EDUCATION AND INNOVATION COMMITTEE

Members present:

Mrs RN Menkens MP (Chair)
Mr SA Bennett MP
Mr MA Boothman MP
Mr MR Latter MP
Mrs DC Scott MP
Mr NA Symes MP

Staff present:

Ms B Watson (Research Director)
Mr G Thomson (Principal Research Officer)

PUBLIC HEARING—INQUIRY INTO ASSESSMENT OF SENIOR MATHEMATICS, CHEMISTRY AND PHYSICS IN QUEENSLAND SCHOOLS

TRANSCRIPT OF PROCEEDINGS

WEDNESDAY, 5 JUNE 2013

Brisbane

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Committee met at 10.32 am

CHAIR: Good morning. I would like to introduce the members of the Education and Innovation Committee. I am Rosemary Menkens, the member for Burdekin and chair of this committee. With me are the committee members: Mr Mark Boothman, the member for Albert; Mr Steve Bennett, the member for Burnett; Mrs Desley Scott, the member for Woodridge and the deputy chair of the committee; Mr Michael Latter, the member for Waterford; and Mr Neil Symes, the member for Lytton. Today's hearing is being recorded and will be transcribed by Hansard for future publication on the committee's webpage. It is also being webcast live and the video will be available on the committee's webpage until it is superseded by a subsequent webcast recording.

On 14 February 2013 the Queensland parliament directed the Education and Innovation Committee to inquire into and report on the assessment methods used in senior mathematics, chemistry and physics in Queensland schools. The terms of reference for the inquiry are available on the committee's inquiry webpage. Written submissions to this inquiry have now closed. A large number of submissions were received, reflecting a very high level of interest in the topic and representing strong views on a range of different aspects of the current methods of assessment.

Stakeholder submissions are an important source of information for the committee's inquiry. Indeed, providing a forum for broad public input to the democratic process is a key benefit of this issue being considered in a parliamentary rather than another form of inquiry. However, the information we hear from written and oral submissions during this inquiry is not the only information that will inform recommendations the committee might make back to the parliament. The committee is conducting its own research into the issues, assessing data from a very wide range of sources.

Today's hearing is the second of three scheduled hearings. The third hearing will now be held on 10 July at the Sunshine Coast. Further details of this hearing will be published on our webpage later this week.

Importantly I must advise you that parliamentary privilege applies to all committee operations, including this briefing. On the other hand, to mislead the parliament, including this committee proceeding, is a serious offence. If a witness is unable or unwilling to provide an answer to any questions the committee might ask, he or she should advise me accordingly, giving reasons. We will certainly consider the reasons and provide ample opportunity for a witness to seek any advice or assistance needed. Witnesses might also wish to take questions on notice if you do not have that information at hand. As well, you may request that any material you provide be kept private and, again, the committee will consider that request. Some witnesses might wish to table further material for the committee to consider. If you wish to do so, you will need to seek the leave of the committee and we will determine whether it is accepted.

We are on a very strict timetable today, with several witnesses appearing later this morning via teleconference in between flights and other commitments. So I aim to hold firmly to the allocated times. For the benefit of Hansard, I ask that those speaking state their name the first time they speak.

BAILEY, Mrs Anita, Australian Family Association

HARVEY, Mrs Tempe, Australian Family Association

CHAIR: This morning I welcome representatives from the Australian Family Association: Mrs Tempe Harvey and Mrs Anita Bailey. Thank you both for coming this morning. Would one of you like to start the briefing? Mrs Bailey, would you like to make a three-minute opening statement?

Mrs Bailey: May I please table this document?

CHAIR: Please begin your three-minute presentation and we will decide whether the committee accepts the document in a moment.

Mrs Bailey: I am Anita Bailey. I am a teacher, a qualified dentist and a science researcher with international publications, and I am also a parent who represents the views of many parents and teachers. I have taught children in public and private schools, including students of refugee and

Indigenous background, and I can say that this system is stopping students from reaching their full potential. I also wish to say that I do not need more workshopping to understand the system. I will now show you how the QSA system has forced teachers to mark in invalid and unreliable ways in the classroom.

CHAIR: Does the committee wish to accept the document as tabled? There being no objection, it is so ordered.

Mrs Bailey: Firstly, page 1 shows the QSA's marking grid for a physics assignment. The QSA did not tell you in parliament the full story. It forces us to mark students in a nonsensical way using letters.

Please turn to page 2 now. The QSA talked about A and B students. The average student who gets about half the questions right should pass, shouldn't they? Well, page 2 is a photo that a student took of their test results. Notice how they can only get a maximum of C for their first three questions. That is because the QSA told us to block off the As and Bs. So, where the student got their answer fully correct, they only get a C and, where the student gets some of their workings correct, as you can see on page 2, they are given Ds. And parents might be telling their children, 'You should try harder. Why are you only getting Cs and Ds?' But it is not the child's fault and it is not the teacher's fault, either, that they cannot use normal marks.

The QSA said in parliament on 20 March that they have never stopped numerical marking, as if to imply that teachers should not be complaining about these marking schemes. However, please turn to page 3 now. This is a QSA publication which teachers must follow. It shows clearly a chemistry question and how we have to use a marking grid and block off the As and Bs. Now what does that mean for your average student? It means that the top mark that they can get is a C and, if they get this lovely chemistry question half right, they only get a D, which is actually a fail. The more Ds they get on their marking sheet, the more they fail.

Please turn to page 4. Furthermore, another way that the QSA blames teachers is, for example, when the director, Patrea Walton, said in parliament that it is the schools that are setting the superlong essays, not the QSA. Well, actually the QSA has presented in parliament a six-page physics essay which they implied was only 1,000 words long. Well, it is actually well over 2,000 words long and had calculation errors and data errors, yet it was given A gradings. And there are much longer assignments—even 6,000-word exemplars—posted online by the QSA itself.

Now we know that the QSA has the best intentions. It says that this is to help Queensland students become research scientists. But I have published science research and this is not helping them. Even though the student worked very hard to fulfil the criteria, this would be rejected in the real world as flawed science. It confirms what so many submissions are saying.

The system is not marking core knowledge or what is right and what is wrong. Even the QSA's own moderators can evidently make the mistake of giving A gradings to assignments that are 1,000 words over their own limits and which have errors in the data and the calculations, and that is a problem that an engineer Dr Meimaris, in submission No. 47, and a scientist, Carolyn Mcilvenny, in submission No. 132, described also. This is just a short example of how the system is extremely invalid and unreliable.

CHAIR: Thank you, Mrs Bailey. Mrs Harvey?

Mrs Harvey: Good morning and thank you for the opportunity to appear. My name is Tempe Harvey. I am a former practising solicitor and a research officer representing the Australian Family Association, submission No. 255.

The AFA is very concerned about the adverse effects of the Queensland Studies Authority's vague assessment methods on teachers and children. The QSA's marking system, using strings of alphabet letters, confuses children with poor feedback. You are probably aware of this but in an exam paper, say, if there are 20 questions, teachers are forced to give each one of them an A, B, C, D or E and then the teacher is forced to add those in some way to achieve a final mark.

Further, the QSA's back-to-back assessment is putting children under unbearable pressure to the point of nervous breakdowns. This is backed up by submission No. 208 of psychologist Anne D'Arcy-Evans. Submission No. 283 of Margaret McDonald, a psychologist and teacher, states it is urgent to stop the QSA's unethical assessment methods. Psychologists do have standards for assessment and they regard this one as unethical.

All students' future employment and career prospects are being affected by this assessment and its extremely poor outcomes. Unless this is urgently fixed, we believe more adolescent children will be harmed and great teachers will continue to leave the system. We know from the submissions and from conversations we have had with teachers that many are waiting to see whether they will

exit the system as a result of the outcome of this inquiry. They are just hanging on in their jobs. If it changes then they may carry on, but they are making exit plans. We totally reject the QSA's response and that of its supporters—mainly the education academics—that teachers need more workshops. No amount of training will fix this system.

