**Leanne Compton** - Hello, my name is Leanne Compton and I'm the Curriculum Manager for Design and Technologies at Victorian Curriculum and Assessment Authority. With me in this video is the outgoing State Reviewer for VCE Systems Engineering, Colin Chapman, and the incoming State Reviewer for VCE Systems Engineering, Chris Simpson. This video is one in a series of videos that the VCAA has developed to support teachers in the delivery of VCE Systems Engineering. This particular video focuses in on the School-Assessed Task and using the criteria to make on-balance judgments to rank the student cohort with a focus on criteria four to eight. Chris is going to take you through his presentation, so over to you, Chris, thanks.

**Chris Simpson** - So thank you very much, Leanne, for that introduction, and yes, I'm going to walk you through criteria four to eight, which are mainly focused on the production of your system, but where there are elements to your intention that were stated in the criteria that Colin outlined earlier, criteria one to three. So again, the SAT task is going to be something mechanical and electrotechnological, and integrated and controlled, and it will be, give us the outcome based on Unit 3, Outcome 1 and Unit 4, Outcome 1.

And criteria four to eight are really specifically about how the student is going to use the planning that they had outlined in criteria three to develop their system and physically build it. So again, it's about seeing how their design of their system is related to the realised one, any prototyping they've done, how their planning was intended to go, and how it's actually worked out over the course of the project. Obviously, scheduling of time and workshops and parts, also sourcing their equipment, which is quite relevant, to mail deliveries and obviously their access to tools and additional components.

So it's really about seeing how we can reward our students, or our cohort, for the work that they've done in building their system and also reflecting back on how the overall systems engineering process has gone. So again, these criteria are mandated and their indicators are guidance. So the indicators are used to make an informed judgement of the students that are in your cohort and you can tailor them to the specific abilities that are there within your cohort, or that specific year that you're teaching the course in. You need to make sure that you tie all of the criteria back to the systems engineering process, and again, as Colin mentioned, that's outlined early in our study design, and the process is iterative, so it's about that going back, reflecting on what you've done, seeing how you can change things, and then moving forwards with a new plan.

Systems engineering process supports very agile development, and it's not just a follow one path to get a final solution. It's about seeing the different options that are available there for your planning and also for potential of production of your system. But it's really important that you use the same indicators for the students in your particular cohort, and that you can be fair and respect how you're going to arrive at a fair judgement . The indicators are very broad. We all work in different environments and the students obviously have access to a variety of different environments that they can create their systems in. So, in any ordinary year, your interpretation of the indicators will change, and it depends on your cohort and the unique circumstances that you're teaching Systems Engineering in.

So we'll delve down into criteria four to eight now with specific look at how they relate to your assessment of your cohort. So essentially criteria four to eight are concerned with the student carrying out their intention as outlined in criteria one to three, showing their adaptation when their plan doesn't work or things fall off as they go along that road to realising their complete system. It's about their decision-making, it's about their effectiveness of re-planning and re-evaluating their performance with respect to that systems engineering process that is outlined in the study design. It works most effectively when criteria one to three are completed and they have formed a fairly strong intention of the system or product, sorry, the system that they're going to build.

So again, we're related to Unit 4, Outcome number 1, so finalise a production test and diagnosis of a mechanical electrotechnologically integrated and controlled system. Again, using that systems engineering process to manage, document, and evaluate their overall system and processes, as well as their use of that process. Production work can be accompanied by a record of progress or a record of work with any modifications to their planning, creation, testing, and evaluation of their system at the end. And the key thing with this one is to make sure that that process is iterative.

So criteria number four, we've already said in criteria three how the student or what tools the student is going to use. Now, we actually get to look at their effectiveness of using those tools, and again, making sure that they do these in a safe and appropriate manner within the classroom.

So going back up to indicator seven, eight, nine, and 10, again, it's how that student has implemented their work plan. Have they done it independently? Have they used appropriate production processes, tools, equipment, and components, and obviously thought about the OH&S that has gone with it. This can be quite an observational thing in the classroom situation, so obviously as you're working with your cohort as they come through, taking notes in the record book that you have obviously printed off, you can then note to see how those students are using these processes effectively within the classroom situation. You can also see if a student in your cohort has picked up on another one within the class and said, you know, you may want to look at the way that you're using this process to do it in a safer manner, so if you have large classes, obviously, you can use others within the group as eyes and ears as well.

