% confidence interval of [34.4,70.4]. We are 90% confident that the pass rate for Reading will be between 34.4% and 70.4%, estimating it will be 52.4%.

The estimated pass rate for Numeracy is 47.0% with a 90% confidence interval of [30.5,63.5]. We are 90% confident that the pass rate for Reading will be between 30.5% and 63.5%, estimating it will be 47.0%.

The predictors contributing to a predicted pass rate are gender, ethnicity, region, age group, and EQI.

The biggest influence on a student's pass rate for any English Medium Literacy or Numeracy exam is the Equity Index of their school.

How this compares to previous pass rates

	2023 Session One		2023 Session Two		2024 Session One	
	Participating	Achieved (%)	Participating	Achieved (%)	Participating	*Estimated* Achieved (%)
Reading	28,403	64.6%	30,486	57.3%	53,396	60.4%
Writing	26,551	56.4%	31,783	54.7%	50,634	52.4%
Numeracy	33,168	56.1%	35,143	50.6%	54,338	47.0%

We are expecting the Reading pass rate to be somewhere between the pass rates for 2023 Session One and Session Two while we are expecting the pass rates for Writing and Numeracy to decrease.

Appendix

The following tables show output for the model

$$Pass\ Rate_i = \beta_0 + \beta_1\ Gender_{i} + \beta_{2,j}\ Ethnicity_j + \beta_{3,k}\ Year\ Level_k + \beta_{4,l}\ Region_l + \beta_{5,m}\ EQI_m + \epsilon_i$$

for each English Medium standard.

The significance column has a * if it is statistically significant at the level of $p < 0.05$.

Table 1 – Reading Output

Coefficient	Estimate	Standard Error	Significance
Intercept	0.50902	0.02232	*
Gender			
Male	0.00000	-	-
Female	0.05447	0.01402	*
Ethnicity			
European	0.00000	-	-
Asian	-0.13631	0.02062	*
Maori	-0.16891	0.01965	*
Pacific	-0.27052	0.02271	*

Coefficient	Estimate	Standard Error	Significance
Other	-0.06811	0.02753	*
Year Group			
Year 10	0.00000	-	-
Below Year 10	-0.05671	0.02659	*
Above Year 10	-0.05005	0.01666	*
Region			
North Island	0.00000	-	-
South Island	-0.04821	0.01578	*
Pacific Islands	-0.31439	0.05796	*
Equity Index Group			
More	0.00000	-	-
Moderate	0.15539	0.01902	*
Fewer	0.27625	0.02057	*
Unassigned	0.36230	0.02695	*

The model has an Adjusted-R2 = 0.7122 which indicates that 71.22% of the variability in student scores is explained by the model.

Table 2 – Writing Output

Coefficient	Estimate	Standard Error	Significance
Intercept	0.348513	0.024107	*
Gender			
Male	0.000000	-	-
Female	0.141046	0.015153	*
Ethnicity			
European	0.000000	-	-
Asian	-0.043664	0.022653	
Maori	-0.117066	0.021393	*
Pacific	-0.118136	0.023956	*
Other	-0.003547	0.029785	
Year Group			
Year 10	0.000000	-	-
Below Year 10	-0.089695	0.030521	*
Above Year 10	-0.041682	0.017237	
Region			
North Island	0.000000	-	-
South Island	-0.027614	0.016926	
Pacific Islands	-0.163323	0.062147	*
Equity Index Group			
More	0.000000	-	-
Moderate	0.160521	0.020715	*
Fewer	0.289493	0.022021	*
Unassigned	0.307841	0.028944	*

The model has an Adjusted-R2 = 0.6489 which indicates that 64.89% of the variability in student scores is explained by the model.