Other states do not put their children through this. We can follow Western Australia's example. That state abandoned a very similar experiment just a few years ago and now they are doing well because they have adopted the rigorous assessment practices that now all other states, except Queensland, have. Other states do four things that we need to copy. Firstly, other states use numerical marking for right, wrong and partly correct answers. This is the fairest approach for students. Marks are like money for children. They want to get more. Without them, they simply lose interest. We believe numerical marking should be restored by the start of next year for all subjects and all grades, from prep to 12, not just for senior maths and science. This would not be a difficult thing to do.

The use of criteria paragraphs in marking maths and science exams should be abandoned. Teachers can swap their 73-page marking guide—and I will just hold this up; it is attached to Professor Ridd's submission: that is what they have to read to mark just one question on a QSA maths exam—with the New South Wales marking guide for their external exam. You can read just one paragraph in this and work out how to the mark the exam. That is also attached to Professor Ridd's submission No. 98.

Secondly, we must limit the proportion of assignment work to 10 per cent of overall assessment and a 500-word cap, and there should be no assignments at all, no English assignments at all in maths. The evidence is overwhelming that cheating is unable to be controlled even in classroom projects. The QSA maintains that logbooks can be used to trace this work. It just does not work. People are doing the assignments. Tutors are being paid. People are advertising on the internet in Chinese to do your assignments to any grade level you like, and I am hearing on very good evidence that they are clearing $800 a week to do this. This means that other children in low socioeconomic areas are being disadvantaged because their parents cannot afford to do this—not that I blame the parents. Furthermore, these de facto English essays assess very little maths or science and are a waste of valuable teaching time.

Thirdly, every state except Queensland has a 50-50 balance between their internal and external assessment. Every other state has their internal results scaled to and underpinned by state-wide external benchmark exams. Ideally Queensland should trial end-of-year-12 external exams by December 2015. That is for the cohort going into grade 11 next year. There is no reason we cannot do that for maths and science subjects, including biology and accounting. Queensland already has an external exam system, although the QSA I do not think has mentioned this to you. It should also be retained for distance education and schools like Hubbard's for wider use.

Fourthly, other states assess explicit detailed curriculum content of the kind that Queensland used to have in the early 1990s. I do not know if you realise, but if you have a look at the handout that you have there, the last page, you will see the top half of that page is an extract of the current Queensland syllabus which shows we have no mandated content in the physics syllabus. It is unbelievable, but QSA has taken the content out and it is merely suggested. Below you will see the syllabus that we used to have where you will see this explicit excellent mandated content. We need to go back to that system.

At the moment Queensland science and maths is like a car without an engine. That is what we have with the 2007 syllabuses we currently have. We must restore mandatory maths and science content to our syllabuses immediately. Teachers should also be given a clear work program with flexibility to make suitable changes for their school. At the moment the QSA makes them reinvent the wheel every time there is a change. It is just not good enough. Teachers need to be given support and then they can make improvements. The simplest way to achieve all of the above would be to give an instruction to teachers to use the previous syllabuses, the 1995 syllabuses for chemistry and physics and the 1992 syllabus for maths, subject to reduced assignment work as proposed.

CHAIR: Mrs Harvey, time is marching on.

Mrs Harvey: I will just finish by saying that we believe that the alternative is to borrow the New South Wales or Victorian syllabuses and that the QSA should be replaced with a new body. They have had their time. They have failed over and over and we need an excellent body with mathematicians and scientists and other experts in the areas that they are writing curricula for. Thank you.

CHAIR: Thank you to you both. Honourable members, do you have some questions? Questions were answered. You mentioned direct instruction from teachers. Do you believe that this does not occur: direct instruction in the classroom?

Mrs Harvey: The effect of the QSA continuous assessment system is that students spend a lot of time trying to teach themselves. The assignments are a classic example. They spend weeks and weeks in the classroom googling stuff for themselves, and the teachers are saying in many submissions that this is wasting time when the teachers could be teaching them. This is part of the flawed constructivist approach, the discovery learning, children teach themselves. It does not work. We need direct instruction and direct assessment. It works, and the *Australian* newspaper had a report on the improved NAPLAN results from schools in Queensland using just that system.

CHAIR: Thank you. I have another query. We notice you are speaking to the Australian Family Association's written inquiry. How do you feel that the terms of reference of this relate to the family or how would you describe that?

Mrs Harvey: As I said initially, these assessment methods are causing untold havoc in families, partly because of the continuous assessment. The children are not given upfront assessment combinations. They are not told, 'You are going to have a test worth 50 per cent at this time of the year, then you are going to have a 10 per cent assignment and then you are going to have a few short tests.' What is happening is they are forced to be assessed over and over and over again, week in and week out—I can attest to this as a parent—so that children come home every night zonked out, spend hours on the computer trying to teach themselves through these meaningless assignments and they learn very little, they are exhausted and depressed.

CHAIR: How do you think this balances against students who know that they have an end-of-year examination, their one-off chance, and the huge pressure—having been through them myself—they are put under? Do you feel that this is not pressure?

Mrs Harvey: It could not possibly be more pressure than the current system. We have students in every other state in Australia coping just fine with the system, in fact, as I think you may hear from Hubbard's, which does have 100 per cent external exams. We are not recommending that. It is only part of their assessment. Actually, the system we are recommending would free them of this endless assessment. They are not even told whether it counts. The stress on the students is unbelievable. Every single week they have something that may determine their future. Instead, just teach them. They will be confident going into the exam because they will actually have been taught.

CHAIR: Thank you very much, Mrs Bailey and Mrs Harvey. Thank you for your information you have given this morning. We do appreciate your time. Thank you.

STEVENS, Mrs Helen, Principal, Hubbard's School

CHAIR: Now I would like to welcome Mrs Helen Stevens from Hubbard's School. Hubbard's School offers an independent year 11 and 12 program for students wishing to complete senior schooling in one year in a non-traditional school environment and uses an external exam to assess the achievement. Thank you for coming along this morning, Mrs Stevens. Would you like to make a three-minute opening statement?

Mrs Stevens: Thank you very much. I would like to request permission to table these three documents.

CHAIR: If you would like to continue.

Mrs Stevens: Good morning, Chairperson Rosemary Menkens and committee members. Thank you for your time and attention today. With more than 82 per cent of submissions requesting urgent change, you must be wondering how to move forward. It is time to choose a better and proven pathway for assessment in maths and science and for all other year 11 and 12 subjects.

Queensland is out of step with every other well-ranking education system in the world. No country that has seriously considered adopting the Queensland system has adopted it in full. Even Finland, the original model for QSA and now the champion education system of Europe, uses marks, percentages and an external exam that counts for 100 per cent for university entry. The Fins use them because it has been proven over and over that external exams provide an effective and efficient means to get the best out of students and teachers. There is ample evidence for this. I draw your attention to this document here. With a quick look at the bar graph you can see how tall they are when they use external exams.

There is a mention of autonomy, so I indicate what that means. If you flick over towards the back of the document—I have chosen to leave the whole document together to give you an idea of how many surveys there are—and if you look on the right-hand-column results down towards about the second last page you will see highlighted areas about how effective external exams are. It is not a document that I want you to read all of; just flick to the highlighted areas and have a look at the range of results that are available. Do that in your time.

Today my purpose is to ensure that all committee members realise that external exams have been in Queensland for decades and are still happening. They work for Queensland students and teachers, too. The current external and internal syllabuses match closely. Exams are set, administered and marked by QSA and results are issued and certified by QSA. Results are accepted by universities, too. On the QSA website there are past exams and answers for 2012, 2011 and 2010. With a flick of your pen external exams could be used throughout Queensland for the year 11 cohort commencing next year. It is not that difficult to do this. Or it could be 100 per cent, too. Just having some form of external exam with marks would ease the burden of students and teachers alike.

As principal of Hubbard's school in Milton I am experienced with maths and science teaching and external exams. Because full use is made of external exams at Hubbard's we have happy students, happy parents and happy teachers. Student retention is high. They are hardworking but relaxed. They do not do assignments over Easter or June-July holidays. They need and deserve holidays. It is healthy. And it is student heaven. Parents, too, are relieved that there are no assignments. They tell me how wonderful it is to see their student smile again—parent heaven. Teachers are enthusiastic, hardworking but relaxed. Staff absenteeism is almost zero and it is teacher heaven, too. This is all with 100 per cent external exams.