So assessment criteria five, and we'll also do six and seven as we go through, is that realisation of the intention we outlined in criteria one to three, so how has the student gone with using their finished system? And again, we're looking at the small language, metalanguage within our criteria here, so using, everything relates back to our study design in that systems engineering process. So thinking about a control system that addresses the context, considerations, and constraints of the design brief, as well as described in the work plan and document modifications.

So how has that student gone about physically building a system, how they thought when they've encountered their hurdles along the way. Have they thought of meaningful ways to get around them? Have they been able to adapt easily and well to changing circumstances? There could be delays with parts arriving. There may be a queue of people needing to use specific machines in the workshop. How have they gone planning for those scenarios? And have they managed to adapt the things that they've done to allow for these hiccups as they go through? The interesting word is independently as well for me, because I quite like in a classroom situation to see other students helping people in their cohort, but obviously, ultimately, the project has to be something of their own building. It can't be a collaborative project.

Criteria six is fantastic. It's that diagnostic testing and we can start pooling these from other subject areas here. So we can look at it as like a scientific report when we get them to use diagnostic testing. It's not necessarily does the device switch on, but the manner in which things take place to get that to work, so it can be written like a scientific report, and again, looking at the higher end criteria, they also have to justify why this test needs done in a specific way or testing specific purposes within their system. So, identifies reasons for the diagnostic tests, conducts the test to generate and analyse and then interpret the data.

So it's all well and good generating lots of data to go with your system, but you also want to be able to go in and pick a part that data and see if it's performing in a way related back to that initial design brief. So the interpretation is a really critical part of this criteria. If the student doesn't do that, then obviously we're starting to look at, like gaps appearing. Again, there's multiple aspects that we can look at with this, and we can start also tying it back to the previous criteria, particularly number four, when we're looking at the use of tools, so the use of tools isn't just the production of the system. The use of tools can also be that generation of the data through some form of testing.

So if it's done in a safe and appropriate manner, then obviously we can start to document that in our teacher paperwork and then add that into this criteria. The nice thing about diagnostic tests would also be to make them replicability. So not just something that the student knows how to do. Should be able to give that document and the appropriate equipment to somebody else and potentially, they run that test and hopefully generate data that's the same. If the data's different, than we've now got a talking point as we move to the later criteria as to where those discrepancies come up.

Criteria number seven, that's a really good one because this is where we get to start giving students reward for failure. I've coined a new phrase, successful failure. So if we can use that to say to the students, while you will actually gain marks by things not quite working right, then this is the area that we would start to give them those marks. So, again, looking at the higher end criteria, independently demonstrate skills and time management and organisation to produce the preferred option independently, describes evidence and progress and risk assessments for production work and diagnostic testing, and then, again, the key verb, justifies decision-making and modifications if required. We would hope that they would be required because obviously that journey down this path is going to have lots of twists and turns.

So being able to see the students in your cohort have other subjects that may be demanding their time, how have they adapted to changing to those things during the production of their system? Again, looking at the risk assessment, it may well be that the one of the machines is not accessible to them in the workshop for that time, they've gone down a different road. Have they then re-evaluated that risk assessment, so done dynamic risk assessment within that classroom situation, and obviously, with the testing justifying, sorry, with the testing, it will generate the data and then can we justify why we've made the choices along that path. And then evaluating the use of the systems engineering process, again, reference back to our study design earlier, including the finished, integrated, and controlled system.

So again, this is where they get to say to you, I made this, these are the bits that have gone wrong along the way. Using the systems engineering process, I've managed to modify those parts as they've come along and obviously relate it back to that design brief, and again, this is that criteria one to three, forming that intention. This is where we get to reward the students for changes to that intention as it's gone along.

So using the systems engineering process, including testing and predetermined criteria to evaluate performance of the system and any changes that may have gone along the way, and it's also a good chance for them to evaluate how they've dealt with the various things that have gone along during their journey to create those systems so, again, these last two criteria are the ones that, where we as teachers get to really reward our students for things not going right.

And again, from the previous presentation, there will be a Q&A webinar early in Term 1, and look at the VCAA February Bulletin for details of the date and how to register.

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