ASCILITE Wavelength Episode 8 Transcript

Opening

Host: Welcome to this edition of the *ASCILITE Wavelength Podcast*. I am your guest host, David Porter. In this edition of the podcast, we talk learning design with two segments produced by Keith Heggart and the ASCILITE Learning Design Special Interest Group.

Learning Design is just one of several special interest groups that are part of the ASCILITE community. The special interest groups take a deep dive into topics at the intersections of learning and technology and are open to both ASCILITE members and non-members. You can find more information on the ASCILITE Special Interest Groups under Get Involved at ASCILITE.org.

Now over to Keith Heggart who talks with The University of New England's Mitchell Parkes about Cognitive Load Theory and its applications to learning. Parkes defines the theory and outlines some principles to assist with cognitive load.

Segment 1: Cognitive Load Theory, Mitchell Parkes

Keith Heggart: Recently, the Learning Design Special Interest Group for ASCILITE caught up with Mitchell Parkes from the University of New England for a chat about learning theories. It's safe to say he had some strong opinions.

Mitchell Parkes: Cognitive Load Theory is the single most important thing for educators to know.

Heggart: In a riveting talk, Dr Parkes, who's the Director of Academic Development at UNE, explained what Cognitive Load Theory is, how it relates to computers, and how we as learning designers might make use of it. Our chat begins with Mitchell explaining how he sees Cognitive Load Theory fitting in.

Parkes: Cognitive load stuff is something that's sort of resonated with me from the get-go, and it's related to a learning theory that has sort of been a bit forgotten. I remember I heard about this first probably in my Graduate Certificate in Computer Studies at CSU. There's a shout-out for CSU. This was back in the 80's, and I was certainly introduced to this idea. And I think, why this has sort of become a bit of a forgotten theory, because I think what's happened is it's been wedged between two biggies. It's been wedged between sort of Behaviourism, and then we've also got Constructivism at one end. Having these things sitting at two ends of the spectrum I think is probably appropriate. Again, think about behaviourism. We've got sort of proponents in a learning theory. It's theorists like Skinner and Pavlov and his puppy dogs. It also is based on that epistemological background is sort of a very positivist thing. And they saw this, this idea of stimulus and response. And they weren't too concerned with what's happening in between this process, so it was largely ignored. So, this was you would characterize that by say being very teacher directed. You know the teacher is the one who sets up the conditions for learning, gives the stimulus, and the students they show that they've learned because by providing the appropriate responses.

Then at the other end of the spectrum, we've got the constructivists. Which they say, no, no, no, no, no. It's about learning It's based upon a more interpretivist epistemology. It's learning is a constructive thing that basically learners build their own views of the world. And so ,we've got theorists around Piaget, cognitive constructivism, Vygotsky social constructivism, and Ernst von Glasersfeld with the radical constructivism. I never really got my head around that.

And so, these were the sort of two bookends. And then I suppose that's why I think cognitivism has sort of been lost a bit in the middle. I was thinking about it. It's sort of epistemologically agnostic because it doesn't necessarily form into one foundation of what learning is or what knowledge is or

isn't. It's really sort of takes into this idea of explaining the mechanism between what happens in terms of the process of learning.

Heggart: Mitchell explained that his background as an ICT teacher informed his understanding of Cognitive Load Theory.

Parkes: What resonates with me—because my background is Computer Ed—it's based upon information processing through this idea. Once we got the metaphor of a computer, it became a nice tool to think. Now it's clear that you know the mind doesn't necessarily work like a computer, but there were terms and things that we could understand. And so, when I think about things such as this item, short term memory and long-term memory, my computer brain tells well, short-term memory is like RAM. It's only there as long as the computer is turned on. You turn it off, it's gone. So, it's temporary, and their long-term memory is like your hard disk and the like, but there's also some interesting things around that in terms of sort of sensory memory that we're actually continually scanning the environment, and there's really so much information is coming in, it's about how much gets attended to. And one of the examples of sort of looking at your sensory memory and it's also sometimes called a sensory register is it's called the "cocktail party effect".

We all go to cocktail parties. You've got that buzz of conversation that, when you can, you can tune into different conversations. Or the classic one is when there's a buzz of conversation and you hear your name mentioned you hear it. You weren't necessarily attending to their conversation at the time, but because you're continually scanning, looking for things of importance or relevance. So, it's about having some control over where we direct our attention, and I'm thinking this is probably the big ideas I want to talk about in terms of the implication of Cognitive Load Theory for learning design.

Heggart: So just what are these big ideas of Cognitive Load Theory? Mitchell went on to explain.