Here is why: Hubbard's students know exactly what they need to master and the teachers do, too. The teachers teach and the students do their best to master the skills and understand the concepts. There are no assignments. Their content is quickly forgotten. They are not a valid way to learn for maths and science students who need to practise skills, master techniques and move all of this knowledge into their long-term memory. It is simply the way maths and science is learned. Therefore, when Hubbard's students proceed to university—and most of them do—they know techniques and can remember concepts. We use marks, too, in our practice exams for good exam time management. This is just not possible with criteria marking. Marks make for objectivity, reliability and validity. They measure improvement or decline. They just make sense.

Just two days before this government came into power, the QSA governing body decided to discontinue senior external exams as from the end of 2015. With Hubbard's proud record of happy students, happy parents and happy teachers this is really difficult to understand. My urgent plea is for all assessments to immediately make use of marks and percentages—it is really easy to do; an external exam to count for at least 50 per cent of the total year 12 score for all Queensland

students. This exam should be the only summative assessment in semester 4 of year 12—the only one. Maths and science assignments should be abandoned. Short reports on laboratory experiments are of more value. Finally, the senior external examination system in its current form be maintained or even expanded. I have brought several documents today. They are succinct and clear.

CHAIR: At this stage we have yet to accept them. I have a question to ask. You do have a senior external examination paper here. Is this available in the public domain?

Mrs Stevens: Yes.

CHAIR: It is available?

Mrs Stevens: It is on the QSA website.

CHAIR: Thank you. Committee, are we happy to table these documents? Moved and seconded. Thank you. Please proceed. I do draw your attention to the time to allow us a little more question time.

Mrs Stevens: I have finished presenting. If you just have a look at that maths B document, I have only given you the cover page and one page in. It is attached to a similar version of a Victorian paper and you will see on the Queensland one it has got 'KP'. That means knowledge and procedures. Down the end is 'MP', modelling and problem solving. The students do not know how much time to spend on these. If they actually do not get to the modelling and problem solving they will get an E, which means they could fail the whole subject even though they get the KPs right because they are not added. As opposed to the Victorian version, if you have a look at the back of that, there are marks and they are added up. It is a really very complicated system for absolutely no benefit.

The other page that I draw your attention to is this very colourful document that is a combination of my scrawl and an English teacher's drawing. It just gives you a quick overview of how we get through the whole years 11 and 12 syllabus in the one year. On the back is evidence that the results are accepted by the University of Queensland. Finally, the other pretty document here is related to the number of submissions that have been put to you. I am sure you do not have time to collate all of this, but someone has for us. The blue section is the people who want some change. It is overwhelming—overwhelming. Okay. So there you go. I will leave you that for questions.

CHAIR: Thank you, Mrs Stevens. Honourable members, do you have questions?

Mr BENNETT: I am just very interested in the graph that you produced with the international students achievement test. It was on—

Mrs Stevens: This one?

Mr BENNETT: Yes. Could you explain to the committee the results from Australia from 2003 with the cognitive scores there, please?

Mrs Stevens: These ones here?

Mr BENNETT: Yes.

Mrs Stevens: Okay. If you flick just over to the next two pages, it explains what the cognitive is. It is the average score of all international tests over the years from primary through to the end of secondary. So it is the measure of their actual ability across a range of maths and science areas. It is the number to look at. You can see how all the other countries can compare there.

Mr BENNETT: So is it fair that say that that is a very good result for Australia up until 2003, Mrs Stevens?

Mrs Stevens: It is up in the upper bracket. It is in the upper bracket. My reason for including it is to show you that there are many countries below and above Australia. Queensland typically, in recent tests—in TIMMS and PISA—scores in the worst of the states. So we have the potential to be very good but Queensland is at the bottom rung of the ladder.

CHAIR: Thank you, Mrs Stevens. I am sorry that our time has come to an end. I really do appreciate your time

Mrs Stevens: Thank you.

CHAIR: Because our next witness is on a teleconference, we are caught with time. Thank you very much.

Mrs Stevens: Thank you for the opportunity.

CHAIR: We have certainly noted all comments you have made.

Mrs Stevens: Thank you.

MATTICK, Professor John, Private capacity, via teleconference

CHAIR: I would like to now welcome Professor John Mattick. Thank you very much for joining us this morning, Professor Mattick. We are interested in your submission from three angles: as a parent, as CEO of a prominent scientific research organisation and as former chair of the Queensland Studies Authority. Before I ask you questions, would you like to make a three-minute opening statement?

Prof. Mattick: Just very briefly, yes. Thank you. I understand that this particular inquiry, although perhaps not the broader remit of the committee in the longer term, is about the assessment methodologies around physics and maths and chemistry. So I will speak mainly to that, but I have some broader and, in some ways, deeper concerns about the structure of the curriculum and assessment methods generally.

My concern about the assessment generally—and this applies perhaps even more so to the specifics of chemistry, maths and physics—is that it is not terribly objective. My experience at both levels in Queensland—at the Queensland Studies Authority and as a parent—was that the school based assessment, which is roughly, and I use that word advisedly, normalised through a quasi IQ test I think in year 11 or perhaps in 12, I cannot remember, I think is insufficient to really fairly and objectively assess students' relative merits of performance. I think the system is quite actively rorted by parents who sit with their kids and do their assignments et cetera for school. So an attempt to try to normalise and take into account serious contextual issues in terms of the different sorts of schools and communities around the state delivers a huge advantage to those parents with the energy, education, time or commitment to participate in their children's education. That has always been the case, but I think the school based assessment system in Queensland badly exacerbates that.

With respect to the broader issues in the curriculum, I have felt for many years that the Queensland curriculum menu in years 11 and 12 is far too fine grained and encourages overspecialisation and, therefore reciprocally, a lack of ability to educate our kids whatever their interests and abilities and future aspirations may be, but educate them more broadly at really the first time in their life when they are reaching some degree of intellectual and emotional maturity and start to understand broad concepts around business, governments, science, genetics—whatever it may be. That also leads to a system where the curriculum is broadly laid out, often in my opinion, too ideologically. It is too loose. So individual teachers—and I talked to a lot of them when I was in a position as chair of the Queensland Studies Authority—have a lot of work every year. They sit around, they tell me, at Beaudesert and other places trying to invent a decent syllabus for their students when it could be done in a much more integrated and centralised way and done properly so that teachers could focus on delivering quality engagement with their students.

I rather like the 80-20 rule, where 80 per cent of the curriculum or syllabus is fairly well developed by experts but 20 per cent is left to the discretion of the school and the teacher for context dependencies, local interests et cetera. That could also be reflective in the assessment process. So that is my general overview. I am happy to answer any questions.

CHAIR: Thank you very much, Professor Mattick. You wrote your submission as a parent. From your observation, how are the impacts on and the outcomes of New South Wales students of these subjects different from that of Queensland students?

Prof. Mattick: I think perhaps all of us survive our education as much as anything, but what we have noticed having been in New South Wales for a year and a half now is how much better our two sons are doing at school here. The quality of the school in Sydney in socioeconomic terms is perhaps about the same or slightly less. The boys were at Terrace in Brisbane, which is considered a good and perhaps privileged school. They are at Waverley here, which is sort of second tier, but still very good. The big difference is they started doing extraordinarily well at school. The older boy, who was sort of B plus-A minus, has not come any less than second in any subject since he got here. When we dug down, it seems to me that they were enjoying the curriculum far more. It is not so mushy. But also, unlike at least at Terrace and I think in Queensland generally, the kids are screened here. So the teachers are able to teach to a much narrower range of interests and abilities instead of trying to deal with gifted and not-so-gifted or disruptive students in the same classroom, which just destroyed their whole educational experience. The kids are loving it here and they were often completely disengaged even in what was otherwise a good school in Brisbane.

CHAIR: Thank you, Professor. I will call on Neil Symes for a question.

Mr SYMES: You claim that the education process currently seems nebulous and subjective. Would you please elaborate on this assertion?

