

# **Independent Review into the Victorian Curriculum and Assessment Authority's Examination-Setting Policies, Processes and Procedures for the Victorian Certificate of Education**

**Report to the Secretary of the Victorian Department of Education**

**March 2024**

## **Executive Summary**

13 March 2024

Dear Secretary

On behalf of the members of the expert panel – myself, Ms Juliette Mendelovits and Mr Menchi Schneier – I am pleased to provide you with the final report from the Independent Review into the Victorian Curriculum and Assessment Authority’s (VCAA) examination-setting policies, processes and procedures for the Victorian Certification of Education (VCE) examinations.

The expert panel (the Panel) conducted its review from 8 December 2023 until 12 March 2024.

It undertook 42 detailed consultations with key officials from the VCAA (including Chairs and members of VCE examination-setting panels of Mathematics and Chemistry, and staff involved in the administration of the VCE examinations), the Department of Education (the Department), staff from the Queensland Curriculum and Assessment Authority and the NSW Education Standards Authority, and representatives from Mathematics and Chemistry faculties from multiple Victorian universities. It also consulted with representatives from the Victorian Catholic Education Authority and Independent Schools Victoria.

To assist in its considerations, the Panel also drew on the expertise of independent Mathematics experts from other universities and credible educational organisations.

The Panel would also like to recognise the cooperation and commitment of staff and executives from the VCAA.

I would like to thank my fellow Panel members for their commitment to the review task.

I would also like to recognise the Secretariat support provided by Nous Group.

Your sincerely

Dr John Bennett AM  
Chair, Independent Review Panel

## Introduction

---

The Victorian Certificate of Education (VCE) is a world-recognised senior secondary school credential. The Victorian Curriculum and Assessment Authority (VCAA) is responsible for the development of the curriculum and assessment requirements for the VCE.

The VCAA develops and administers over 160 examinations to more than 80,000 students in approximately 630 examination centres in Victoria. The examinations include written examinations and oral and performance examinations held during October and November each year. In addition, the VCAA develops a separate suite of 14 examinations in VCE subjects that are sat by students attending schools operating under the northern hemisphere school timetable.

In response to several issues emerging around the 2023 VCE examinations, the Secretary of the Department of Education (the Department) initiated an Independent Review (the Review) of the VCAA's VCE examination-setting policies, processes and procedures, with a focus on Mathematics, Chemistry and the incorrect distribution of copies of the Chinese Second Language examination.

The specific issues were as follows:

- An open letter signed by 73 university mathematicians presenting a critique of the 2022 VCE Mathematics examinations including 5 alleged 'major' mathematical errors, which coincided with similar concerns being expressed about alleged errors in the 2023 Mathematics examination papers.
- An error in one of the questions in the 2023 VCE Chemistry examination paper.
- At 2 schools (examination centres), students were incorrectly given the VCE Chinese Second Language examination paper instead of the Chinese Second Language Advanced examination paper.

## Approach

---

The Secretary appointed an independent expert panel (the Panel) to the Review, with 3 broad Terms of Reference including:

1. Content of the questions in the Mathematics and Chemistry examination papers.
2. Editorial review of the questions in the Mathematics and Chemistry examination papers.
3. Process for the distribution of examination papers to ensure students received the correct examination in subjects where there are multiple examination papers for different levels of study.

The Panel was chaired by Dr John Bennett AM, former Chief Executive Officer (CEO) of the New South Wales Office of the Board of Studies, now known as the NSW Education Standards Authority. The other members of the Panel were Ms Juliette Mendelovits, a quality assurance expert from the Australian Council for Educational Research, and Mr Menchi Schneier, a partner from Ernst and Young. Nous Group was commissioned to provide Secretariat support to the Review.

The Review began on 8 December 2023 and concluded on 12 March 2024. In this time the Panel undertook over 40 consultations as outlined in Table 1.

