Transcript of teacher reflection interview

Steve Grant with Natasha Woodcock, Chris Cilento and Andrew Sayers of Henley High School, SA

Steve Grant: This is Steve Grant recording the STEM illustration of practice for Henley High School in South Australia. I have Natasha Woodcock and also Chris Cilento. Can I get you both to introduce yourself, to give you some background in your connection with the STEM project, please?

Natasha Woodcock : I'm the assistant principal of learner growth, pedagogy, integrated learning and STEM, and I lead the STEM program but don't actually teach in that area.

Chris Cilento: My involvement, I've been working with Year 9s for a number of years now. I've been directly in the classroom and I've seen a number of STEM units rolled out across our school and my involvement in the classroom is with the maths and science faculty.

Steve: You ran the STEM Connections project at Henley High School here. Can you describe to me what happened after the project?

Chris: I know they've worked a number of connections with the Year 7s[i]. I was directly involved with the Year 9 stuff, so we had the Year 7s turn up and they worked closely with a primary school each and they managed to roll out six or so different projects across that unit, which was quite successful in terms of each house that we have at Henley High School around a different program. They collaborated really, really well with the primary schools in order to do that. But the big thing there was it was driven a lot by the teachers for that one because there's so many individual projects and the logistics of it was a hard thing for Sandy to manage, for sure. Overall, the expo at the end of it, where it all accumulated and came back together, I think that was a massive success because just seeing that number of projects and what each group and each house would bring in to the party was completely different. I think that was the big successful part of it at the end of it. It was a lot of work to get there and it was tough and collaborating with primary schools, figuring out timetables and logistics of when teachers can meet and when they

can't, that makes it tough for staff at times. But at the end of the day that expo was a pretty big success because there was so many different pieces of learning going on.

Natasha: And there is something that I didn't explain before, but Henley actually runs, we have about 250 Year 8s and 250 Year 9s and we break them into five houses. So we have at least two classes in each house of Year 9s.

Steve: So did the project continue after this initial round with Sandy?

Chris: Yeah. So Sandy drove that one and it hasn't run this year with the primary schools and I think probably that Andy, when he's here, will be able to elaborate a little bit further but it didn't I believe go ahead this year purely based on that logistics and figuring out all of the communication with the primary schools.

Natasha: It wasn't just the communication either; it was actually physical space. Henley is a school built for a maximum of 1,200 students and we had 1,460. There was no space. [laughs]

Steve: What changes in the school context have occurred? I know, Natasha, you were talking before about some significant changes that have occurred at the school. Have there been any other changes in the school context that have impacted upon the project in particular?

Natasha: There have been. As I said to you there's been, we've got a new principal. He's been here three years, which doesn't sound like it's new, but it actually is because the previous principal was here for about 15 years or something, 12 years. A long time. So that was a whole change to the entire school and on top of that, we've got pretty much all new leadership and there has been a big turnover in terms of leadership of the science and maths faculties as well due to staff going to other positions and other positions within the school as well.

So it's been quite different and that has affected the program because on top of that, we've got more students as well and we're now in capacity management. We're not allowed to take any more students other than those inside and it's caused a lot of difficulty with being up to the logistics and also not knowing who to contact as well in the primary schools. They've also had quite a bit of change at the moment as well. It's just leading up to the Year 7s moving into high school has changed a lot of the dynamics as well in South Australia.

Chris: One of the positives, though, that I have seen is, we obviously run transition for our Year 7s coming into Henley from the local areas. The ones that do manage to get an enrolment here, we've found that their transition has been much simpler because they've made those connections with staff. So they might have had the same staff member that's been working with

them whilst they're in Year 7 at the primary school and then as they transition over to Henley, they've already got familiar faces; they know the area of the school. So that would be a big positive in terms of how we've seen the transition process take place and working with those primary schools.

Natasha: We are still working between teachers but not so much bringing the primary students over, which just physically wasn't possible.

Steve: In reflecting on STEM and STEM practice, how has your thinking around STEM changed and how has the pedagogy at school been impacted?