Prof. Mattick: Yes, it is nebulous and subjective both on the curriculum side and on the assessment side. The guidance on the structure of the curriculum were very broad and I saw very good and quite lovely and enthusiastic and dedicated teachers really struggle to try to put together a disciplined and engaging curriculum for their students. So basically, to some level or other, the teachers were being asked to independently invent the details of what they were teaching. That put an enormous amount of pressure on them and also it meant that you had quite a variable quality of product being delivered in the schools. A really good, well-thought-out curriculum with indicative experiments or experiences that kids can do can really help the teachers. I think that a core set of people who really understand teaching and the stage that the kids are at and the spectrum of interests and abilities can develop really good menus for teachers and allow them to then do some further customisation perhaps but to get on with the job of teaching.

As I say, again, I like the 20 per cent flexibility rule, because that covers, I think, reasonably well the fact that the interests and range and social and economic context dependencies might be quite different in, say, Gladstone from Beaudesert. So I think you need to preserve some flexibility, but to constrain it in some ways.

I have already mentioned the assessment process. I have seen this firsthand—not in my own family. Parents who are interested in their kids' education are really the major factor. You may not be aware—I do not know if I mentioned it—I wrote a report to the Smart State Council, because I was on the Smart State Council on education. The council, which was a fairly accomplished group of people, basically said to the Premier and the education minister, Peter Beattie and Anna Bligh at the time, that they felt this was the most important report they had written for the council. It had basically three elements—that we had to really start to re-invest in improving the quality, the status and stature of the teaching profession. We put it in those terms—the status and stature—because everybody loves their good teachers and that has a lifelong impact on them. We needed to look critically at the structure of the curriculum, because it had drifted over 50 years. The idea that chemistry should be a stand-alone subject in year 12 was predicated on the unstated supposition that people could go into professional chemistry at that point. Basically, as I said in my submission, you have remedial teaching in first year, because that is not the way it is. So I think there is a lot to be done there.

Also we felt—and this goes back to the parental involvement—that the government on behalf of its citizens could do a lot more to engage parents, because in the end it is parents and teachers who really determine the quality of educational outcomes. Those parents who are willing to sit with the kids, even just to give them moral support while they wrestle with quadratic equations or whatever and understand how you can calculate these things—and you do not have to use these things professionally but you do need to just have a feeling for it—then those kids do well in life as in education. I think the trouble is that, under a self-assessment period, if a lot of the assessment and assignments are done at home then you cannot tell what is done by the parents and what is done by the students. A good teacher can see that there is a disconnect, but I know of cases where people got very high grades out of high school and I was really assessing their parents rather than the students.

CHAIR: Thank you, Professor Mattick.

Mrs SCOTT: Professor Mattick, you have probably answered a lot of the question that I have. I was going to ask whether the present system disadvantages students whose parents have a lower education level or those who are ESL students. I have a lot of migrants and refugees and so on in my area. Just compare that with your 80-20 example. I would just like an assessment on that.

Prof. Mattick: With respect to different sorts of socioeconomic groups?

Mrs SCOTT: Yes, certainly.

Prof. Mattick: Well, first of all, I think a comment about migrant groups. If we think back a generation or three, we are all migrants in this country. My background was basically Irish working class, and my mother in particular was very aspirational and made sure her kids got a good education, and that set us up for having good choices in life. The same was true of the Vietnamese immigrants when they came in after the war; Greek parents making sure their kids become doctors—putting too much pressure on them from that point of view. But I think that migrant communities tend on a whole—with one or two notable exceptions—to be very aspirational for their kids and very positive enforcers for education.

But having—and I am talking as much figuratively as literally—a really good-quality, structured curriculum which can be common across the state—and to some extent common across the country, because there is more and more interstate movement—makes it much easier to assess

that objectively. But to leave 20 per cent, both on the assessment and on the curriculum, for context dependencies, you know—it could be that kids in remote areas want to spend some more time in developing some aspects of their subjects that have to deal with their environments or their culture or whatever. And the same is true for immigrant kids, I think.

It would be great to be able to allow a school that has a high proportion of, say, Sudanese kids to actually have an extension area which talked about African and North African history or whatever to give them a sense of pride. It gives a flexibility without having a completely ad hoc landscape.

Mrs SCOTT: Thank you very much for your comments, Professor Mattick. Sadly, our time has come to an end, but we really do appreciate the information you have given us this morning and we appreciate your time.

DONNELLY, Dr Kevin, Private capacity, via teleconference

CHAIR: I would like to welcome Dr Kevin Donnelly, who established—and is—director of the Educational Standards Institute based in Melbourne. We really do thank you this morning for joining us, Dr Donnelly. Would you like to make a three-minute opening statement before the committee asks questions?

Dr Donnelly: No, I am quite happy. As you know, I did a short written submission so I would assume everybody has had a look at that. I am very happy just to answer questions.

CHAIR: Thank you, Dr Donnelly. Yes, we do have your submission in front of us, and it certainly does cover a lot of points.

Mr BENNETT: I am just interested in your opinion again in addition to your submission about school based assessment and external assessment comparison.

Dr Donnelly: Well, obviously they are two very different kinds of assessment. As I mentioned, I taught for 18 years and was involved with—in Victoria, obviously—the panel of examiners for English, and I was also a member of the board of studies, so I have had a fair bit of practical experience of both forms of assessment. When I first started teaching in Victoria, really most states around Australia, if not all of them, tended to rely on end-of-year examinations or half-year examinations. They became more popular. But over time it was more school based assessments. So when we in Victoria moved from the high school certificate to the Victorian Certificate of Education, the VCE, for example, we had a lot more assessment over the year, and I was teaching year 12 when that happened.

And I suppose, to be brief, my criticism of school based assessments is that, as I say in my submission, it really is very inefficient; it is time-consuming; it is open to cheating, plagiarism, to students getting work done by others; and it is very difficult to get comparability of results between schools or regions. In Victoria, when there was a change of government and the Kennett government came in, Sam Ball was the new chairman of our board of studies. We had a review of our VCE as it was, and we actually changed the system, because of all of those kinds of faults, to put more reliance on end-of-year examinations. We still have school based assessment, but it is moderated both against the GAT, the general achievement test, and the end-of-year results.

Mr LATTER: I think you were heading this way in your last couple of statements, but do you think school based assessment, or an element that is assignment based rather than exam based, has any place in a modern education system?

Dr Donnelly: I taught for many years, and it is always a good thing to give—depending on the subject, obviously. I mean, in subjects like music or creative arts you obviously need to have assessment that is school based that takes time—and it might take three, four or five goes at it, if you like. So in performance obviously you need to do that. But subjects like literature or English—and I would say science or mathematics or physics or chemistry—are more theoretical subjects and they lend themselves, I would argue, better to more formal examinations. Now, that does not mean that in chemistry, for example, you do not do graphical experiments or biology. But that has been how that school based work is going to be verified, how it is going to be ensured that it is credible, that it is verified, and how you are going to relate that grade, whatever is given, to the overall grade that the student received at the end of the year. As I say, one way to do that is to have some kind of statistical moderation, where you look at how the school overall goes in terms of the end-of-year exam, which is more formal, and the kind of results which are achieved, and you relate that back to what the school based assessment is. The other option there is obviously to allow schools to give school based assessments but it is not used for high-risk consequences like tertiary entry.

Mr BOOTHMAN: Thank you for all your answers. They are certainly very informative. You have actually partly covered this topic, but you claim that the current QSA assessment process is substandard and flawed. Why do you think the current model represents an invalid and unreliable method of judging student outcomes?

Dr Donnelly: There are a number of things there. I mean, firstly, obviously, I am based in Melbourne. I did do a review of the Queensland education department some years ago when Bob Quinn was the education minister, so I have kind of kept track since then in terms of the debate. Now, I will be honest: I am relying on a lot of the other submissions that I have read, plus conversations and emails I have had with teachers and people from subjects. There are a lot of different points of view. But I suppose based on the experience in Victoria that we had—which actually is a very similar approach to what Queensland now has—and looking at some of the international research identifying the characteristics of strongly performing education systems, they

tend to rely on academic high-risk, externally set and moderated exams in the more formal sense of a two- or three-hour exam where all the students are sitting the same paper and the questions are unsighted or unknown so you cannot prepare for it. It really is a test of how deep and how knowledgeable you are in the subject matter.