Table 3 – Numeracy Output

| Coefficient	Estimate	Standard Error	Significance
Intercept	0.458791	0.020473	*
Gender			
Male	0.000000	-	-
Female	-0.063155	0.012775	*
Ethnicity			
European	0.000000	-	-
Asian	0.019543	0.018423	
Maori	-0.175938	0.018305	*
Pacific	-0.271316	0.020016	*
Other	-0.098241	0.025399	*
Year Group			
Year 10	0.000000	-	-
Below Year 10	0.007657	0.019463	
Above Year 10	-0.109624	0.015152	*
Region			
North Island	0.000000	-	-
South Island	-0.029712	0.014261	*
Pacific Islands	-0.326250	0.055932	*
Equity Index Group			
More	0.000000	-	-
Moderate	0.140254	0.017921	*
Fewer	0.286879	0.018977	*
Unassigned	0.422676	0.024227	*

The model has an Adjusted-R^2 = 0.7837 which indicates that 78.37% of the variability in student scores is explained by the model.

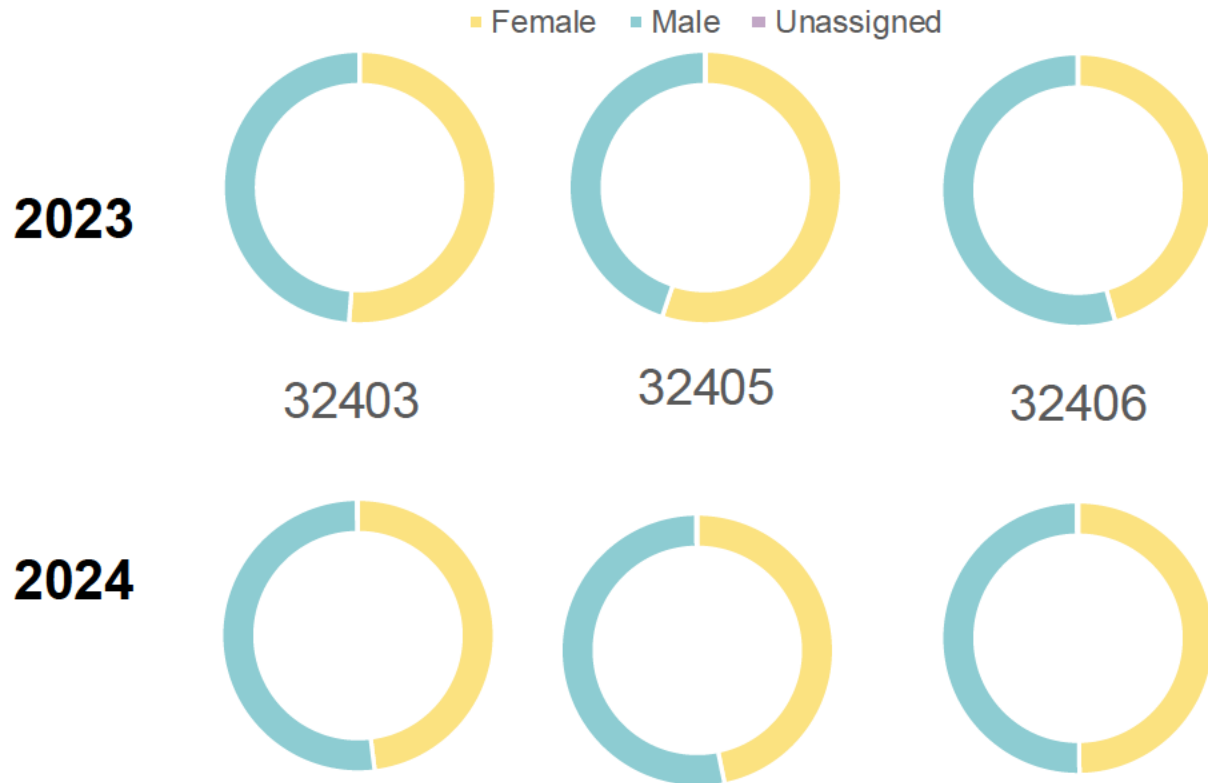# Predicting 2024 Literacy and Numeracy English Medium Pass Rates