Natasha: Because of the STEM, we've actually started to move into integrated learning in a big way and next year in our Year 8 program for the first time in the start of semester two, we'll be running a four-week integrated learning project which will include all the core subjects. So English, HASS, Maths, Science and Languages. Because of the way our timetable works, Languages actually becomes part of the – they're one of the core subjects. That's going to happen next year and we've already done quite a bit of planning towards that but it's the STEM curriculum and the STEM projects that have allowed that to happen because people have got used to the idea of doing some sort of integrative learning.

Steve: Has it triggered a change in the thinking amongst staff?

Natasha: It has really changed a lot of the leadership thinking around it, and there has been a noticeable change that instead of saying, "No, we don't want to do it" it's saying, "How can we do it?" which might not sound like a big change but it really is. So that's underway at the moment with that 'how' and then including staff into the 'how'.

Steve: What are your reflections?

Chris: We've recently just completed our Year 9 unit this year. I'd say it was one of the most successful units that we've had for quite some time. There was a lot of work that was put into it and the organisation behind it and at the end of it we gathered data based on what the Year 9 students actually thought of it. So, grabbing it straight from the students, and the big positive thing that came out of it was the fact that they found the learning where they were guiding themselves the most powerful. So whilst during that five-week unit we didn't have a specific, "Alright, now we're doing Science, and now we're doing Maths", it was all the time we were doing STEM for that five-week period across the maths and science lessons. They found that – and I can purely just speak from the experience that I've had with the Year 9s – they were very directive in terms of they had to work through their group dynamics, they had to have leaders

inside of their groups and different roles and time management skills, which is something that middle school students aren't strongest in at times. But the fact that they really liked the open plan learning style. So they go, "Alright, we've got this task here that we need to complete by Tuesday, this one's has to be ready to go by Thursday", and it was about how that group faced that challenge and who was doing what was really powerful. At the end of it, once it all came back together, the expo was incredible; it was very powerful learning that had taken place there and I think the feedback from it was that they really want more of that type of learning, where it's not, "Okay, sit down, we're working through a textbook right now, we're going to focus on this part of the curriculum." They want to be able to learn using those capabilities that we're always talking about: How are they problem solving? How are they actually reflecting on what they're doing? and making changes based off of those decisions that they've made.

Like what Natasha was saying earlier, space is a massive one for us at Henley and luckily enough we've managed to structure our STEM unit this year across the houses. I work in a house called Florey. With Florey, I have them for Maths and Science, one of the classes, and then the teacher next door had the other class for Maths and Science. So we collaborated the two classes together. We had 50 students that were working amongst that and we were able to open up the classroom walls and they used that whole space by themselves. Which was great to see, because we pretty much walked in to the lesson, and said, "This is what needs to be achieved". Once they understood the project, once they knew what they needed to do, or "We're doing testing on these days; you need to be prepared to do those tests", like the field test that we were running for the unit and they had to manage everything themselves from that and the life skills learning that they did through that was far beyond anything else that you see in a classroom when they're just working through an assignment. It was much more powerful than that.

Steve: You talk about students developing those softer skills: collaboration, time management, project management, group dynamics and being in a different space as well. The kinds of learning that the students were going through is very different and they enjoyed that. You said that they were getting a lot out of that. Your pedagogy before then and your pedagogy, your way of teaching now, has there been a change or a shift in the way that you thought about STEM and science, that integrated learning, before the project and now after?

Chris: Sure, yes, prior to it, running through the STEM units, it was definitely, I'd say Henley itself probably had a more traditional schooling outlook in terms of how that curriculum was planned. There wasn't much collaborative work between the two faculties at all, I'd say, but over

the last or six or seven years we have brought in those changes and we're getting more and more overlap. I think now that the school is starting to get a bit more continuity with the staffing as well. Natasha mentioned the leadership structure is becoming more rock solid for the long term now. I think that's happening also with the staffing faculty. We're starting to see that teachers are buying into it and I think that's really important in terms of getting that overlap and particularly where possible having a teacher that has Maths and Science for the same class, that's a very strong point. So the change taking place, there definitely is more movement towards overlapping those skills and I know personally for myself I love whenever we can collaborate and whether it's not just in the classroom but we can put the two classes together and find a way for them to use those skills, those softer skills that we want to work through. But putting them in those situations where their real authentic learning is taking place.