Table 1: Individuals and groups interviewed by the Independent Panel

VCAA staff	<ul style="list-style-type: none"> <li>• Acting and substantive Chief Executive Officer (CEO)</li> <li>• Executive Director, Curriculum Division</li> <li>• Executive Director, Assessment &amp; Reporting Division</li> <li>• Directors of Curriculum and Enrolment, Assessment and Results</li> <li>• Acting and former Examinations Unit Managers</li> <li>• Assessment Operations Unit Manager</li> <li>• Curriculum Managers for Mathematics and Chemistry</li> <li>• Examination Development Managers for Mathematics and Chemistry examinations</li> <li>• Production Coordinator</li> <li>• Desktop Publishing Manager</li> </ul>
Examination Development Panel Chairs and Reviewers	<ul style="list-style-type: none"> <li>• Panel Chairs for Mathematical Methods and Specialist Mathematics</li> <li>• Study Specialist Reviewers for Chemistry, Mathematical Methods and Specialist Mathematics (2023 and future)</li> </ul>
Examination Supervisors	<ul style="list-style-type: none"> <li>• Chief Supervisors of VCE examinations for schools with students enrolled in both Chinese Second Language and Chinese Second Language Advanced</li> </ul>
University academics	<ul style="list-style-type: none"> <li>• Representatives from the Mathematics faculty at Monash University, the University of Melbourne and Australian Catholic University</li> <li>• Representatives from the Chemistry faculty of Monash University and the University of Melbourne</li> </ul>
Interstate curriculum and assessment bodies	<ul style="list-style-type: none"> <li>• New South Wales Education Standards Authority – examination development, distribution, and administration supervisors</li> <li>• Queensland Curriculum and Assessment Authority – examination development, distribution, and administration supervisors</li> </ul>
School system representatives	<ul style="list-style-type: none"> <li>• Independent Schools Victoria</li> <li>• Victorian Catholic Education Authority</li> <li>• Diocese of Ballarat Catholic Education</li> </ul>
Department of Education staff	<ul style="list-style-type: none"> <li>• Deputy Secretary, School Education Programs and Support</li> <li>• Deputy Secretary, Schools and Regional Services</li> <li>• Deputy Secretary, People and Executive Services</li> </ul>

The Panel considered numerous published and in-confidence documents related to the policies, processes and procedures for VCE examinations, as well as in-confidence documents and records specific to the setting and production of the 2023 VCE examinations for Mathematics and Chemistry.

The Panel also engaged 7 independent Mathematics experts including university academics from interstate, past chairs of VCE Mathematics setting panels, and professional educational assessment experts specialising in Mathematics, to provide advice on issues arising from the 2022 and 2023 VCE Mathematics examinations.

The Panel is grateful for the support it received from the staff of the VCAA who provided explanations and materials to assist the Panel to better understand its policies, processes and procedures as they related to the Review.

Other individuals and groups the Panel interviewed were also very helpful in sharing their thoughts and experiences. These included Examination Development Panel members,<sup>1</sup> Chief Supervisors and those critical of aspects of the VCE Mathematics examinations.

The Panel is also grateful to staff from the Queensland Curriculum and Assessment Authority (QCAA) and the New South Wales Education Standards Authority (NESA) for providing materials and commentary about their processes and procedures in the matters being reviewed.

## Findings

---

The annual VCE examinations process represents a comprehensive and challenging program of curriculum-based assessment, involving multiple processes over many months and relying on dedicated people with a wide range of knowledge and skills.

The Panel has concluded that, overall, the VCAA has comprehensive policies, processes and procedures for developing, reviewing, distributing and administering these external examinations.

However, there is a need for the VCAA to review and strengthen some of these policies, processes and procedures, including consistency in practice, to improve the VCAA's quality assurance settings and to ensure it maintains the integrity of the external examinations system. This applies particularly to Mathematics.

## Mathematics

The VCAA has acknowledged the discovery of 4 clear errors in the final 2023 Mathematics examination papers (one in each of the 2 General Mathematics papers, one in a Mathematical Methods paper and one in a Specialist Mathematics paper). These 4 errors were dealt with in the administration of the examination papers and/or in their scoring. The Panel found that the actions taken by the VCAA in dealing with the impacts of these issues on students appear to be appropriate under the circumstances and are similar to what other comparable Australian jurisdictions would do.