So when you look at, as I said, the experience we had in Victoria, when you look at the fact that most other states, if not all of them, have a greater reliance on external assessment—and those countries overseas like Singapore, Japan, Finland that do well in international tests also have a greater reliance on externally set and marked exams—I think that really, from a teaching point of view and certainly from the public point of view, makes it more credible because parents, employers and universities all know that it is a level playing field in the sense that all the students are sitting under the same conditions and there is no opportunity to have work done by tutors outside the school or by older brothers or sisters or parents, and teachers really are able to stand back, if you like, and there is a clear demarcation between what the teachers are doing and what the students are doing. I know when I taught what I will call school based assessment in your system there was really a difficulty as a teacher as to when you knew how much of the work was a student's and how much was yours.

CHAIR: Thanks, Kevin. I realise the question I am going to put now is probably a little outside your submission, but would you be prepared to make a comment on the actual outcome of students—say, Queensland students' as compared with other states—when they enter university or other tertiary studies, or even the workforce, in terms of how they are coping when they actually go to that tertiary level?

Dr Donnelly: I have not looked at any specific research on that matter. Some years ago the federal government did do a review. They actually interviewed and surveyed academics at the tertiary level as part of an attempt to discern anecdotally, I suppose, the concerns that academics had. Based on that survey, the feeling was that over time standards had deteriorated. The standards for undergraduates over time—and this was during the 90s—had fallen away and there was a concern, certainly in that first year, that they were having to water down the courses in first year, especially maths and science, physics and chemistry.

Now, the academics obviously said something was going wrong at the secondary level where students were getting quite good grades in year 12—and I am talking around Australia—and not being adequately prepared for tertiary studies. The fact that all the universities around Australia now have remedial classes in essay writing or in algebra is evidence of that. There is a concern about the standard of year 12. Another example would be Duntroon Royal Military College in Canberra. A couple of years ago they put out a paper where they basically argued that students from around Australia had to do remedial work in the first six months because they were not up to scratch. So I think there is a real issue about the quality of year 12. The Howard government, when Brendan Nelson was minister, did a report on the Australian Certificate of Education and looked around Australia. I think there was a general feeling that a lot more needed to be done to adequately prepare students for tertiary. Now, that is not just a Queensland problem, but from looking at some of the submissions I know that some of the academics feel the problems are made worse because of the assessment system.

CHAIR: Thank you for that, Kevin. Sadly, our time has come to an end, but we do appreciate all your comments and the breadth of your submission as well.

DARNELL, Dr Grant, Science Teachers Association of Queensland

CHAIR: Good morning. I now welcome Dr Grant Darnell. Dr Darnell, I invite you to make a short, three-minute opening statement before committee members ask questions.

Dr Darnell: Thank you. As way of background about myself, I am the head of science at Ipswich State High School. I was a chemistry teacher a couple of years ago. I am currently a biology teacher. I was also on the QSA panel for chemistry—the QSA review and monitoring panel—and I am currently on the biology panel for QSA for the Brisbane-Ipswich region, so I am intimately involved in my everyday life writing selection criteria for these assessment pieces and delivering the assessment pieces. My current class right now in year 11 biology is doing an EEI, so I am very familiar with this. In addition, I have been involved in putting through my school the foundational prep to year 10 science curriculum. I think what we have to not lose sight of with science in particular is it is a practical subject. Not only is it about knowledge, which is what a lot of the talk this morning has been about; it is about communication of science and the actual physical hands-on science. Science is one of the only subjects at school that is compulsory that is practical—that is, you can actually get up from the desk, get the students to move around, experience hands-on experiential learning and have them communicate that in a non-traditional sense. I think that that is something we cannot lose sight of.

External exams have been talked about a lot this morning. As a teacher and I think the constituents of the science teachers would hate to have an external exam where students are asked, 'How would you do an experiment? How would you change an experiment? How would you alter an experiment?,' and actually have to write it down. Students would prefer to do the experiments and then write about them and then change them. That is something we cannot lose sight of. Science is not a theory subject; it is a practical subject. Before I was a teacher I was also a research scientist. I have international publications as well, and I can see what the EEIs, particularly in chemistry and physics, are about. It is mirroring what I used to do as a scientist, which is communication. It is also not mandated in the syllabuses—the current syllabuses—that EEIs have to be written in a scientific format—that is, introduction, aim, hypothesis, materials, method. They do not have to be a 6,000-word assignment; they can be a poster. It is up to the individual schools to be able to dictate that. I as head of department would write the assessment pieces for my school and my teachers deliver them. I am happy to take any questions. I would rather you ask me questions than have me keep talking, so I will answer anything.

CHAIR: Thank you very much for that, Dr Darnell.

Mr BENNETT: Good morning. In a lot of the submissions we have taken about this issue there is a reflection of professional development for teachers and continuing, and I would be interested in your comments about that because it is a part of your submission as well. Would you be able to comment on that?

Dr Darnell: Our submission is probably a pretty accurate reflection of what is out there in the science teaching community. It was pretty much split fifty-fifty down the middle for and against. But one thing that was really evident in our submission was that some teachers—I do not know whether they are new teachers or experienced teachers who are not familiar with the new curriculum—do want support from professional bodies, and not just QSA. Our body is one of those as well which could probably do more to support teachers, particularly teachers who are going to the panel process and who are intimately involved in panel and are undergoing these school based reviews to moderate standards of these assessments and work. Once you go through that system, you really do gain an appreciation of what they are about and how they are good assessments. I think more training is always vital for teaching staff, because the turnover in teachers these days is quite high. So as new teachers come into the profession they need to be upskilled, and upskilled very quickly, and that is part of my role as head of department as well. I do that with my staff continuously.

CHAIR: Dr Darnell, just to follow through on that, we are hearing a lot of comments about stress on students, stress on teachers and stress on parents because of the system of assessment. Would you be prepared to comment on that?

Dr Darnell: Sure. When are exams not stressful? Any assessment is stressful. We also cannot lose sight of the fact that there is assessment of learning and there is assessment for learning, and the EEIs and the ERTs are for learning. It is also assessment to teach children and teach students how to communicate and do assessment pieces as well. Stressed? Yes, they can be but probably not by the individual assessment pieces but the amount of assessment through all of the subjects of kids at school. They might have six assignments or six exams coming up. My school is currently going into exam block in a university model where the students might have three or four

exams over a two-week period that they have to study for. That is the traditional exams. All EEIs that are coming in for my biology, chemistry and physics classes are due before the other exam block, so we do stagger assessment.

I think assessment is always going to be stressful. I think external examinations at the end of the year, which is one hit over a two-year period, will be extremely stressful. NAPLAN is an example in year 9 and down through the lower grades where you see it in the paper every week. It is a stressful process for everyone involved. I do not think there is any ideal model for that, to be honest. I think maybe a bit of both possibly, but I think assessment is always stressful. The beauty of the EEIs and the ERTs where they run over an eight-week period is that it can be between four and eight weeks or six weeks. You are not assessed every day on that. It just means that the experiments you are doing and the time you are given to write that experiment up, as we call it, in class time to research around that goes for that period. Often the EEIs and the ERTs are a stand-alone assessment for the term. It is the only assessment for that term.

I have one more point. This is what I tell my students particularly in my class: 'This is the piece of assessment for the term. It has to demonstrate your knowledge and understanding of the science for the term.' To put that into context, if you are delivering content and you are making kids write notes every day, which is what you do for knowledge based assessment—they write notes and they study for an exam—I would want the equivalent amount of time spent on doing the assignment as they would do writing notes and studying for the exam. It is just a different type of assessment in a different context. But it still has to demonstrate knowledge and understanding, and particularly EEIs and ERTs scientific inquiry skills, which are also coming in the new senior syllabuses for national curriculum, if they are implemented. It is a large part of that as well.

CHAIR: Dr Darnell, we are also hearing a lot of comments about parent intervention in school based assignments and assessment. Would you be prepared to comment on that?

Dr Darnell: I would.

CHAIR: Would you be prepared to comment on what you have seen or how it is something that you can guard against?