Natasha: There's definitely been a change, even in the three years since I've been here, but the real key one has been, especially for the maths faculty. They want it embedded in the program not an add-on to the normal program. That's something that myself and Andy and Jeffrey maths – Andy science and Jeffrey's the maths leader – and myself have been working really hard to try to do. So they are assessed in their classes for that work because in the past it was a different assessment grade. It had nothing to do with what they were doing in the classroom and I think that's really got a lot more buy-in from teachers. Plus, they know that this time next year they're going to be doing one. Whereas in the past it was sort of up in the air about when it was going to be and that sort of thing whereas now it's in, for example, that integrated learning one will be weeks one to four, term three. They know that now. Whereas in the past that wasn't there. So that's made a big change too, I think, and also in the past, the projects were done and created by a couple of people and then it was given to people. So there wasn't the ownership of it whereas this last one, we had one teacher come up with the idea and he did the key amount of work, but then it went to the teachers who then actually planned and owned it for their own classes. That was where it's been different.

Chris: Yes, Ross definitely did a huge amount of work himself and it definitely wouldn't have been as successful as it was without that huge chunk of work that he collaborated and put together for the staff. I know everybody that was teaching that unit was incredibly thankful for it. But, yes, touching on what you said, Natasha, it worked. It was much easier for reporting as well. This year for our maths component of the STEM we looked at measurement. So, we covered the Year 9 component of measurement and then in the science area we were looking at heat transfer and looking at conduction, convection and radiation. It was all through basically

they had to design a rocket ship that could take off and re-enter the atmosphere and so we were covering aerodynamics; we were looking at conduction, convection, radiation heat and how that was all going to take place but it had a real-life problem to it.

Once we finished up and it came to assessment, that was easier to do because it was part of that; we had to teach that anyway. In terms of our Science we had to teach the heat transfer stuff and in terms of Maths we had to teach measurement stuff, regardless. It was just putting those things together and finding ways that they can overlap, and they can be integrated – once we have that and … it was really successful from there.

Steve: In terms of the industry connections that you had with the STEM Connections project; did they sustain? Did they improve? Do they impact teaching and the quality of learning?

Natasha: I wasn't here when that started, and we haven't had any real industry connections with the STEM programs since I've been here. So no, it didn't. We do have industry connections in terms of working with tech studies but not with the overall STEM program.

Steve: What do you think was the cause for those industry connections to drop off?

Natasha: I think it was really more about people being able to make those connections and then keep them and there was someone in the role; Sandy was involved for quite a number of years and when she left I think she'd already allowed them to drop off. So new connections haven't been made because, as I said, this is my first year in the role. It's one of those things that just hasn't continued, and STEM is actually not the key component of my role. It's one of about five, whereas hers, it was her main area.

Chris: We haven't had a huge lot to do with the industry and just from a classroom perspective we obviously generally get guest speakers to come in and that's quite powerful to see: hey, this is the real-world situation. So at our expo or at a launch, whenever we start a STEM unit generally, we do have a STEM launch as well where all the Year 8s or all the Year 9s will sit in the hall and we'll have some people come and speak to us. I think that's where the powerful connection is made, is going, "Hey, this is the real-life person. This is where it actually leads", and looking at the jobs and possible pathways that the STEM unit could take them on. Whilst that's kind of a one-and-done thing, like they come in, they speak to us, it's awesome, the students most of the time really get a lot out of hearing from somebody that has been working on a spacecraft in real life and I think that's where it's quite powerful. But we haven't kept connections where we can keep going back to them and it is more also a one-and-done kind of situation.