Parkes: I think Piaget, and particularly, also Seymour Papert, talked about big ideas. What are the big ideas? I think there are four big ideas that we really need to know about Cognitive Load Theory, and then, how do we tease out the implications of these for learning in general and learning design in particular. Basically, the idea is that our working memory is small, and long-term memory is large. I can handle that, because when I think about my computer, I've got so much RAM. And when my computer is running slow, I've got too much loaded up. Even my dear iPhone, I overload, because there's a limited amount. And so, the idea that my long-term memory is large. So, if I can get things in line, my longer-term memory and put things on the hard drive that I want to keep, then I'm pretty safe. So, the idea of learning is just basically the idea of taking things from working memory to long-term memory, and so this is from a cognitive load perspective.

So how do we get things in working memory? First thing, we have to attend to them first. Because we've got this idea, this sensory register, we have to get things attended to, get them in working memory. Then how do we put them into long-term memory, where they've got a little bit of chance of being stored? But there's a problem, there's a bottleneck because we do have a finite amount of things we can pop in our working memory, and so when that gets overloaded, when it gets too full, the transfer from short-term to long-term memory gets blocked, or it's not as effective or efficient as it could be. And what happens is not much learning can take place. So, we've got this bottleneck. It's about creating efficiencies, about creating directed attention. And that's really the guts of Cognitive Load Theory, and learning design needs to be called cognizant of it.

And also, another idea is deciding that we actually present separate information-processing channels between verbal and visual material. There's good evidence to suggest that we have different amounts of load if we can juggle things between the visual and the verbal channels.

Heggart: So, if that's what Cognitive Load Theory is about, well, what does that mean for us as learning designers? Dr Parkes went on to explain.

Parkes: So, we've got this idea that working memory is limited. So, we got to think about the split-attention effects. Let's look at the diagram first. If you've got your learners having to put things together from multiple sources, they actually will actually overload, and they won't necessarily remember things. So, this idea where we've got the water cycle science teacher, remember this? So, we've got, you know, A-B-C-D. But what happens is students are attending to the diagram, and then, they're attending to the text, and then, they're having to sort of imprint the thing back over the diagram. So, what happens is that a very limited working memory gets quite full. The best way is to actually integrate the text with the diagram. So, when you can do that, this is so making sure we're not splitting our learners' attention between a legend and a diagram. The redundancy one is this one, which you could rightfully pick me up on this. It's talking about the idea when you presented the information, either it's not directly related to the learning, or you're giving the same information in multiple forms. And I've just given a very good example of that, because I've just read what I've read out what you're trying to read. So, if you're trying to read that, you might be reading that at a different speed is what I'm talking about. And so, there's a problem there. So, it's about if you're trying to avoid doing it in multiple forms. Another way is thought about making sure that you put in additional information, not necessarily related to learning. And there's me, I've got a very, very lovely wombat stuck in the middle in a bit of text. I mean, that fact that I put it there, it's distracting in itself, but a learner might go well. "What's the relationship of that to the text?" So, there's already redundant information. So, then this is idea that the modality effect. If we've got diagrams, and you've got text and speaking, one of the big ideas was that it is evidence suggests that the mind will process visual and auditory information separately. So, if you're going to talk to a diagram, it's best to have the diagram and instead of having the labels actually speak, narrate the diagram because they're being processed by two different channels, and that's not filling up working memory as much.

There is this idea is called the worked example effect, and it talks about the power of scaffolding. So, this idea that guided problems, I mean I give my students lots of problems to let them solve themselves. But what happens is that that so much of their attention and effort is being focused on sort of unpicking the problem, what happens is they're not necessarily remembering the process. They're so in the middle of doing the process, they're not necessarily remembering the process. So, we've got this case, and this has sort of been replicated a lot of times in the research, is that these learners might effectively solve the problem and you can watch them solve the problem as an educator. And you get the idea, "Well, they've obviously got the concept." But no, because they spend so much time hard coding out this solution, they actually haven't necessarily put the process into long-term memory. And so, this is the idea that this worked examples. They've shown that students who do things on worked examples, they tend to perform better in tests.

And this is this idea of scaffolding, and I think scaffold is a beautiful thing. I get annoyed when people say "spoon feeding", and frankly I just want to slap them with a wet fish. So, are you spoon-feeding? No. So, What's a scaffold? A scaffold is something that holds a structure in place to look and support itself. So, it's about thinking about this idea that we've got novice learners working with them with worked examples helping them understand the principles. And then as we move from novice to expert, then we slowly remove those scaffolds and then they're doing the independent problem

solving. So, it's not that we don't want our students to be independent problem solvers. We just have to realise in the very beginning they probably do need some guidance to help them build the scaffold. So, thinking that's an important part you won't think about building into your learning designs. This idea of not only breaking things into manageable chunks, but thinking about where the support is needed, where the guidance is needed.