However, concerns have been expressed by Mathematics academics that many other questions in the Mathematics papers were flawed. To investigate the validity of these criticisms, the Panel has relied on the analysis of 7 highly qualified experts to examine issues with the 2022 and 2023 Mathematics examinations.

In this context, it is worth noting that a common experience in test development is that, when a question is initially submitted for review to a panel of experts, flaws – or at least points for

---

<sup>1</sup> In its *2023 VCE Examination Development Manual*, the VCAA states that 'an examination development panel consists of the writing team and the reviewers appointed to review the examination. All are involved in the development of the examination.' The examination development panel comprises the Panel Chair, Panel Members, the Study Specialist Reviewers, the Examination Sitter Reviewer, and the English as an Additional Language Reviewer.

improvement – will very often be found. The development of Mathematics examinations needs to take into account several factors, amongst them:

- The Study Design specifications.
- The technical correctness (or perhaps better, acceptability) of the mathematical phrasing and layout of the questions.
- The level of mathematical proficiency that can reasonably be expected from the students.

Balancing these 3 factors is challenging, and the Panel found that in the case of some questions in the 2022 and 2023 VCE Mathematics examinations, mathematical precision and ‘correctness’ have been given a lower priority in the interests of accessibility for test takers.

Regarding the 2023 examinations, concerns had been expressed by Mathematics academics and others around 19 questions. The independent Mathematics experts engaged by the Panel found that:

- Of the 5 questions of concern in the General Mathematics papers, all 5 were found to be poorly worded and could have been improved. Two questions had more than one answer and another had an error in the question, which was acknowledged and dealt with by the VCAA.
- Of the 14 questions of concern from the Mathematical Methods and Specialist Mathematics examination papers, 3 were found to be acceptable by all 7 independent experts. However, of the remaining 11 questions, at least 5 of the experts (and in some instances 6 or 7) found the questions to be poorly worded or to use poor terminology; not to be aligned with the Study Design (regarding a term used in 2 of the questions); or, in the case of one question, to have a wrongly labelled graph, which was acknowledged and dealt with by the VCAA.

Regarding the 2022 examinations, concerns had been expressed by a significant number of Mathematics academics around 5 questions in particular, which they described as ‘unacceptably flawed’. These 5 questions were also identified as containing errors by all or all but one of the independent Mathematics experts engaged by the Panel.

Inspection of the archived documentation for Specialist Mathematics and Mathematical Methods in 2022 and 2023 indicates that the processes documented by the VCAA were generally followed, though not always rigorously.

In most cases, the errors identified in the Mathematics papers were present from the earliest drafts. These were not detected in any of the multiple opportunities for review and revision that were undertaken.

While it is important that experienced and fully qualified teachers are members of Examination Development Panels, it is just as critical that suitable academic specialists are also included. The VCAA has recognised this to a degree, but the Panel found that there is scope for a greater representation of Mathematics academics on Examination Development Panels, both as Panel Members (i.e. question writers) and as Study Specialist Reviewers.

The VCAA has positive, professional relationships with some Mathematics academics who provide sound and constructive support to a variety of projects, including the development of VCE examinations. There is, however, considerable potential for expanding this network and engaging with a much wider group.

## Chemistry

An error was discovered in Section B Question 1(a) of the VCE Chemistry paper whilst the examination was underway. A table containing the information students needed to answer this question (about the composition of coconut oil) contained an incorrect chemical formula for linoleic acid. Instead of listing the chemical formula for linoleic acid, it gave the chemical formula for linolenic acid.

The Panel found that the error had appeared in the initial draft of the examination question and that this was not detected by the subsequent quality assurance and review processes.

The Panel observed that the composition of the Examination Development Panel for Chemistry appears to be well-balanced in terms of its members' background and experience. It has a mixture of specialist academics and teachers from both the government and non-government sectors.

The Panel is not aware of any other issues that have occurred in VCE Chemistry examinations papers in recent years.

## Chinese Second Language

Students at 2 different schools enrolled in the Chinese Second Language Advanced course were instead given the written examination paper for the Chinese Second Language course. The students completed this examination paper and it was only after the examination was completed that it was discovered that they had been given the incorrect paper.