Natasha: Each time there's been somebody different, too, hasn't there. When Sandy was getting people in. So, currently we will work in that area again. It's just a case of now building new relationships with different groups.

Steve: So there are some challenges around maintaining those relationships but also initiating those as well?

Chris: Yes, I would say the initiation is the tough one. It's who you know, and if for some reason you don't happen to know some engineers and some astronauts or something like that – not a whole lot of people know their local astronaut! So unless you actually know those people, I think that we probably have struggled in terms of initiating those relationships and it also comes from how much would those industry people want to buy into our own programming; how could they contribute. I think that would be powerful if we could get the buy-in from them and then they also see some form of incentive to do that. So that, "Hey, we've got these people, we're preparing them and, in the future, they will be working in your workplace and you could be their boss."

Natasha: It's definitely been much easier for the tech studies area to do that. They have a connection with the crane drivers' association and now have a student who's just completed his licence to drive a crane – literally. And earn double what we do! [all laugh] Those sorts of connections have been made but they don't necessarily work with what we're doing in the classroom.

Steve: Interesting, thank you for those observations. You mentioned that there have been some connections between learning areas and with the integrated learning projects that you're planning for next year. Can you talk more about what connections still exist between learning areas?

Natasha: The STEM has – tech studies, due to our line structure and so on, has actually stopped working with the STEM program. Mainly because our students, only a small percentage of them, do tech. The groups used to have science and maths and then tech, and you might only have one student, two only, two or three students in an entire class doing tech. It made it really difficult to continue that. It was decided this year that we would just do it with maths and science and that's been really successful. In terms of connections between subjects, we made the decision not to have tech because it was so difficult logistically but the science and maths side of it has worked really, really well this year.

Steve: Do you feel like you have the skills and knowledge to plan and develop units of STEM yourself?

Chris: Personally, I feel like I would absolutely be able to. I'd be comfortable in setting up the current one that we've got at the moment – building upon that and reflecting. And I'm assuming that being Week 9, we've got a science meeting, probably we'll spend a little bit of time at some stage reflecting and reviewing what our STEM program actually looks like this year. And by all means, yes, I feel super comfortable. If I had to lead that direction, I feel like I'd be able to do it. I would be a little bit hesitant myself if I had to start from scratch to just build one up and put one together for an entire faculty. I think that needs to be done in collaboration with leaders. It also needs to be done in collaboration with the other year level teachers: the maths and science teachers from Year 9 or from Year 8. I think everybody needs to be contributing to that.

Personally, my opinion is, I feel like there needs to be a driving force and we were lucky enough that we did have that. Like we were saying, there was one teacher that was that driving force this year and I think we need that driving force every year in order for the unit to be successful because sometimes, and you do see it sometimes, if it's messy and there's free range, you can see it in the classroom if the students don't see the relevance behind it the unit loses its value. Same with the staffing, if the staffing haven't got that buy-in, if they can't see the structure and the value behind it, I absolutely can see that it wouldn't be as effective as it has been this year. So, personally, yes. I feel like I would be able to build upon what we've got. I feel like it would be a lot of work and it would be a huge amount of planning, but I know I would be able to do it. That being said, it needs to be a collaborative exercise; it can't just be one thing driven by one person; it needs to be a team effort.

Steve: Joining us now is Andrew Sayers, science coordinator at Henley High School. Andrew, can you give us some background please on your connection with the STEM Connections project at Henley High?

Andrew Sayers: Yes. I am the current science coordinator and I'm in my first year in that role. However, prior to this role I was the maths coordinator at Henley High School from about 2016 to 2018. So I was involved in some of the leadership planning of the STEM project in collaboration with the STEM coordinator, science coordinator and tech coordinator. I was also a Year 8 science and maths teacher. I collaborated with a local primary school, Kidman Park Primary, in 2017 and 2018. That involved 50 students from Kidman Park and 50 students from a house in Henley in Year 8. So there were 100 students in total, four classes of 25. We ran two projects: one in 2017 and one in 2018.