Heggart: So, what advice would you give to learning designers trying to implement Cognitive Load Theory?

Parkes: Just remember think about presenting information in visual and verbal channels, because remember we've got the modality. Getting the big intent to combat extrinsic cognitive load, take content, break it down into smaller segments. Try to get rid of the nonessential content, and highlight important things. It's about directing attention. That doesn't mean that our presentations or our learning management systems should be bare wastelands with nothing in terms of pictures and images. But just be mindful, there's a trade off. So, I'm mindful that every time I put a picture of a very cute wombat up on a slide or anything like that, that I'm trading off a little bit of a student attention, because they're homing in on the wombat or whatever. Making sure that you place the words close to its corresponding graphics, so you remove the split attention effect and thinking about the power of the group. You know, not only the fact that group work and collaborative activities are important with themselves, the fact there is a nice way to sort of share that very limited cognitive load.

Heggart: Well, there you have it. Cognitive Load Theory and how to make use of it in your learning design work. Thank you very much, Dr Mitchell Parkes.

Host: Thanks to Keith and Mitchell for those tips. And if you are interested in further exploring the principles, such as the redundancy and modality principles, be sure to check out *e-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning* by Ruth Colvin Clark and Richard E. Mayer. The book, now in its fourth edition, provides a practical guide for applying these principles to learning.

When we come back, Patsy Polly of The University of New South Wales shares with Keith how she is using some of today's contemporary learning technologies and approaches to equip learners for their futures.

Mid-Program Break
Announcer: This podcast is brought to you by ASCILITE and tell as the Technology Enhanced Learning Accreditation Standards. TELAS is a rigorously derived framework that recognises quality online learning through a certification process. The standards for free. Find out how to get your course certified at www.TELAS.edu.au Now back to our podcast.

Segment 2: Patsy Polly
Host: Welcome back to the *ASCILITE Wavelength Podcast*, featuring critical discussions from our Learning Design Special Interest Group. The group recently invited Patsy Polly to discuss some of the learning innovations she is using at the University of New South Wales. Polly provides an overview of how she has integrated, teamwork, blogging, microcredentialling, badging, and eportofolios into a comprehensive whole to help students, not only learn but to evidence that learning. Keith Heggart kicks us off.

Keith Heggart: There are a lot of buzzwords in education at the moment, talking about things like micro credentials and eportfolios and all kinds of other ideas. But what does that all mean for us as

learning designers? How can we make those ideas…and should we…part of a meaningful learning experience for students? Recently, the Learning Design Special Interest Group for ASCILITE caught up with Professor Patsy Polly to talk about exactly these issues. Professor Polly is a Scientia Education Fellow at the University of New South Wales, and she's responsible for making these things happen. So, to start off our discussion, we asked her, "What's the point of all of these ideas? Why should we look at being innovative in our learning design work?"

Patsy Polly: I always like to come back to our institutional priorities as a start point for why I like to infuse new ways of doing and innovation into our courses and programs and how I like to motivate, not only our students, but our colleagues in thinking about what they're doing in their classrooms and beyond in terms of what we would like them to be upon graduation. And it comes down to becoming. global citizens, scholars, leaders and professionals—trying to bring across the idea of instilling in students the understanding of their discipline and its interdisciplinary context and also having abilities of ethical, self-directed practice and independent lifelong learning. And when we're thinking about skills, the whole idea of developing those skills and recognising those skills for students is very important. And what we have learnt during these COVID times is that upskilling and repurposing our skill sets is super important in adapting to change.

Heggart: So, Patsy, you've explained that innovation is one of the ways that we might help our students have a better learning experience and especially thinking holistically about their journey through university, and also how it might help us be more adaptable in times like COVID. So, how did you go about doing this at UNSW?

Polly: So, let's start with the whole idea of recognising professional skills development, the whole idea of linking reflective practice, experiential learning and all the other things that students do along the way, not only at university but outside of university, to build up their graduate attributes. So, the challenge, this work started with a challenge, and that challenge is teamwork. And let's face it, a lot of our students find teamwork activities challenging. But when we rephrase this in terms of understanding that assessment tasks when coupled with reflective practice and asking students to think about the types of skills they're building, in particular professional skills. A lot of people call these soft skills, generic skills. I tend to refer to them as professional skills because, to be honest, these are the skills that are quite difficult to master and are required in our workplaces. So, teamwork is such a skill that is required for success in a workplace, and of course communication is coupled to that.