Cohorts in 2023 and 2024
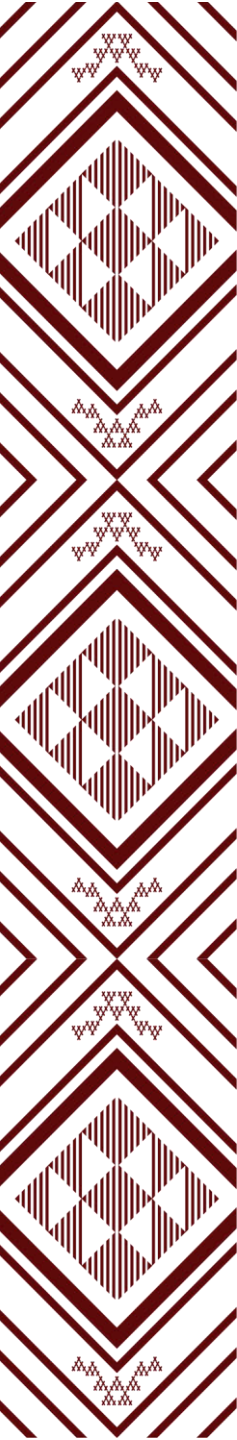
Gender

2023

	32403	32405	32406
Female	16,573 (51%)	16,030 (55%)	14,550 (46%)
Male	15,762 (49%)	13,043 (45%)	17,355 (54%)
Unassigned	1 (0%)	2 (0%)	3 (0%)

2024

	32403	32405	32406
Female	25,652 (48%)	23,689 (47%)	27,080 (50%)
Male	27,695 (52%)	26,896 (53%)	27,202 (50%)
Unassigned	49 (0%)	49 (0%)	56 (0%)

Ethnicity

2023
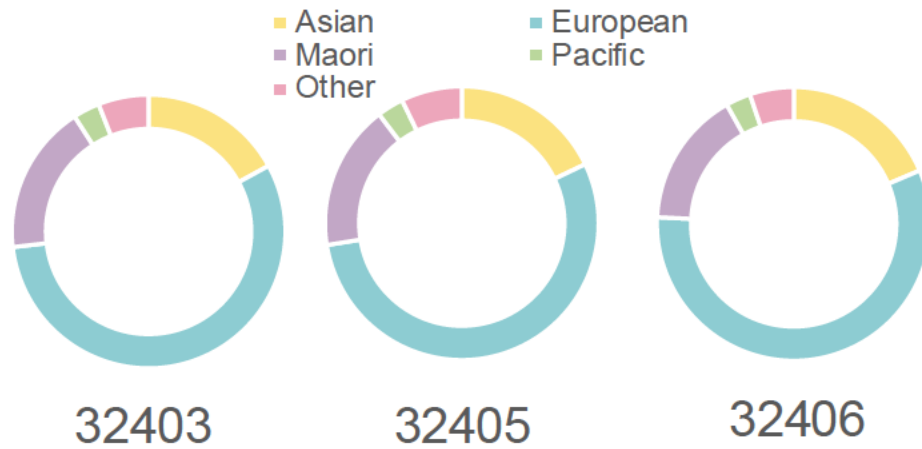
	32403	32405	32406
Asian	5,505 (17%)	5,204 (18%)	5,938 (19%)
European	18,147 (56%)	15,848 (55%)	18,234 (57%)
Māori	5,729 (18%)	5,004 (17%)	5,125 (16%)
Pacific	1,016 (3%)	912 (3%)	940 (3%)
Other	1,925 (6%)	2,092 (7%)	1,657 (5%)