The Panel found that the incorrect distribution of the examination paper at 2 centres was a result of local administrative errors in adhering to VCAA policies, processes and procedures.

After reviewing documentation related to the packing and delivery of examination papers to schools, the Panel was satisfied that the VCAA has appropriate processes and procedures to ensure that schools receive the examination papers and other materials that they need, and that when schools receive the papers they have the appropriate guidance to ensure that they are stored securely until they are needed.

Having noted the above, the Panel has identified refinements that could further assist in reducing the likelihood of such errors occurring at examination centres in future.

## Transparency and handling of errors

During the consultations there were criticisms from Mathematics academics and others that the VCAA was on occasion slow in the public release of the Mathematics examination materials and reports, and that queries and complaints were not addressed or satisfactorily answered in a timely manner.

The Panel acknowledges that in large-scale credentialling programs like the VCE, despite the best efforts of staff, it can sometimes take considerable time to properly investigate issues and respond to the correspondent. In addition, there are matters that, in order to maintain the integrity of the credential, must remain confidential.

Nevertheless, when reviewing the timeliness of publication of materials, including comparisons against other states, the Panel identified opportunities for the VCAA to publish documentation earlier. The Panel also believes that there are measures that the VCAA can take to deal more effectively with issues when they are raised, and give all stakeholders confidence that any problems that arise will be dealt with appropriately.

The Panel understands that the VCAA has held some internal discussions to identify where errors might have occurred with the 2023 Mathematics, Chemistry and Chinese Second Language examinations and what actions it could take in the future to prevent such an issue arising again. The Panel acknowledges this positive step.

## Recommendations

---

The Panel has made 6 high-level recommendations, each with associated actions.

The Panel believes that this set of recommendations, if implemented effectively by the VCAA, should address the issues encountered in the 2023 Mathematics, Chemistry and Chinese Second Language examinations.

The VCAA should commence implementation of these recommendations immediately to ensure that the VCE examination processes demonstrate the appropriate quality and rigour in 2024 and beyond.

The recommendations are made in the context of addressing the issues identified related to Mathematics, Chemistry and Chinese Second Language. However, the VCAA should consider applying the learnings and insights to other study areas, where applicable.

### **1. The VCAA should increase the representation of suitably qualified academics on the Mathematics Examination Development Panels<sup>2</sup> including by:**

- a. Establishing stronger partnerships with Mathematics faculties at Victorian universities to encourage the participation of suitably qualified Mathematics academics in Examination Development Panels.
- b. Updating the advice on the VCAA website to ensure that it is clear that academics are an important cohort for inclusion in Mathematics Examination Development Panels.
- c. Introducing a required minimum number of academics into the Mathematics Examination Development Panels as follows:
  - i. For the 2024 examinations, include 2 Mathematics academics as additional Study Specialist Reviewers for Mathematical Methods and Specialist Mathematics, and one Mathematics academic as an additional Study Specialist Reviewer for General Mathematics.
  - ii. For the 2025 examinations and beyond, include in each of the Mathematics Examination Development Panels:
    - (a) 2 suitable Mathematics academics as question writers for the examination.
    - (b) 2 suitable Mathematics academics as Study Specialist Reviewers for each of Mathematical Methods and Specialist Mathematics and one for General Mathematics.

---

<sup>2</sup> The 3 Mathematics examination panels referred to here and throughout the recommendations are: General Mathematics, Mathematical Methods and Specialist Mathematics. It does not include Foundation Mathematics, which was introduced in 2023.