But there is some significance in building these skills, and the significance comes back to visualising them and making sense of how they've formed as part of a degree program. So, we would like the idea of visualising graduate attributes in teamwork and launching into this idea of professional skills and career development learning. We want these skills to be visualised by students. Now, students come to university to engage in a career development learning and their program of activities via their degree program, of course. But there's other things that they learn a lot that way, and we need to really make that explicit for our students. We also have to understand that stakeholders and educators need to know this is happening, and also that we visualise these skills and we recognize these badges of achievement.

So, these are the concepts that I'd like to bring it across today. And I'd also like to convince you that assessment tasks within disciplines, within coursework programs, degree programs are authentic, not only to our discipline and viewed as skills building, but can also be seen as many work experiences. Because a lot of us design these learning experiences to be in alignment with what the

discipline values and what the field values and what the career values. So, I'd like you to think about this as a new way of looking at assessment tasks.

So, let's think about professional skills development. I always start with a course example, because this is where the design starts to happen, especially with tasks and assessment tasks that are authentic to our discipline. So, I'm a medical research scientist by trade, and to communicate research is super important in our sphere. So, we've implemented a task called the Research Impact Symposium, which is a team presentation worth 30%, so it's worth quite a lot of the course schedule. And the whole idea is to improve student skills in research and teamwork. So, we instil the idea, and we design the task to build up these research practices, critical thinking, evaluation, and reflection on the types of skills learnt, but also developed teamwork skills. And teamwork skills is also wrapped into research and communication skills because students have to work together as a team to research a topic and come back as a panel and discuss it. So, communication is super important.

As part of this, we've built in the concept of eportfolio pedagogy, where students are thinking about the types of the skills and the research skills they're presenting with their team in terms of their professionalism. So, they are taking the role of researcher, they're presenting their project, they're learning how to speak about it confidently and communicate key aspects of the research in a team. So, it's quite a complex task, but the portfolio segment of it is the reflective practice part of the work.

Heggart: So, there's a lot there to unpack, but just to get us started, tell us a little bit more about how the reflective practice part of this actually works. What kind of tools do you use?

Polly: So, we ask students, "How do you develop these skills if you're not given opportunity?" So, we give the opportunity as part of coursework. So, the implementation practice that we've developed is to enable reflective practice that is connected to various aspects of the course, but in particular this assessment task which we call the Research Impact Symposium, which is really aimed at building those teamwork and collaborative skills. And students are asked as part of that task to reflect critically on their learning of skills. And that reflection, while we talk about it at the beginning of the course…So, day one, when the course kicks off, students are asked to think about what they're doing as they travel through their course, but also post engagement with the task, in particular the Research Impact Symposium, and to blog about those experiences.

So, we use a blogging tool within Moodle called OUBlog, and the whole idea is students are organically thinking and writing about those experiences. I have a reflective rubric that I've developed, so we can mark these types of blogs, but that is not revealed to the students. And the purpose of that is to give students the opportunity to write organically, write from the heart, write from their personal experience, rather than writing to a rubric. So, while we have a rubric, it's purely a guideline for us to evaluate the sorts of thinking that comes through that portfolio work. The language also has to be modified. I would really encourage that. So, the art of science, where we're collecting core facts and data needs an interrogative and iterative process, right? So, I like to rephrase the language. It is a tango between observation and critical thinking. We do build awareness, and we understand the thinking, so we build awareness of thinking. Then, we start to understand it, and this is really metacognition. So, becoming comfortable, my students became comfortable with reflecting. We gave them feedback on the reflective process. We mark the blogs. We saw some really amazing things coming out of them. And we also talked about how we changed from analysing data, making sense of this, networking it to make a bigger constellation, and really using critical thinking and reflective practice, which are very much foundational in becoming

professional scientists. And students start to become super comfortable with this. So, this method of task, evaluation of each other skills to become aware of your skill, and also write about that has become super powerful and implemented across programs.

Heggart: So that's reflective practice via blogging? Tell us how the badging and the nano- and micro-credentials fit in.