2024
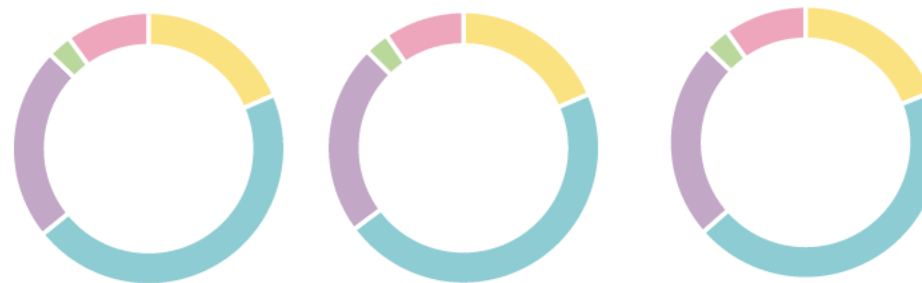
	32403	32405	32406
Asian	9,922 (19%)	9,399 (19%)	10,303 (19%)
European	24,355 (46%)	23,421 (46%)	24,228 (45%)
Māori	12,261 (23%)	11,509 (23%)	12,823 (24%)
Pacific	1,549 (3%)	1,475 (3%)	1,650 (3%)
Other	5,309 (10%)	4,830 (10%)	5,334 (10%)

Year Level

Below Year 10 ■ **Year 10** ■ **Above Year 10**
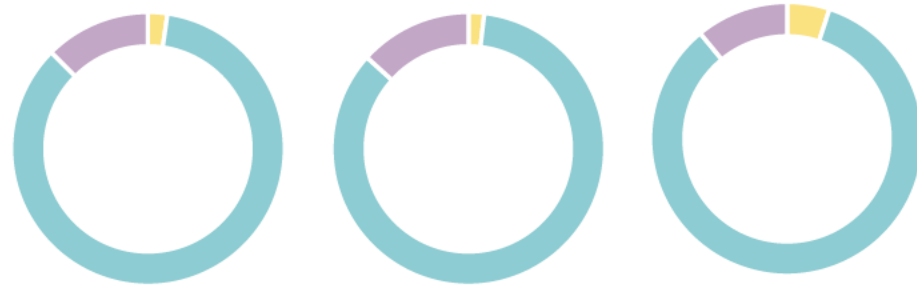
2023

	32403	32405	32406
Below Y10	742 (2%)	545 (2%)	1,609 (5%)
Year 10	27,553 (85%)	24,659 (85%)	26,805 (84%)
Above Y10	4,041 (12%)	3,871 (13%)	3,493 (11%)

32403   32405   32406

2024

	32403	32405	32406
Below Y10	752 (1%)	521 (1%)	1,315 (2%)
Year 10	29,957 (56%)	26,128 (52%)	29,435 (54%)
Above Y10	22,687 (42%)	23,985 (47%)	23,588 (43%)

Region

Legend: North Island, South Island, Pacific Islands

2023

	32403	32405	32406
North Island	23,655 (75%)	21,452 (74%)	22,929 (72%)
South Island	8,585 (25%)	7,512 (26%)	8,902 (28%)
Pacific Islands	96 (0%)	111 (0%)	77 (0%)

2024

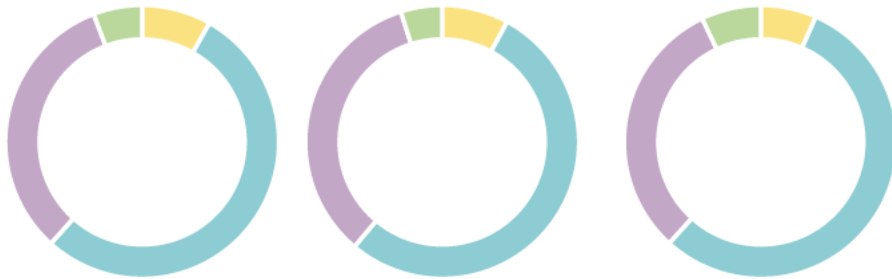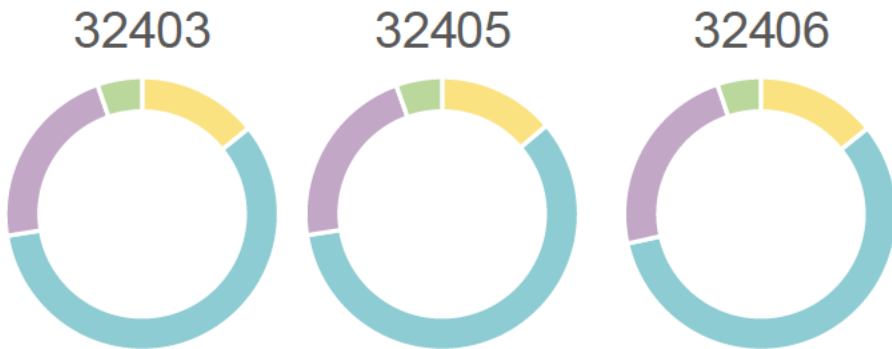|	32403	32405	32406
North Island	40,830 (76%)	39,091 (77%)	42,137 (78%)
South Island	12,378 (23%)	11,370 (22%)	12,013 (22%)
Pacific Islands	188 (0%)	173 (0%)	188 (0%)

