**Leanne Compton:** Hi, my name is Leanne Compton and I'm the Curriculum Manager for Design and Technologies at Victorian Curriculum and Assessment Authority. This video is one in a series of videos that we have developed to assist teachers in the delivery of curriculum and assessment for 2021. This particular video focuses in on VCE Systems Engineering and School-Assessed Task and using the criteria to make on-balance judgments to rank a student cohort with a focus on criteria 4 to 8.

Colin Chapman is the state reviewer for VCE Systems Engineering and Colin is going to take you through this presentation today. So over to you, Colin, thank you.

**Colin Chapman:** Thank you for this opportunity to work with teachers across the state in respect to system engineering and improving our practise. Here we have the intellectual property statement.

Criteria 4 through to 8 for the School-assessed Task can be broken usefully into two sections really. Four, five and six support the students actually carrying out the plan that they developed through criteria 1 to 3. And criteria 7 and 8 reward for students adapting to the plan, not going to plan, re-planning and assessing their project and its congruency with a effective response to the design brief. The criteria here concerned largely with producing, testing, evaluation, re-planning and reflecting on the use of the systems engineering process itself. Again, the criteria are mandated and the indicators are guidance. You can use the indicators to be able to form a judgement in ways that are appropriate to the particular students in a particular circumstance that you have in any particular year of the study that you are teaching them in. You need to personalise your use of the indicators with the mandated criteria for your cohort, using their strengths to allow them to respond in the best possible way to the criteria for the school-assessed task. You need to make sure that you tie all of your considerations for criteria with the systems engineering process, remembering that it is an iterative process and we're not building one-shot-type projects. We really want a quick, effective, agile response to the design brief and we want the students to go through cycles of iteration so that they can improve their response to the concerns of the design brief.

And again in criteria 7 and 8, we reward the students for going through this process effectively. It is important that you use the same indicators for each of the students in a particular class, that you can be fair with respect to how you're going to arrive at a judgement . And you need to communicate that. There may be some circumstances that occur throughout the year where you need to change the indicators that you may use but then this change has to be indicated to students as early as is practicable and then applied to all students in the same fashion. So there may well be that some plant or equipment that you had in your workshop is no longer available through malfunction or some other circumstance and you may then have to change the indicators that you will use but then that has to be applied to all students equally. You need to think about the reasonableness of the indicators for the cohort that you have. Note that the indicators are quite broad and that is because in any ordinary year, your interpretation of those indicators will change, depending on your cohort and their unique circumstances.

So we're looking at carrying out the plan from criteria 1 to 3 and evaluating. We're looking at the students carrying out the intention they developed in criteria 1 to 3, adapting when the plan does not go to plan, making decisions, re-planning and evaluating their performance with respect to the systems engineering process. This works most effectively when criteria 1 to 3 is completed effectively with regard to intention development. Criteria 1 to 3 reported on mid-year is essential for this School-assessed Task to work effectively.

So we're looking at Unit 4, Outcome 1. We're looking at finalising production, which was begun in Unit 3, Outcome 1. Testing and diagnosing a mechanical and electrotechnological integrated and controlled system using the systems engineering process. And we're looking for management, documentation and evaluation of the systems and processes, as well as the use of it. We're expecting to see completion of production work, accompanied by a record of progress and modifications. This should include images and text materials and a record of diagnostic testing and performance data and a report that evaluates and suggests improvements to the system with respect to the factors that influence its creation and to the student's use of the systems engineering process.

So let's look at the assessment criteria and the indicators and the performance descriptors. It is important to keep in mind the whole time while we're doing this that the first port of call is the determination of satisfactory completion. And essentially, if the student is able to give a response in the criteria on any level of performance that is above that's shown, then that is evidence for satisfactory completion. It is a separate judgement to level of achievement. So we judge satisfactory completion first and then go to level of performance.

So here we're looking at use of tools, equipment and machines to make the system, the system doing part. And we're looking at implementation of the work plan, which was developed in criteria 3 and compliance with OH&S requirements, which is again developed in criteria 3. So this is the reality of their project, whereas in criteria 3, they were planning ahead. It's reasonable to expect that the carrying out of use of tools, equipment and machines to make the system will have the students going across some changes with respect to outcomes of using these equipments. Things that they didn't necessarily foresee may turn up. Access to tools and equipment may change and also, understanding of OH&S requirements and the particular equipment and plant that they are using may force the student to rethink the application of OH&S requirements. And that's fine. Things don't go to plan. Our maturity with respect to the production of our project changes and we just need to record these things, make judgments, re-plan and carry out the re-plan.

You can see here that we have a couple of key words that change. So at the low end, it's following steps. At the high end, it's implementing a work plan. And then you can see that we have in the middle there, with support, and at the high end, independently using production processes, tools, equipment, components and materials.

At the high end, we're looking at with precision and technical skills compliant with OH&S requirements to produce the preferred option. Now, this is not to say that precision and technical skills will not develop. If a student develops increasing precision and technical skills, then we're able to award the student a higher level of achievement. We expect that the student will change in their maturity of precision and technical skills as their work with the School-assessed Task progresses. And they should be rewarded when such things happen. This links in very well with documentation that the students would have to fill in with regards to competency for use of particular tools, equipment and processes, which can be found on the department's website.