Polly: So, let's come back to the concept of badging and nano- and micro-credentialing. So, this is a schema of some badges we worked up as part of another project. So, while you have your skills developing, and this is all very fantastic in particular courses and degree programs, how do students then talk about these, for example, in a portfolio very explicitly, very quickly, very carefully, in a very curated way? And I propose that badges or nano-credentials are the way forward. And it's a good way of recognising these skills. Because these skills, as we just talked about, are very much integrated in curriculum and assessment tasks. So, while they're authentic to discipline, how do you talk about that in an academic transcript, which is a series of marks related back to the course. And it's a final mark, and it's not really broken down into pieces that students can clearly talk about. And let's face it, I may not be able to clearly talk about something that I achieved in Year 1 versus something that I may have achieved in Year 4 Honours by the end of my degree. The Year 4 Honours is probably more apparent in my mind, so it gives our students a mechanism to explicitly discuss where and how they mastered these competencies as part of their learning journeys.

This was part of another project. I've done a series of projects that come back to learning design that have been applied not only within courses, within degree programs, that have been taken up by other folks internationally, nationally. So, this is why I work in communities. I work with colleagues, students as partners, and so on.

And the benefit of badging or micro-credentialing is that students get to recognise their skills. They package them up in these vessels of information, and they can transport them out to LinkedIn or transport them into their portfolio and really easily comfortably talk about these things. So, it's a way of validating the skills. It really has to be warranted by the universities. And they're these tiny little credentials that may have life-wide and life-long value for our learners.

Let's go back a little bit, everybody, to micro-credentials, badges, and the design characteristics. They need to be competency based and need to be on demand, shareable, and personalized. So, this is where the eportfolio starts to marry up with the badge concept. So, you may have evidence of some experiences in a portfolio. You may have some reflections that come back to that experience. You would also theoretically have a badge that sits not far away from that, and students can use those badges to talk about their skills.

And there are different badges for different purposes, and here we see some from Harvard and RMIT and IBM. So, they've been used for various reasons, across various sectors. And this is not new. This was super new in 2016 and a little bit earlier, but now it's been around for a while, the concept of badges and micro-credentialing. But what do we do with these badges, right? Are they just icons that we talk to as an image, or do they create a space for data and information that we can also talk to? This is the other concept I'd like to bring home to you.

We talked about the UNSW Teamwork Skills Development Framework. That was worked up and adapted a little bit further for our context and beyond by our team, our Medical Sciences academic team. But I would encourage people to think about rubrics as a vessel of information for qualitative data that can sit behind a badge. And this was a project that I worked up with Badge COP, our badging community of practice, which was a community of practice formed by people across the

university from various faculties and degree programs. Each person came with their particular interest. Some people wanted to build up critical thinking. Other people wanted teamwork skills. Other people wanted creativity, ethics, and so on. So, if I can take you back to the AAC&U set of value rubrics, it is an amazing resource that can be used by academics to implement in their courses and degree programs for evaluating skills, professional skills, generic skills, soft skills development. All right. Now, we adapted this. We then adopted it further with our industry partner Edelex, to use the rubric to sit behind a badge. So, you can imagine all of these elements, these six elements, teamwork elements, here in dark blue over on the side of this rubric, coming back to being used as various elements within a badge. Very powerful. So, all of a sudden, you not only have an icon, but when you click on that badge, you've got information that sits behind it.

Heggart: Wow, incredible. Thank you so much for sharing your wisdom with us, Professor Polly. The thing that really struck me was how cohesive the vision that you've laid out for professional skills recognition at UNSW is all the way from the institutional goals, to the graduate attributes, and then through a variety of learning design frameworks, tools and strategies such as micro-credentialing, nano-credentialing, digital badges, eportfolio pedagogy, and a few other things as well. Incredible stuff. Thank you very much.

Closing

Host: And thank you for listening to this edition of the *ASCILITE Wavelength Podcast*. I have been your guest host David Porter. Thanks to our guests Mitchell Parkes and Patsy Polly, the ASCILITE Learning Design Special Interest Group, and segment producer Keith Heggart.

Music for the podcast is produced and performed by Kevin MacLeod of Incompetech.com. Thank you for listening to the *ASCILITE Wavelength Podcast*. You can find out more or get involved at ASCILITE.org.

Epilogue

Host: Hi, I'm David Porter, one of the producers of the ASCILITE Wavelength Podcast. I wanted to take a moment to invite you to be part of the podcast. We've designed the ASCILITE Wavelength Podcast to be community contributed. We invite academics, professionals and affiliates passionate about learning and teaching in tertiary education to pitch and produce podcast segments. If you are interested, we invite you visit ASCILITE.org and check out the Connect section for further details and submission guidelines. And we at ASCILITE want to thank you for listening.