Steve: Could I ask you to reflect on what happened after the project? Did it continue? If yes, can you give some elaboration on that, and if no, what stopped you?

Andrew: The 2017 project was a mission to Mars project and that involved the use of Microsoft Teams, which was quite innovative at the time; and industry connections. It was quite hands-on, it involved coding robots to traverse the surface of Mars. So that was 2017. In 2018 we did a nuclear radiation project and that involved designing some sort of prototype or product that would protect humans from a radioactive disaster – it could be used in the medical field. So that was to do with radiation, which was quite high level. We didn't have as many industry connections with that one. Those projects, no it hasn't really continued. The connections with the primary school have ceased.

Probably some of the barriers to the project continuing … partly funding, because the funding stopped, and it is a huge undertaking, especially if you've got a primary school that is a certain distance away from the high school and having to get here, just in travel and transport, that costs quite a lot. So there are some complexities around that. Release time for teachers. The 2018 project, for example, we ran it across full days and that's fine for primary schools because they've got that one teacher the whole day, but I might have science for a third of the day and then I need to be covered for my other lessons for the other two-thirds. So there are some complexities with working with the primary schools.

Positives from it were that the Year 7s were able to access our specialist facilities and expert teachers. For the high school, we were able to view the different pedagogical practices of the primary teachers and that was really good. So, to answer your initial question, no. We learned a lot – we learned a heck of a lot from the project but there hasn't been any continuation with those links with industry. But we've been able to apply some of what we learned to our other STEM projects such as the Year 9 Orion project that Chris has just spoken about.

Natasha: Also, one thing I will say is that there have been connections kept with primary school but they've changed. Instead they've done work shadowing. Teachers have gone there and shadowed them for a day and then the same thing did happen as well. So those sorts of things have happened but they've been in a different format due to the logistics that were just horrific between lots of small primary schools and a very, very big high school.

Andrew: Just on those complexities, we're under a capacity management plan. I don't know if you've spoken about this, and even though we've got the facilities we don't have enough of the facilities. The primary schools were able to access our labs, but often we wouldn't have enough space to cater for 50 or 100 students at a time. So just the amount of work involved in planning a space or one or two classrooms that we could use was huge. That was a lot of time involved.

Natasha: I did explain that our school was built for a maximum of 1,200 and we had 1,460.

Andrew: Probably been a thousand. The primary schools that are close such as Henley Beach Primary, that worked beautifully because they could walk here in 10 to 15 minutes. But the ones that are a bit further away, you need to pay for the buses and so on and there's time, money.

Steve: Have there been any changes in school context that have occurred and what impact did they have? Positive changes? Negative changes? Neutral changes?

Andrew: I think, generally, there's still negative perspectives about STEM projects because they involve so much work for teachers. The students, and perhaps this a school-specific thing, but the students don't like all that independent thinking and that comes with STEM projects. They're used to structure and they like explicit teaching, a lot of them.

Steve: Could I get you to reflect upon some of the changes that might have occurred in terms of leadership or in terms of resources or in terms of staffing – those contextual factors that have impacted upon the project?

Natasha: It's been a complete change. I don't know that that's a bad thing, though. I think it's actually been good because the people who are now in those leadership positions have some experience with it but are more open to making changes. Is that the way you'd see it as well?

Andrew: Yeah, and also the leader of STEM was Sandy Moran and she left just when the project finished. So, there was a bit of a lack of continuity. That's probably also played a part.

Steve: How has your thinking around STEM changed? Has your pedagogy been impacted at all by the project?

Andrew: To be honest, the 7/8 STEM project didn't change a huge amount. I would say the Year 9 STEM project this year did. The Orion project, because it was successful. The 7/8 projects I don't believe were. We learned a lot and perhaps that's partly why the Year 9 project this year was more successful. But I don't think it changed a huge amount.

Steve: So are you saying that the way that you have done teaching and learning has not changed from before the project to now, after?

Andrew: Yes, I would say that's correct.