Equity Index

Legend: ■ More ■ Moderate ■ Fewer ■ Unassigned

2023

2024

32403 32405 32406

	32403	32405	32406
More	2,656 (8%)	2,295 (8%)	2,102 (7%)
Moderate	17,282 (53%)	15,471 (53%)	17,591 (55%)
Fewer	10,531 (33%)	9,887 (34%)	9,963 (31%)
Unassigned	1,867 (6%)	1,422 (5%)	2,252 (7%)

	32403	32405	32406
More	7,594 (14%)	6,998 (14%)	7,735 (14%)
Moderate	31,089 (58%)	29,722 (59%)	31,133 (57%)
Fewer	11,887 (22%)	11,149 (22%)	12,668 (23%)
Unassigned	2,826 (5%)	2,765 (5%)	2,802 (5%)

Model
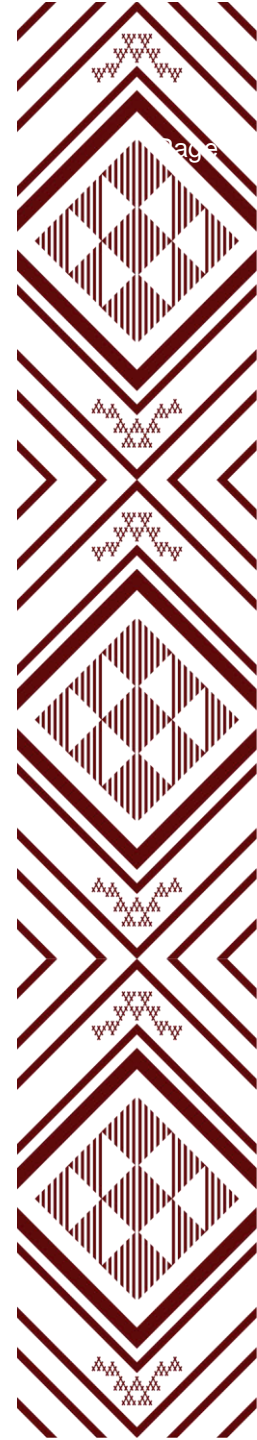
$$\text{Pass Rate}_i = \beta_0 + \beta_1 \text{Gender}_i + \beta_{2,j} \text{Ethnicity}_j + \beta_{3,k} \text{Year Level}_k + \beta_{4,l} \text{Region}_l + \beta_{5,m} \text{EQI}_m + \epsilon_i$$

where

Pass Rate_i is the proportion of students with the given characteristics that passed.

Gender_i is value β_1 for female and 0 for male

Ethnicity_j is value $\beta_{2,j}$ for the jth ethnicity A, M, P, or O, with 0 for E (European).

Year Level_k is value $\beta_{3,k}$ for the kth year level group, with 0 for "Year 10".

Region_l is value $\beta_{4,l}$ for the lth region South Island or Pacific Islands, with 0 for the North Island.

EQI_m is value $\beta_{5,m}$ for the mth EQI Group Fewer, Moderate, or Unassigned, with 0 for More.