Dr Darnell: Should we? I think parent involvement in children's education should be applauded. If it does not come from the parent, people hire tutors and it comes from tutors. I am not saying that parents should be doing the work for them, but they should be involved in children's education. My children are in grade 1 and grade 2. I help them with their homework. That is not cheating. If you are lucky enough to have a parent who is in the sciences or maths and they can help and facilitate and guide their student through, I would pat them on the back. It should be applauded. There are parents who have not got that level, and when you start talking senior sciences and maths it is at a fairly high level. You probably can never guard against it. The same parents will be helping those students through an external based exam as well. They will be coaching them, they will be tutoring them, they will be making them learn stuff. As a teacher who is a professional you can tell if the student has written it or the parent has written it, and I think we have to not lose sight that teachers are professionals as well and it is our judgement. You can always ring home and ask, and I have had to do it. When I worked in a different school to where I am now, I knew that the parent wrote the assessment for the child and I rang home. There are ways around that.

Mr BENNETT: I am just interested in your comments about a lot of the arguments we have been getting about preparation for university and the success rate of that first-year block. Would you be prepared to make comment about that?

Dr Darnell: Absolutely. I am glad you raised this; I was going to raise this as well. I think the EEI assessment—and, again, that is what the inquiry is about—is training students for university, and I experienced it myself going to university. I was the first in my family to go to uni. From high school to university is not just a jump in academic ability; it is also a jump in type of teaching because university is where you do not get a roll-marked when you turn up to lectures. You have to turn up on your own bat. There are a lot of other distractions around university. So dipping standards in first year of university from high school might not be a curriculum issue; it is a social and a lifestyle issue as well, and you cannot lose sight of that fact. There is no one simple answer for that.

With regard to EEIs and ERTs being assessment for learning, it is trying to engage and encourage these children to find answers on their own, not just have it spoonfed to them by the teachers. So, yes, the teachers become a facilitator rather than a didactic type of teacher, but we are always there for the students to touch back to. They go off and they research a project, they find

some knowledge, they come back and say, 'Sir, how does this fit into this?,' and you guide them in that. So by the end of that extended period where the assessment runs for—it goes over that period—when it is due at the end, hopefully the student has gone away, had a think about it, come back to the teacher, the teacher puts the pieces back together, the student goes away and comes back again. So that is really probably preparing them for the non-spoonfed way university runs these days as opposed to just smashing them with lectures, smashing them with notes and then expecting them to rote and recall at the end of a two-year period.

Mr BENNETT: But what about the argument of not being prepared though and the big gap about their capacity to be able to operate at first-year uni as opposed to the year 12 graduation?

Dr Darnell: With respect to curriculum knowledge?

Mr BENNETT: Specifically, the subjects that are part of this inquiry.

Dr Darnell: Physics and chemistry?

Mr BENNETT: Yes.

Dr Darnell: My understanding of the current Queensland syllabus is that it covers everything that you need to cover to undertake the first semester of university, and often the first semesters of, say, a science degree at UQ will cover year 11 and 12 chemistry in that first six months. I certainly did at QUT down the road here when I went through quite a few years ago now.

CHAIR: I guess what Steve is referring to is the fact that we have been given evidence from some universities that they are having to dumb down the curriculum to meet with the standard of the students who are coming through.

Dr Darnell: I have not seen what they are offering at first-year university currently and what they are asking the students to do, but basic chemistry is taught. I am teaching basic chemistry in year 10 right now, so we are teaching the fundamental basis of chemistry. Whether it is something they are trying to do such as inorganic equations that are beyond them at the moment or they have forgotten it over the holidays, I do not know. The debate between tertiary and high school has been going on forever. I do not think it is going to get solved. It is the same as the high schools have with primary schools. It has never changed in the 20 years I have been around this, and I do not think it ever will be.

Mr LATTER: Dr Darnell, this was not your assertion of course, but there have been assertions throughout this process that teachers are stressed and short of time partly because they are required to develop their own curriculum through fairly vague guidelines issued by QSA. Can I ask you, if you are able to tell me, must a teacher or a school develop a new curriculum each year or over time might a teacher or school develop a curriculum that can be used again and again?

Dr Darnell: Sure. The short answer is no. The long answer is that a school will develop a work program, and I can talk about my school. We have our own physics and chemistry work programs. Those work programs go to the QSA panel that I mentioned I was involved in. They then look at the program to make sure that it is of the right rigor and then it comes back and they say, 'Yes, that work program's fine.' So, no, every year teachers do not have to write their own work programs if there is one in the school already. If it is a new subject, yes, they do have to write a work program, and nor do they have to write their own assessment differently every year. The assessment also goes through the panel process making sure it is at the appropriate standard. That is what the moderation and verification process is with the QSA panel.

Mr LATTER: Thank you.

CHAIR: As there are no further questions from the committee, Dr Darnell, thank you very much for those answers and also for your submission. We really do appreciate your time this morning.

Dr Darnell: My pleasure. Thank you for the opportunity.

CHAIR: Thank you very much.

MATTERS, Professor Gabrielle, Australian Council for Educational Research

CHAIR: I again welcome Professor Matters. We really appreciate your time this morning. I invite you to make a short three-minute opening statement before the committee members ask questions.

Prof. Matters: Thank you, Madam Chair, for the opportunity to elaborate on what Professor Geoff Masters and I wrote in ACER's submission. I will be responding directly to the terms of reference for this inquiry. I will not be talking about Queensland's position in the assessment world or QSA's functions, nor will I be talking about the false dichotomy of internal assessment versus external assessment. A conversation about good assessment and fitness for purpose is for another time.

We have three points to make. First, assessment methods should be chosen primarily for their capacity to provide useful information about student learning in a subject such as mathematics or an area within it such as algebra or geometry. In Queensland you see a philosophical preference for particular forms of assessment—for example, teacher devised. The change that is required is from a philosophical commitment to a single way of assessing to a recognition that different methods are appropriate for different kinds of learning even within the same subject. It is our opinion that factual knowledge and conceptual understandings in mathematics, chemistry and physics could be assessed by a common external test while laboratory skills and written research reports and so on could be assessed by teachers in schools.

Second, the approach to recording student performance on an assessment task or activity needs to be appropriate to the task or activity. This issue, I believe, was the precipitate for this inquiry. In Queensland you see a philosophical preference for criteria and standards at the task level. It is our opinion that the marking guides in their current form are an unnecessary extension of the principles of valid and reliable assessment—principles that apply in any system including one that is teacher based. Awarding one of five levels of achievement comes at the end of a course of study when teachers look at results over all assessments over all four semesters and make an on-balance decision about the standard obtained by a particular student. This should be the only place where overarching criteria and standards are applied. The change that is required here is to recognise that it is not appropriate to impose a single approach—the use of the criteria and standards matrix—for recording results on all forms of assessment at the task level. Maybe it could be left to the discretion of teachers as to how to record performance on individual tasks.

Third, the approach to combining evidence from multiple sources or to aggregating scores needs to be appropriate to the assessment method. In Queensland there seems to be a philosophical opposition to arriving at on-balance conclusions numerically. Although some rule based decisions are made, the practice is to use teacher judgement to arrive at overall conclusions. Teachers have got the message, whether intended or not, that they should not be calculating test scores. The change that is required here is a recognition that for some kinds of tasks such as tests the best way to reach an overall result is simply to add results on individual test questions and then to interpret the resulting scores qualitatively by reference to the exit levels of achievement and standards as set down in the syllabuses.

In conclusion, we believe that the Queensland assessment system must provide the best possible information about what individuals know, understand and can do rather than being shaped by commitments to past practices or by philosophical objections to the measurement of student learning. Most of our recommended changes to mathematics, chemistry and physics can be implemented immediately within the present system, or at least the spirit of our recommended changes can be captured immediately. Thank you for the opportunity to be heard, Madam Chair.

CHAIR: Thank you, Professor Matters. We really do appreciate those comments. I will throw it over to committee members now for questions.

Mr BENNETT: I noted your opening remarks about assessment, but I would ask you about and press you for your opinion of external exams. I know you made a comment on it, but would you be able to expand for me your preference for external examination?

Prof. Matters: I am sorry if I was not clear. I did not actually express a preference for external exams, per se. I expressed a view that is held by Geoff Masters and me that in mathematics, chemistry and physics a common external test in mathematics, chemistry and physics would be a better way to go than using criteria based assessment—teacher devised as at present. For a teacher to set a really good assessment task is not something one does on a Sunday afternoon or even a wet Sunday afternoon. It takes a lot of time, a lot of ability and so on. Obviously teachers can develop these abilities. Some are born with them. But the point is that to actually look

at an assessment task—and this could apply to an external examination question as well—and say, 'That is a good item. It is good because it tests the content of the subject. It is good because it follows all the psychometric principles of good assessment tasks. It is good because it communicates to the student what they are supposed to be doing and what can be rewarded.' Those three qualities can exist in assessment tasks set in schools and examinations set externally.

I guess our view is that the situation in chemistry, physics and mathematics, the central subjects, has become too complicated. I think if you cannot explain something to your mother, or to your aunty or to your uncle, for that matter, then something is wrong. I would go so far as to say that we probably need to revisit the rationale of school based assessment to see to what extent the present manifestation of it matches that.

I need to tell you—this will tell you how old I am—that I was teaching senior chemistry and physics at the very time there was a change from external assessment to school based assessment. I went on holidays at Christmastime after preparing students for external exams, and I came back at the beginning of the next year and it was school based assessment. So I have lived through both of those. Again, I do not believe that one is superior to the other, but I do believe there are hallmarks of good assessment and there is fitness for purpose to be looked at. Maybe the time has come to introduce an external common test in mathematics, chemistry and physics. I am making it very clear that I am not suggesting that is appropriate for all subjects. Geoff and I have studied the syllabuses and the assessment in those subjects.

CHAIR: Thank you, Professor Matters. How does Queensland's system compare with what you would see as international best practice? Is there agreement in the educational research world about what is best practice?

Prof. Matters: I am sorry, Madam Chair, I would prefer not to answer a question about best practice because I believe it is not a simple question. I can say, however, that my present life is working with assessment systems across the world. I will not bore you with the number of countries I have worked with just this year, and a lot of that work is reviewing assessment systems and giving advice to ministries of education. I would say in every country I visit the question is asked: can you talk to us about school based assessment? You come from Queensland. That is not part of my brief but I do that. When I am talking about it, I find that I can express the litany of positives that was set down by Dr Radford in 1970. I can assure you, though, that I do not talk about the criteria and standards matrix. I do not talk about exit levels and on-balance judgements. But I do talk about the power of teachers to devise and mark an assessment instrument and have those assessments count. Because the question that people in other countries are asking is not about the criteria and standards matrix or exit levels and on-balance judgements. They are asking whether there is another way for us to collect information about student learning. They are acknowledging the very thing that I think we are saying about two modes of assessment: that you cannot get all the information about all that students can do using one form of assessment.

CHAIR: Thank you.

Mrs SCOTT: Good morning. Professor, do you believe that a combination of examinations where all schools are examining on the same level and then a certain amount of practical assessment in classes would reduce the stress for teachers, parents and students and there would be more knowledge of what is required of them?

Prof. Matters: Again, I do not believe that that question is within my area of expertise. I am sorry, if you could let that one go. I will say, however, that a bit of stress is not bad for performance. I think to protect young people from stress is not to prepare them for life. Of course that can be an extreme case.

Mrs SCOTT: How did you manage that transition from one type to the other?

Prof. Matters: I guess I believed that I knew my subjects and I knew how to assess them. However, there were some people who did not know their subjects and were completely lost in how to undertake assessment. In that year that I will not mention—I think ACER had item banks—a lot of people went to HSC past papers until they had enough confidence in what to do.

If I can tell another story, the year after that the senior physics paper was set by a professor at the University of Queensland—for that was where all the power was—and that physics paper had a question on it that was out of the syllabus. As a result of that, only 30 per cent of students passed. In the following year I was rung by the board of trustees in the school where I was teaching and asked, 'How did we go? How many 3s and 4s did we get?' It became the story at Kmart and the story everywhere. What the government of the day did then was put all the ratings up by one to

make the story look better. But that is what brought that on. How did I operate then? It is a long time ago but I hate the phrase 'in service' and I hate the phrase 'professional development'. There was a certain amount but not enough training in how to write good assessment tasks. I do not believe that sort of training on how to write good assessment tasks is a luxury for some people who write exams either. I am not sitting on the fence but I worry about good assessment in any context. That is what I am talking about. If more energy were spent on the features of good assessment and how to get them, I think we would be better off.

CHAIR: Are marks and percentages incompatible with a standards based system?

Prof. Matters: Percentages are always a problem because 85 per cent in a subject means nothing because the exam might be harder than it is somewhere else but it is 85 per cent. So we put aside percentages. In terms of marks, however, it is my opinion that marks are just a code for labelling performance. You could call it A, B and C. You could call it 3, 2 and 1. You could call it alpha, beta and gamma, or you could call it X, Y and Z. The point is how you combine those judgements expressed as codes.

When the criteria and standards matrix is used—and I think that is the central argument here—it is not appropriate to match student work to a set of words in cells that, in my opinion, is not very clear or succinct. I will give an example. So if the question is 'What was Einstein's equation?,' you would give one mark for $E=mc^2$. For 'What do the symbols stand for?'—two marks. For 'Substitute values for symbols and perform this calculation'—three marks. If you get the correct answer—four marks. When those marks are combined and fed into the final decision about what level of achievement the student can get, then those marks have a meaning that can actually be sucked up, if you like, into the overarching criteria and standards. To apply the criteria and standards at the item level is what we referred to earlier introducing something that is not critical to the process.

CHAIR: Thank you for that. Sadly, our time has come to an end. But we really do appreciate your time and particularly the fact that you have come in twice representing various areas. Thank you, Dr Matters.

Prof. Matters: Thank you, Madam Chair, for the opportunity to be heard. Thank you, MPs.

FINGER, Professor Glenn, Dean (Learning and Teaching), Arts, Education and Law Group, Griffith University

CHAIR: I welcome our final witness this morning, Professor Glenn Finger from Griffith University, speaking to the joint submission by the Griffith University Arts, Education and Law Group and the Science, Environment, Engineering and Technology Group. Professor Finger, would you like to make a short opening statement?

Prof. Finger: Thank you very much and thank you for the opportunity to present the following three-minute summary. My name is Professor Glenn Finger and I am the Dean of Learning and Teaching of the Arts, Education and Law Group at Griffith University. My portfolio includes being chair of the group assessment board and includes the governance of assessment and academic achievement standards of domestic and international undergraduate and postgraduate students undertaking studies at the Queensland Conservatorium; the Queensland College of Art; the Griffith Film School; the Griffith Law School; the School of Criminology and Criminal Justice; the School of Humanities; the School of Languages and Linguistics; and, of direct relevance to this inquiry, the School of Education and Professional Studies, which provides initial teacher education programs preparing teachers of mathematics, chemistry and physics.

Our submission was prepared in collaboration with the Science, Environment, Engineering and Technology Group. Before summarising the key messages from our submission—and I am not going to elaborate on all of those; they are there for you—the committee might like to be aware, similar to Professor Matters indicating her personal experience in the Queensland system, that I undertook my primary schooling in a small Queensland country school, Burnett Heads primary school, subsequently completed my secondary schooling in a Queensland state high school and had a firsthand experience in what was known as the Queensland external examination process when I undertook examinations for matriculation in grade 12 in 1971.

My subject choice, if we could call it choice, required the study of English, mathematics 1, mathematics 2, chemistry and physics, and then we had a choice of a final subject. We had a limited choice of geometrical drawing and perspective and I think French, ancient history or modern history at the time. I was the first in my family to complete a university degree and my parents had been required to leave schooling in primary school. So they never experienced secondary school. So I must declare a huge respect for the transformative and social justice aspects of education in Queensland schooling and in particular Queensland state schooling from my experience. So, if there are biases, you will understand where they might have come from.

I also wish to acknowledge that I have had the opportunity to read through the submissions provided, and I congratulate the committee on the range of submissions and the range of people invited. These have been provided, I believe, by scholarly colleagues with international recognition in assessment. Professor Gabrielle Matters, who was before me, is one such person. I also highlighted submissions from Professor Claire Wyatt-Smith, highlighting the importance of teacher judgement and defining concepts such as validity, reliability standards and other important understandings about assessment. I think that a very important contribution in the documentation was by Professor Royce Sadler, made in a forum, where he highlighted the dual purpose of assessment for these subjects, and therefore the importance of understanding predictive validity—what are we trying to predict from the assessment in these subjects? In addition, there is an extensive summary of what I regard as continuous review and improvement initiatives over time, well-intentioned, outlined in the Queensland Studies Authority submission.

Furthermore, there is a range of perspectives, and we have the anecdotal evidence from our own conversations with current students, and recent students, and, importantly, with teachers of senior mathematics, chemistry and physics. But I think the student voice is one that might be considered more carefully, to engage with students who are currently experiencing the assessment regime more generally, and specifically, in these areas and also to engage with recent graduates of year 12 about their experience—what worked well and what could work better—because I sense that voice is really quite missing here in the submissions by others who are seemingly expressing ideas on their behalf.

Furthermore, to set the context, I reviewed the QSA data on enrolments and levels of performance in mathematics B, mathematics C, chemistry and physics—and I did this, I guess, as these trends are useful in my role as chair of our group assessment board, because you look for anomalies, don't you, over time? Are we getting too many VHAs? Are we getting too many LAs? Have we got evidence and the confidence that we have grade integrity? In terms of enrolment trends, there has not been any significantly, I do not think, large decrease or increase in

enrolments. I looked at 1992, 2002 and 2012 but I had a sense—and this might be collected from the student voice—that, whereas I had no choice—I had to do chemistry, physics, maths 1 and maths 2—students for a whole range of reasons are probably opting for other pathways, and I think there is some evidence around that. Given that our country is saying that of central importance is mathematics, chemistry and physics—the maths/sciences area—I think we should be looking very carefully, again from the student voice, at the selection. Compared, for example, with Asian countries who are doing so well in these areas, are we giving more choice to our students than we should be? Why are those subjects perhaps not growing in attraction to a 21st century student? I did notice, apart from some instances of changes, for example, an increase in VHAs in maths C in 2012, that I think the grade distributions confirm that there is credibility from the evidence that you have to be very good to achieve a VHA, just as I think you had to be pretty good when I did the year 12 external examination in those subjects.

In summary, our submission's key arguments are provided for you and I want to highlight a couple. I note of interest that Professor Matters highlighted the special structure of mathematics, chemistry and physics. But we have to ask some wider questions of what does it mean to be a student, the new narrative of a student, in the 21st century and the technological changes that are going to help Queensland and Australia really be economically competitive? How are we going to deal with technological change and to really drive the innovation? I think we have a wider issue, if we take a helicopter view, of the lack of interdisciplinary approaches that is reflecting through our curriculum structure, and the low priority given to the technology curriculum which is in the third tranche of the Australian curriculum being developed. So there is the potential that mathematics and science might be seen as distinctly disconnected areas to that of technology. I think that the technological innovations evident in some of our competing countries suggest that they are well ahead of the game on us in this and evident in their productivity agendas.

So I think there is a need for a new narrative for the 21st century student or scholar—one who is going to think mathematically and scientifically and work mathematically and scientifically in the changing environment of the 21st century. So if we believe that we can construct an external examination that complements teacher judgement, we are in favour of that particular approach—but definitely to complement a rich range of assessment evidence to be demonstrated by students, and not to replace teacher judgement. And there needs to be the ability for an ongoing recalibration of that judgement as our external environment changes. I would not like to think that the examination questions that I was asked in 1971 would still constitute 100 per cent of the questions in an external examination in mathematics, chemistry or physics now, or for that matter, in 10 or 15 years time. Those arguing against a constructivist approach differ here, and we do not support this as we are immersed in a world of information abundance with new knowledge being crated exponentially. Our Queensland students should be seen as active participants in co-constructing new knowledge and solutions. Most importantly, if assessment still relies totally or largely on a pencil and paper based examination as some are advocating, I think that this is seriously flawed as I suspect that few scientists and mathematicians undertake research and create new solutions by working by themselves at a single desk answering questions using a pencil and paper.

So we have in our submission a really strong statement about assessment, assessment of learning and assessment for learning, and the critical relationship between constructively aligning curriculum, assessment and reporting. If we do have an externally developed examination, there are, as Professor Matters said, international standards around how they are constructed, and there is great value in having those constructed by what we might call expert groups and done in a way where the student can independently demonstrate what they know and can do with what they know, but it would be a complementary measure. However, please do not think that there is absolute empirical reliability around where you would place the cut score—and we heard that a moment ago in relation to the use of marks, for example. So if it is a 100 per cent to do well, where do you put the cut score for the VHA? How sure are you that the person who got 84 is not as good as the person who got 86 on another day in another way?

For example, there is international research which I am exploring with a doctoral student that I think has great value here around certainty based assessment, where the student on a multiple choice test not only selects the answer which they believe is correct but indicates the extent to which they are sure they are correct. So if they think the answer is C, then we want them to be promoted to be honest and also a risk taker and indicate how certain they are that they are correct. So if they are absolutely certain and the answer is correct, they are the heart surgeon we are after, I think. If they believe they are absolutely correct but they are actually incorrect, they are misinformed and they are probably not the heart surgeon we are after.

At the moment a lot of the multiple choice question design of assessment requires some questions around reliability and confidence that the person has not just guessed the answer—how certain are they that they are correct? So there is a matrix from mastery—'This is the answer I chose and I am certain I am correct and the response was correct'—to misinformed—'This is the answer I chose, and I am certain I am correct, and the response was actually incorrect' or, uninformed, for example, 'I chose this answer, but I actually have no idea, and the answer was correct.' This is an example of how different approaches can give further insights to inform the design of assessment to inform learning. So in terms of the design of assessment, I think there are new ways, and new approaches to assessment. The other part of what we are saying here is that we need to have a look at the way our top scientists have learned their way of working scientifically and to work with those scientists and mathematicians. The key messages are there for you. I am happy to conclude there. I think I have possibly gone a little over time.

CHAIR: There is no doubt, but your comments were very, very interesting, Professor Finger. I would like to pursue an area. You referred to your experience with external exams, and I certainly go back there. But, from the student uptake perspective, you pointed out an era when certain subjects were mandated to do a certain discipline. Maybe this is a little outside of this inquiry, but do you think that perhaps that could become a criterion at a later date—students do have such a very broad choice of subjects—that, from the tertiary level, certain subjects become mandatory?

Prof. Finger: Absolutely. I think my colleagues in the academy would agree with me when I say we use mathematics 24 hours a day, whether you are in the Conservatorium or the Griffith Law School. You do not have to be in engineering to be using mathematics. You might be aware but I think these subjects need to be a prerequisite for entry into teaching. That is one tangible requirement, I think. Queensland is moving to make secondary English, mathematics and science mandatory for entry into initial teacher education programs in a staged way so that those students who are in year 9 know that in year 11 and 12 they need to do mathematics B or C or chemistry or physics or a science. I think we can ramp that up. It would assist with predictive validity—of prerequisite knowledge if you are looking at fit for purpose for university entrants. So we have some important concepts here relating to the distinction between prerequisite and assumed knowledge. For many programs at university we require English. Then we assume that students have done some mathematics. So I think this is where the interface could be strengthened with university requirements perhaps restricting some choice if our country believes that these subjects are really crucial to our future. I think that is something that could be staged.

CHAIR: Thank you for that. It is maybe a little outside the areas of this inquiry but it is certainly relevant. Professor Finger, I think our time has expired.

Prof. Finger: Sorry I did not leave more time for questions.

CHAIR: No. Your comments have been very, very relevant and very valid. I want to thank you for coming in this afternoon. You have brought a quantity of information to this inquiry.

Prof. Finger: Thank you.

CHAIR: On behalf of the committee I would like to thank you as well as all of the witnesses who have informed us today. I certainly urge those people with an interest in the work of the Queensland parliament's Education and Innovation Committee to subscribe to the committee's email subscription list via the Queensland parliament's website. I now declare this hearing closed.

Committee adjourned at 12.18 pm