Steve: We were talking before about industry connections and some of the challenges around sustaining and maintaining those. Can you talk to me about the industry connections that you had before the first part of the project? Did they sustain? Did they improve? Did they impact teaching and learning and the quality of it?

Andrew: I'll probably retract what I said slightly in terms of no change, because one thing that that project did bring out is the importance of industry connections. As a leader of science that is a priority for me for 2020; it's one of my strategic goals for our faculty that we grow those industry connections. Let me give you an example: we've got biomedical science; we've got a course at Year 10, and I'd like some site visits to the IMVS, to SAHMRI, to the universities and to build those connections. I'd like to do that predominantly at Year 9 and 10, and to target some of the career pathways there. I think the 7/8 project and certainly the Orion project has made me recognise the importance of those industry connections.

Steve: Did those industry connections keep going after the project or have they since died off?

Andrew: Because the project changed – I was very much in favour of doing the same project in 2017 and 2018 so you could continue those connections – because they were so different, the projects, we couldn't maintain those connections. Another reason for wanting to continue projects is teachers become very negative if they're having to do something new every year because of the workload.

Natasha: We talked about that …

Andrew: Yes, so that's another reason, not just keeping those industry connections but building that sense of confidence amongst the teachers that these projects are okay; they're not as much work. But if you're doing a new one every year, they are a heck of a lot of work. We've done five Year 9 STEM projects now. Five different ones. From 2020 we're going to do the 2019 project again.

Natasha: We also talked about embedding it into the curriculum. So it's actually marked as part of their curriculum as opposed to a separate task on top of. Which was a real thing that they really, really objected to.

Steve: Might be worthwhile now having a think about that in terms of the integratedness, that it was going to be assessed as part of the teaching and learning. What connections still exist between learning areas?

Natasha: I actually think that science and maths has grown stronger, but tech has completely pulled out of it. Which is a bit unfortunate but it's just due to the logistics of the fact that in only a small percentage of our students in Years 9 and 10 and so on actually do tech studies.

Andrew: Science and maths has always been reasonably well integrated here because our middle school philosophy, which is Years 8 and 9, the same teacher teaches two subjects and

it's usually maths and science, and English and HASS. Often a Year 8 teacher or a Year 9 teacher will be teaching the same class for maths and science, and that allows you to integrate the two. I agree about the tech connection, that we haven't really – that's to do with timetable structure, purely.

Natasha: It is, yes, our timetable structure just doesn't work for them to be more involved and I think they'd like to be, as well, but it just doesn't work.

Steve: You came in at the tail end of Chris's reflection on his skills and knowledge to plan and develop units of STEM. Do you feel like you have the skills and knowledge to plan and develop units of STEM?

Andrew: Yes, I'll comment on two perspectives there: one as a teacher and one as a leader.

As a teacher, I'm pretty confident to plan a project of this type. What I'm not confident on is the technology side or the engineering side, because I don't have that background and you see engineers and people with that work history come into a school environment and teach maths and science and they can do that so well. And that's where the tech teachers are really good, they've got that.

I know Chris referred to the importance of having a leader or a small group of leaders that drive the project because often you'll have a few in a team that won't contribute much and then that pulls everyone else down as well. So the dynamics of the teaching team are really important.

Steve: The last question I wanted to ask was did you rerun the project and what changed but I feel like you've already covered that in describing what it's looked like from 2017 and 2018.

Andrew: I will add something to that, though. The reason why we didn't run the project the second time is because the Year 7s come here into Year 8 and they've done the project before. So we couldn't run the same project. You could do it every third year. But that's the reason why we didn't. So no, we haven't run the project again. You could run the 2017 in 2019 and the 2018 in 2020 but we couldn't do the same project in 2017 and 2018 and *no* group could, no school could.

Natasha: That's different when we do it with the Year 9s. That can be run because they're different students every year.

Steve: Andrew, Natasha, thanks so much for your time.

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[i] At the time of the interview Year 8 is the first year of high school in South Australia. (This will remain the case in SA until Term 1, 2022 – the last state in Australia to move Year 7 out of primary.)