- 2. The VCAA should strengthen the examination-setting process and construction of the Mathematics examination papers to ensure they are of sufficient rigour and quality, including by:**
  - a. Requiring that all members of Mathematics Examination Development Panels participate in a training session outlining best practice in the design of Mathematics examination questions, including that they should be constructed using the appropriate symbols, conventions and the 'language of Mathematics'; and that efforts to make questions more accessible to students must not distort their mathematical integrity.
  - b. Simplifying the development of examinations for the 3 Mathematics Study Designs by requiring multiple-choice questions in all examination papers to have only 4 options instead of 5, to bring them into line with the examinations in all other VCE Study Designs and examinations conducted by other comparable Australian jurisdictions.
- 3. The VCAA should strengthen the examination review processes for Mathematics and Chemistry including by:**
  - a. Strengthening the guidance for the VCAA Examination Development Manager in convening the initial meetings for each of the Mathematics and Chemistry Examination Development Panels to ensure everyone is fully aware of their role and responsibilities in relation to the review and checking of materials, and the procedures they need to follow. This should include a reflection on learnings from the prior year's examinations process based on the report from the Chief Assessor.
  - b. Introducing an additional Study Specialist Review of the 'print-ready' examination papers for each of Mathematical Methods, Specialist Mathematics and Chemistry by an academic who has not been involved in the development of the examination.
  - c. Requiring that the reports of the Subject Specialist Reviewers, Examination Sitter Reviewers and the English as an Additional Language Reviewer are considered at a joint meeting of the full Examination Development Panel – as well as the relevant VCAA staff – to endorse the final examination paper(s).
  - d. Refining the current process as required, to ensure that all reviewers – Subject Specialist Reviewers, Examination Sitter Reviewers, and English as an Additional Language Reviewers – receive feedback on how the matters included in their reports were considered and addressed.
  - e. Requiring that wherever possible, once the examination paper has been assembled, meetings of the Examination Development Panels and the review processes occur face-to-face within the VCAA's secure offices.
  - f. Improving the records management protocols and practices associated with the reviews of the examinations.
- 4. The VCAA should update its training of and guidance to the in-house Editors and Desktop Publishers involved in the Mathematics and Chemistry examinations as follows:**
  - a. Ensure staff responsible for editing and desktop publishing of Mathematics and Chemistry examinations papers have relevant training in formatting Mathematics and Chemistry questions, including diagrams, graphs, formulae and other stimulus material.
  - b. Ensure there is clear guidance for Editors and Desktop Publishers such that, if they believe an amendment is required, it is marked up and submitted for the Panel Chair's approval.

- c. Ensure that after amendments are made by an Editor or Desktop Publisher a new version of the examination paper is printed and checked by the Panel Chair to see that the amendments have been made correctly and no other flaw introduced.
- 5. The VCAA should update its guidance for staff at examination centres to reduce the possibility that students could receive the incorrect examination paper, as follows:**
- a. Amend the standard script of the instructions given to students before an examination session begins to ensure it includes appropriate checks that the students have been given the correct examination paper.
  - b. Require an orientation meeting to be held involving the Chief Supervisor, all Supervisors and the VCE Coordinator at each examination centre before the first examination is held.
  - c. Develop training materials and guidance for staff at examination centres covering the key actions needed from the time examination papers are delivered to an examination centre to the conclusion of an examination, and discuss this material at the orientation meeting referred to in Recommendation 5b.
- 6. The VCAA should publish examination material in a more timely manner and update its policies and processes relating to the management of errors and alleged errors as follows:**
- a. Tighten publication timelines for examination documentation to more closely align with other comparable Australian jurisdictions as follows:
    - i. Publish the VCE Mathematics examination paper on the VCAA website within 5 days of a paper being sat.
    - ii. Publish the final version of the Marking Guide used to assess students' performance on the VCAA website within 5 days of the end of the marking of each Mathematics examination.
    - iii. Publish the report prepared by the Chief Assessor on the VCAA website before the end of January the following year.
  - b. Require Panel Chairs to meet with the Chief Assessors and other senior Assessors during the Assessment operation to provide advice and obtain feedback.
  - c. Update the VCAA's documented policies, processes and procedures to articulate its approach to responding to an issue raised in relation to an examination by a member of the community.
  - d. Provide annual training to relevant VCAA staff to ensure they are aware of the documented policies, processes and procedures applying in the case of an issue being identified in an examination paper, including determining and explaining how the issue will be addressed to ensure students are not disadvantaged.
  - e. Provide a report to the VCAA Board each year regarding the performance of the annual examination series, including reporting any issues that arose, explaining how they were managed and outlining the steps to be taken to reduce the likelihood of such issues occurring in the future.