This is the second videocast on creative research methods. The first was on arts-based methods and the third will cover transformative research frameworks and Indigenous research methods.

But this presentation is about research using technology and mixed methods research. We'll start by looking at the use of technology in research. Technology can be used at all stages of the research process. If nothing else, researchers are going to be sending emails to each other throughout, from the very start to the very end of the process. But technology is most commonly used at the data collection and analysis stages as well as for this communication that happens throughout.

Technology is also very helpful for planning research. Think about spreadsheets, Gantt charts, all those great tools, the project planning and project management that exists technologically. It's also great for setting research into context. We go to the internet to find academic literature, grey literature, other forms of context settings, secondary data perhaps that may set research into context. Great for presentation, PowerPoint, Prezis and so on, and for dissemination through the internet, through multimedia, through CDs and so on and of course for collaboration. Technology is a huge help to researchers but it's not entirely only positive because technology can also go wrong. Equipment can break down. The skills of the researcher may be inadequate to the situation that they face, technologically speaking. Technology changes how we work as well: it enables, it gives us opportunities that we wouldn't otherwise have, as well as causing disappointment.

For example if you audio record an interview, get back to the office and discover that your tape or other recording device is in fact blank, that would be a nasty surprise. There are also nice surprises, researchers are now using social media and apps and all kinds of technological devices. We do need to remember that technology does change our research practice and try to acknowledge when that happens. It's not a bad thing in itself but it is important to recognize when and how technology affects and has an impact on our practice as researchers.

So if you're using technology in research, it's important to remember that the digital divide is still very much there and it's quite a big chasm in fact. Those of us who work perhaps in universities or for organizations where we earn an income and all the organizations are technologically connected and we're technologically connected, and we have maybe a smartphone and a laptop or an iPad or whatever it is. It can be easy to think that everybody's

connected, everyone has access, everyone's online – it's not true. There's still quite a percentage of people in the UK for example, I think its 28% at the last count, who don't have access to technology. And access itself isn't an absolute so I'm quite well connected, I have a smartphone I have a laptop, if I get mugged and my bag is stolen containing my smartphone and my laptop, how much access then do I have? None, until I can maybe replace those items or find somebody else's device I can borrow to access the internet. So there is a problem of exclusion if you're doing research using an app for a smartphone, your participant pool is only those people who have smartphones that can download and the skills to download and use that app. So exclusion isn't necessarily just about hardware, it can also be about skills; these are important things to remember.

Also doing research online, perhaps using social media or other forms of contacting people online, you need to be aware of ways that that can cause participants to become unsafe. It's harder to maintain privacy and anonymity online. You need to understand how people's identity can be tracked online. You may be, for example, doing research using Facebook. Your participants may give you permission to access their Facebook pages, they may friend you on Facebook so that you can collect your data. They may not realize that they're also inadvertently giving you access to other accounts connected to their Facebook accounts, to their Instagram account or their Pinterest account or their Twitter account, which they didn't consent to you using. As an ethical researcher, I'm sure you wouldn't use those accounts but if you weren't ethical you could do and if someone else was able to hack your account and thereby access theirs, they could end up being stalked online or cyber-bullied or other forms of undesirable and unsafe conduct that they could find themselves on the sharp receiving end of.

So we need to be aware of our data footprint, of our participants' digital footprint and how those things can interact. Also technology can be quite seductive and can actually inadvertently cause people to act unethically. So for example if you're analyzing quantitative data using the SPSS software 'Statistical Package for Social Scientists' you need to know which calculations in which tests you should run for your particular data set and its particular configuration. It's not ethical to run all the tests because if you're looking at a five percent probability level and you run 100 tests then five of those are likely to produce significant results but that's not ethical that's fishing and that's not okay. You need to run the tests that are appropriate for your data set and see if you get a significant result. Similarly

with presentations: you can do all the charts and graphs and infographics, your slides will be so overloaded that people won't be able to read them let alone remember what it is you're trying to say. Just because you can make a bazillion charts using Excel doesn't mean it's a good idea. You need to make good decisions about what to present and how to present it, and not let the technology lead the way.

There are some real positives to research using technologies. So for example videocasts like this one have been used for explaining a research project so that perhaps people with memory impairment or young children are able to watch it more than once, as many times as they like, so that they may decide whether or not they want to take part in the research. It may be someone talking like I'm doing here or it may be animation for example. For children there have been some nice examples where researchers have produced animations explaining what the research they're doing is about.

Online surveys can be really useful because they can be made so complex and yet the pathway through a survey from a participant's viewpoint may be only a few questions long. There's lots of scope for if this answer is given at this point go in that direction, if this other answer is given go in the other direction. That might take 60 pages on paper but online you can hide all the answers that aren't required, all the questions that you don't need the participants to answer, and simply present the ones that you do need. Also it's quite easy to complete a survey if you are connected and you have a device on hand it's quite easy to do it and then click send to get it done.

Videos are great for observational research although there are limitations. You're only going to see what the camera is pointing at. Unless you have more than one camera you will miss some viewpoints and also it's challenging to analyse because there are so many dimensions. If you're observing people interacting in a natural situation, are you going to analyze their dialogue, are you going to analyze their body language, their clothing? What else? What other factors might there be that you might want to analyze? It can become extremely complex and time-consuming and difficult to transcribe as a result, but it is very accurate and it does enable you to go over and over again so if your videoing quite a complex situation you can focus in on little areas to look at them again and see what's really going on much more easily than you can if you're observing something complex like that in person.

Technology is great for crossing distances so I've mentioned Skype interviewing that's fantastic. I've conducted Skype interviews with people literally on the other side of the world and it's worked very well indeed. And for crossing boundaries in other ways, so across disciplinary boundaries, across organizational boundaries, technology helps us to understand what's going on in other arenas, helps to break down the old silos of disciplines and fields and organizations that used to cause really more problems than they solved in the sense of increasing the knowledge in the world. Technology is a great aid for teaching. It's really helpful for conveying information, for enabling people to look at videocasts like this one in their own time, in their own way, and as much or as little of it as they like, rather than having to sit through a lengthy lecture at a time prescribed by someone else. And of course we have access now to huge quantities of data through technology. Governments are making their data open for organizations. There's lots of secondary data and this data is not only quantitative but also qualitative. There are qualitative data repositories where you can find interviews, transcripts, and all sorts of other kinds of qualitative data images, and so on.

So that's a brief overview of research using technology. Now we're going to look at mixed methods research. Traditionally, research methods weren't mixed and what that meant in practice was that research was either quantitative or it was qualitative and never the twain should meet. Then I think one day someone had a bright idea and said "Let's talk to those other people doing that other research and see what they're about." And so the discipline of mixed methods research was born from those conversations and initially it was mixed quantitative and qualitative in the same project. This was radical for a time then it became more mainstream and now you can mix different qualitative methods and have a purely quantitative project that is still mixed methods or equally you can mix different qualitative methods and have a whole project that is mixed methods but also entirely qualitative or you can mix quantitative and qualitative as was done in the first place. Also when it began was around mixing different methods of gathering data so you might do a survey for the quantitative side, and some interviews for the qualitative side, and then analyse them separately, then analyze them together. But now we also look at mixing methods of contextualizing, so you might do a literature review and a different form of context-setting perhaps using quantitative data, you might use different kinds of literature in your literature review, you might incorporate images; that would be a form of mixing methods. You might mix methods of analyzing your data so you might use narrative analysis and discourse

analysis and see if they tell you different things about the same dataset. You might mix methods of writing, so you might write prose and poetry in the same presentation – same written presentation. You might mix methods of presenting: you might use speech and songs and images and haiku. You might mix methods of dissemination, so you might have an exhibition, but then you might film that exhibition and put the film on YouTube. All sorts of ways that you can mix methods in research. But it's not for doing just for the sake of it. It's really only sensible to mix methods if your research question calls for you to do so and that is important to remember. Where mixed methods research I think really comes into its own is when the research question is particularly complex and so a single method isn't really going to cut it, it isn't really going to enable us to investigate that question as fully as we need to do.

There are some problems with mixed methods research. It does take more resources because you're using more methods, so inevitably it's going to take more time, more money, and so on, and it can be difficult working with researchers from other disciplines particularly when they work perhaps in a slightly different paradigm so it's important to have conversations at a very early stage about how you work, what methods you use, why you use those methods. Find out what your epistemological and ontological stances are and how those can be integrated, and how those can be brought to work together, or if not integrated then how you can use from each of those to contribute to the research process.

Also it can be difficult at the analytic stage. If you've got different datasets you're probably going to analyze those separately to begin with, may use different forms of analysis, but there will come a point where you want to integrate or synthesize those findings to try to make a coherent narrative. That can be really difficult. Sometimes it's just not possible because they tell such different stories. That in itself raises an interesting question about why that should be, and it may simply indicate that you need to do further research, that you need to collect more data analyzed in a different way, to try to get to the bottom of whatever the problem is that you're facing.

Mixed methods research needs to be carefully designed as a mixed methods project right from the start. What won't work is if your research is going a bit rocky in the middle and you throw a few more methods in to try and fix it, that's really not a good idea, that's not going to work. You need to plan it from the start. Be clear about why you're using more than one method at whichever stage of the research process you want to mix your

methods.

And this is probably the most mature of all the different types of creative research methods so there are some books and journals that I would recommend to you. These are probably the classic ones in the field so I'll leave them here on this slide for you to take down if you want to write down or go and look for in the library or whatever and that will end this presentation on mixed methods research. We will look next at transformative research frameworks and Indigenous research methods.