Criteria 5 is concerned with the realisation of an integrated control system and the indicator is produces an integrated control system. Now, at the high end, again we have independently produces and at the lower end, with support. This is not to say that there may have been a higher degree of support required at the beginning and then the student became increasingly independent and then became independent. If they develop independence in production and operation as the engagement with the School-assessed Task progresses, then that allows you to award a very high mark. The idea that the student increases their ability to be able to work independently is important for this study and should be rewarded. They need to produce an operational integrated control system that addresses the context, considerations and constraints of the design brief as described in the work plan with documented modifications. If things don't go to plan, we expect that the student will notice that. Then they will make a re-plan, re-test and re-evaluate. That is perfectly acceptable for this process. Again, it's an agile response to a design brief and that we do expect there to be iterations. And during those iterations, we do expect that the student will be able to show a stronger response for criteria 5 and they should be rewarded appropriately. Again, if this project is a iterated response, the student is more likely to be able to show, through their iterations, an increasingly independent production and response to the design brief.

Criteria 6 is a very important criteria and there is no reason why the student cannot address the criteria 6 at multiple stages in their response to the School-assessed Task. In fact, there is expectation in criteria one, two that the student does do some modelling and testing, even if it's verification of operation of particular components or modules, sub-systems and so on. This can also act as evidence for engagement with criteria 6. Again, if the project is iterated, there will be multiple opportunities for the use of diagnostic test procedures and the interpretation of test data. It should be noted that such a test really should be centred around quantitative data and this response is most likely to be effectively displayed as a type of learnt report. It's important we use the indicators and they are that they need to identify appropriate diagnostic tests. It must be stated exactly what this test is for. Need to provide reasons for diagnostic tests. So we're looking for justification here at the higher end.

Explains how to set up the diagnostic tests. So we're looking at the student developing a list of equipment needed and a procedure and that procedure can and should be associated with images to show how the setup was developed. The tests should be conducted and the student needs to generate a new test data. If they were to tabulate the test data and graph it in such a way that they can respond effectively, that would be a strong response. Remember that this test data itself can inform not only changes and modifications to the response to the design brief but also can inform a change of design of the diagnostic test procedure itself. That can also serve as strong evidence. So here we have at the high end, identification of reasons for the diagnostic test. So the first port of call is the reason for the test, not just the test itself. At the lower end, it's simply using diagnostic tests. At the higher end, we're looking at their tests being conducted to generate, analyse and interpret test data. So those verbs, they're important.

Generate, analyse and interpret. They are higher-order skills. So they need to collect the data, display the data, analyse the data as it is and interpret the test data. And as I've indicated, that interpretation of the test data could inform changes to the project itself as a response to the design brief. It could also inform changes to the diagnostic test procedure itself. So we need to make sure that our students are aware that that is a possibility. The verb changes as we're going through the levels of performance. They're important. So at the very low end, it's simply use. At the next level up, it's use and then description of test data. And then we move towards description of reasons or identification of reasons themselves and so on.

Criteria 7. Project management to realise the preferred option. So we're looking for management of the production of the system and documenting decision-making, modifications and justifications. In this criteria, we have to make sure that the students are aware that they must give evidence of management of production of the system. It can't simply be just build, build, build. They need to be situating all their activities with respect to the plan they developed in criteria 3. And where there is deviation and really, we do expect there will be, they need to document that and justify that deviation. All decision making, modifications and so on must be justified and documented. This documentation can take a number of forms. It can be written, it can be spoken, it can be done in film, with images or some hybrid or collection of those ideas in the record of evidence.

It's further evidence that the record of evidence really is better supported as an electronic documentation. At the higher end, we're looking at independent demonstration of skills in time management and organisation. Now, this does not mean that the student shows perfect time management as planned in criteria 3 all the way through. Time management includes re-planning time management in the light of problems with time management that we've not foreseen. Re-planning is rewarded. If there is evidence that the student has had to make decisions with respect to re-planning and they document that in different versions as they're going along, that would be strong evidence of independent demonstration of skill in time management. And organisation to produce the preferred option independently. They need to describe evidence of progress, risk assessments for production work.

So remember, risk assessments, they're carried out in criteria 3 as a plan and as the response to the School-assessed Task is progressing, there may be a maturity or change in how risk assessment is carried out. And if that's the case, that should be documented and rewarded. And that also can be reflected in changes in diagnostic testing and again, the key verb here is justifies decision making and modifications if required. Justification is certainly stronger than explains. So we're looking for an argument here as to why what they did was the best decision under the circumstances. And again, any decision that they student undertakes throughout the School-assessed Task is also up for grabs again with respect to rethinking and re-justification.

Criteria 8 is concerned with evaluation of the use of the system engineering process, including finished integrated control system. And indicators include evaluates the design, evaluates the production, materials, tools and processes, tests and evaluates the system itself. So at all levels, we're looking at using the systems engineering process, including diagnostic testing. And predetermined criteria. Remember, the criteria was developed in criteria 1 for evaluation. They need to, at the higher end, explain recommendations to the design and production of the system. Now, this means that not only is the product itself available for critique with respect to how it could be designed differently but also, all production concerns are also here up for grabs, including timelines, scheduling, risk assessment, access to tools and plant and so on.

This is an opportunity for the student to compare what was intended in criteria 1 through to 3 to what happened through criteria 4 through to 6. Strong documentation of things not going to plan and decision making and those decisions being justified and considering criteria that were developed at the beginning and how they might measure performance to those criteria and how things may have changed should be rewarded in criteria 8. Again, in criteria 7 and 8, we're giving reward for the student adapting to the circumstances as they emerge with their engagement with their School-assessed Task and how what happened is different and the same as what was planned in criteria 1 through to 3.

For further information, you can contact the Curriculum Manager for Design and Technologies, Dr Leanne Compton, using the details below.

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