ϵ_i is the residual term of the ith group of characteristics.

Each distinct combination of variable then had their pass rate calculated. This was applied to the number of students in each cohort to estimate an overall pass rate.
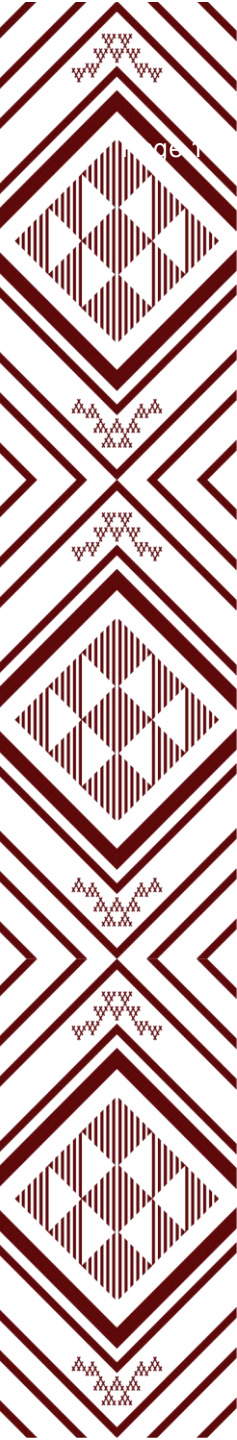
Predicted Pass Rates
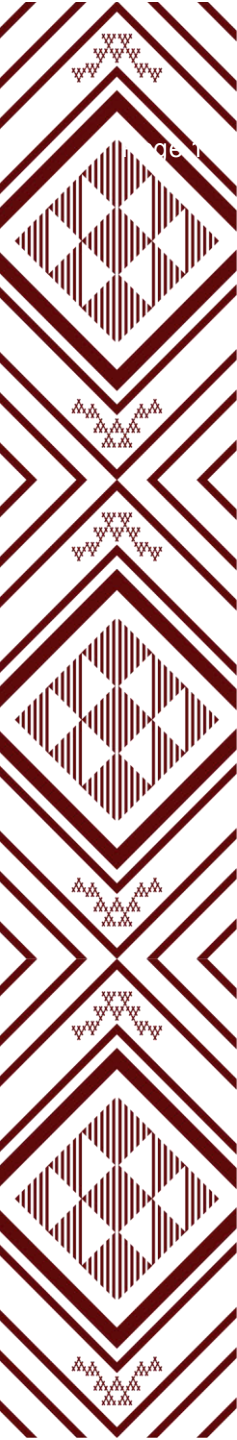
- The estimated pass rate for Literacy Reading is 60% with a 90% confidence interval of [44,77]. We are 90% confident that the pass rate for Reading will be between 44% and 77%, estimating it will be 60%.

- The estimated pass rate for Literacy Writing is 52% with a 90% confidence interval of [34,70]. We are 90% confident that the pass rate for Writing will be between 34% and 70%, estimating it will be 52%.

- The estimated pass rate for Numeracy is 47% with a 90% confidence interval of [31,64]. We are 90% confident that the pass rate for Numeracy will be between 31% and 64%, estimating it will be 47%.

- The predictors contributing to a predicted pass rate are gender, ethnicity, region, age group, and EQI.

- The biggest influence on a student's pass rate for any English Medium Literacy or Numeracy exam is the Equity Index of their school.

Note that these predicted pass rates are based on many assumptions eg. students in a given cohort will perform the same as they did in the past.

Comparison with History

	2023 Session One		2023 Session Two		2024 Session One	
	Participating	Achieved (%)	Participating	Achieved (%)	Participating	*Estimated* Achieved (%)
Reading	28,403	64.6%	30,486	57.3%	53,396	60.4%
Writing	26,551	56.4%	31,783	54.7%	50,634	52.4%
Numeracy	33,168	56.1%	35,143	50.6%	54,338	47.0%

Kia ora
Thank you

www.nzqa.govt.nz

NZQA | Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority