Elizabeth Oles (00:00:00):

Hi, everyone. I'd just like to welcome you to today's session. My name's Elizabeth Oles and I'm the Associate Artistic Director of Australian Dance Theater. Today's session that you're here attending is thinking bodies and it's presented by ADT. And just before we kick off this, just a few really important things that I'd like to say. Firstly, I'd like to acknowledge that we're gathered here on the traditional country of the Ghana people of the Adelaide Plains, and we recognize and respect their cultural heritage, beliefs and relationships. With this land, we acknowledge that they are of continuing importance to the garner people living today, and that we respect their elders past and present just a few housekeeping things. Please switch your mobile phones to silent, and you're welcome to connect with the Adelaide festival of ideas through tweet. The handle is at ADL FOI. The hashtag is hashtag ADL FOI, and on in's Instagram, it's also at ADL FOI. Please do not record this session. It is being very kindly recorded by John at the back there. And that will be put up on the Adelaide festival of ideas website. And at the end of the session, there's also going to be the opportunity for you to ask questions. There is a microphone on a stand at the back. So if you have any questions, please form an orderly queue at the mic. So I'd now like to welcome to the stage. Scoth Delahunta, Thomas vanilla, Zoe Dunwoody, Kimball Wong, and Kate Stevens. Thank you.

Speaker 2 (00:01:43):

[Inaudible].

Scott Delahunta (00:01:43):

Hello, welcome. Thank you very much. And my name's I'm Scott Delahunta. And could you just say your names again because you were standing up for

Kimball Wong (00:01:55):

I'm Kimball Wong How long have you been with the ADT? I've been with ADT for nearly nine years,

Zoe Dunwoodie (00:02:04):

Zoe Dunwoodie. And I've been at ADT for four years.

Kimball Wong (00:02:08):

Thomas Wynnona and I've been here for about

Scott Delahunta (00:02:09):

Two years and I'm lucky enough to have been working with at least these guys for three years and Thomas for the last two. And what we're going to do today is we're going to discuss three experiments that we worked on collaboratively over the last three years. One is on memory and tour on creativity. So our ideas to just share with you some of the experiences that we had setting up those experiments with the dancers and collecting the data and doing some of the data interpretation, but also some of the ways in which we've somehow shared and understood new forms of terminology together, which I think has been a very crucial aspect of what we've done. And after we finished that will take about 40 minutes or so the timer is right there. It's very clear how much time we have. And as lip said, we'll open up for questions afterwards and there's a mic in the background to do that.

Scott Delahunta (00:03:04):

So I really do our plan is really to give some opportunity for questions, many of which I'm sure we'll open up over these next 40 minutes. So my, our job here for the next 10 minutes or so is to talk about this experiment in long-term memory also with Kate who will help a little bit as well. So long-term memory for dance. Why is it interesting? And one of the things about you guys as dancers, you're really working in the contemporary field. So you may have some training that overlaps with ballet, but really more, much more in the contemporary field. And you guys are inventing new movements, it's right up there written they're using a building movement and phrases. So they very much contribute to the creative process. So for those of you who aren't so familiar with dance, this might be new information that there, there is much involved in the creative process as Gary and Lebar as well.

Scott Delahunta ([00:03:58](#)):

So they make a huge contribution. And one of the things that about that in terms of memory is that they have extremely good memory for the movements that they not only create, but that they teach to each other and they learn from each other and also in performance. So from a scientific point of view, understanding these VR, this very complex form of memory and how that, how all of that information, all, all those movement forms are stored in the body can be of extreme interest from the point of view of cognitive science or embodied cognition in enhancing our understanding of that particular phenomenon. So from the science side, there's a lot of interest. And from the dance side, a better understanding scientifically could have big benefits for the field itself. So this is some of the terrain that we're been moving around in, and this particular experimental setup now in the next slide, Kate.

Scott Delahunta ([00:04:53](#)):

So this is something I'd really like to try to get across also with you guys is the the extent at which this process has been collaborative, the extent to which we've been designing experiments together, that's called participatory design. There is a precedent for it, but it's also slightly unusual. It involves it's a different way. A more classical sense of design might be that the scientists design the experiments, determine what the variables should be and come into the studio and collect the data and go away and study the data. And our relationship with you has been, we've tried to be much more engaged in what it is that we're doing. So we set out to develop the experiment together. And part of that involved a conversation at the beginning before we started quite a long conversation and our goal was, and Kate, you can jump in any time, if you a cause Kate's a psychologist, I'm more from the dance side. Our goal was to find a, in order to study memory from a scientific perspective, you're really looking for when memory fails. Is there anything you want to add about that?

Zoe Dunwoodie ([00:06:03](#)):

Yeah, I guess there's a journalist said to me years ago. Well, what's the big thing about memory and dance. It's just like running. So there's an interesting question. Just what makes dance different from a cognitive point of view. And there's a distinction in cognitive psychology between procedural kinds of memory and declarative memory. So general knowledge, semantic knowledge memory for particular episodes in our lives. So I think there was a kind of an assumption here that we were seeing if memory for dance was any more than memory for something like running. So there is, of course in the creativity of dance, there's a, it is an intellectual pursuit. It is a cognitive kind of exchange, even though it is embodied and very much using the body. As Scott said, when I run experiments with very often first year psychology students, it's very easy to set up situations where I give them novel materials and then I test their memory for them.

Zoe Dunwoodie (00:07:00):

And I look at, or I come to understand memory from the pattern of errors that they make, not what they succeed on, but the pattern of errors working with ADT and other dance companies, of course their job is to have a hundred percent accuracy in memory. When you see the performance, it is precise every night. It is pretty much the same. So this was the memory challenge. It was finding a method, working with the dancers to come up with an experiment where in a safe kind of a way we actually set up circumstances where we might see some, some lapses in memory that we don't always see in the performing kind of context. Scott, do you want to talk about the way the dancers came up with that?

Scott Delahunta (00:07:41):

Well, we spent, we spent some time just discussing with you the issue of memory in your work and what happens when you forget things, you know, the experience of forgetting or the kinds of variables that might contribute to, to forgetting or having a challenge with memory. And do you remember Kimball? You talked a little bit about, well, you talked quite a lot for about an hour and a half about different phenomenon, but you mentioned something, it wasn't Kimball just talking for one hour and a half. You got it all on tape, but this phenomenon of freezing somehow. Can you say something?

Kimball Wong (00:08:12):

Sure. So I guess what I was discussing is while particularly in performance onstage, you can, I've certainly had, it's certainly happened to me many times where you feel like you actually don't know what's coming next. Like you've lapsed, you've forgotten what the next step is, but somehow the body just keeps going and it does the right steps. And you're not sure how you did it and obviously it's through the brain, but it feels like your body just takes over and gets on with the job until you go, oh, I'm back on track. Okay, good. We're going. So yeah, for me, it's, that's a very strange sensation when you realize you don't feel like you're thinking, but you're continuing the movement correctly, I suppose. Yeah.

Scott Delahunta (00:08:55):

So extraordinary phenomenon, something else we could try to, we didn't study that in particular, but obviously an extraordinary phenomenon that one could try to imagine how to study. So we're just collecting all of these possible variables that might give us a way in which we could conduct some kind of a, an experiment. And Zoe, are you, I asked, I asked you to think about the emotional dimension of this. Do you remember what it is that you, you said about emotion is a variable that kind of like the things that contribute to forgetting or not, or remembering material?

Zoe Dunwoodie (00:09:27):

Yeah. So I guess when you're learning material, there's a lot of, you know, you might be having not such a very memorable day in general, like you're just, you're just coming into work and you're just doing your thing. And the next day you might not remember anything. So it's kind of like, yeah, you, you might not connect as well with the material that you're learning. So therefore it doesn't really get ingrained in the body as well. Or maybe you have to learn it by yourself, offer for video and that, and that's, I guess a lot harder than when you're actually interacting with someone and they're giving you lots of feedback on what what you're learning. So I guess the emotional variables kind of huge really, and also, I guess it's being in a space that, you know, you're, you're using parts of the space as well, like your surroundings to remember what you've learnt as well. So there's lots of things. Yeah.

Scott Delahunta (00:10:30):

You've broken out another variable and other one was space how you might rely on space to remember things or music. So these were this, we were in this conversation that we were just in a way probing for all of the different kinds of things that might constitute variables within the memory landscape of your experience. And I Thomas you had one other that I wanted to ask you to just say something.

Kimball Wong (00:10:50):

So I said, because I just come to the company I didn't, I've only just, I was only just exposed to the way we were rehearsing with ADT for about two months before we had this experiment. And I was sort of going off of my previous experience with my previous company and learning material where there's something that needed to that a term that I never really was used to was, which was I'll let you sleep on it, you know? So like you can, if you're not getting it today, let you sleep on it. You can come back tomorrow, probably be sit better. Whereas in my previous company there was that wasn't the option. So like, like you get it now. You're not going to go. You're not going home until you get it. So I think the way in which, or the methods in which that you are, that you're taught and that you were rehearsed I think sort of has an impact on how you remember things as well. So if you're obviously repetition is a huge thing that we do just regardless across all boards with other companies, but the way that the repetition and the stress that's put on a certain situation differently has impacts on how long you remember something.

Scott Delahunta (00:11:50):

So the kind of conditions that come with working with a particular company. So this was the range of different kinds of variables we had. We had over two dozen that showed up in that conversation. But one thing was absolutely clear throughout the conversation is that Kate and I would have great difficulty figuring out what the dancers, where it is that they would lapse what it is that they might forget in performing, because it was also clear. You had lots of strategies for coming up with ways of remembering. So the challenge that we gave them was to, we broke into two groups and we asked you to think of something that one of your colleagues in the other group would never remember. So the memory challenge, if you go to the next page, Kate, their memory challenge resulted in a collection of phrases. That, for that, for example, Kimball was challenged with this first one here, this small phrase from a section of not Zoe was challenged with Lazarus, from G Jake, with rugged ballet, et cetera, et cetera.

Scott Delahunta (00:12:50):

You went into another room and you didn't know that you were going to be presented with this particular phrase as a challenge to remember. And so you came out of the back room and then somebody, one of your colleagues said, Kimball, your solo bit to try to remember is not from the end, the end end phrase of not. And that's the way we presented it to them. And then we recorded them the next. And could you play the first one? So on the left, you see Scott Ewen coming out to perform the mind solar from G and on the right, we put the clip of the other dancer, whose name, I don't know who is this other one here? That's Matt, that's Maddie performing. And you'll see Scott on the left working through the task. And in many ways he's not doing too bad. He's clumping parts of it. He's getting some of it. Could you play Jake? And Jake's on the bottom. Now Jake's going to try to do rugged ballet. Dan's solo from G so clearly getting parts of it. Not all of it.

Speaker 2 (00:14:00):

[Inaudible]

Scott Delahunta (00:14:01):

And then another bit, okay, next page. So, so we collected all of that material in video, and then Kim Vince from deacon university, Dick emotion lab, who was not able to be here today analyze the data that we had analyzed the videos by counting movements as one way of clumping. So simply counting the number of movements that they did in each one of the phrases. And she found some general. And the other thing we did is we asked you with a questionnaire afterwards to recount more information, more qualitative information about that experience. And then here's just a slight, a bit of a glimpse into some of the results in a way you could say responses from the questionnaire. So the kinds of things that they could remember, the fact that music wasn't so necessary, and I'll draw your attention to the last response that came from the questionnaire.

Scott Delahunta (00:14:56):

So this is coming directly from you, the sense that if you had performed the movement, it would be easier to remember because this was part of the discussion. So that's kind of an assumption, but in the data itself that showed up in the analysis, that seems to not be the case. So interestingly enough, no real difference between whether you'd performed it before by that, by by you or not. So that's, that's some of the sorts of insights that we were looking for. Oftentimes the data that we come up with, it might not surprise. You kind of confirm something they already do know because there's so much about their practice. They know, but occasionally we find some nugget, some discovery, which is seems to contradict something that you assume. And the last one on the bottom is a segue into the next presentation on duets that duets themselves and this in some ways would be almost intuitive that a duet working together would make it easier to recall material than just working solo. But what is that effect? What is that effect of working together? What is the nature of the relationship, which makes that cohesion, that kind of cohesion? What, what makes that work? That would be the interesting question from our side. Can you show the next slide and just play the duet? So the last thing we're going to show you, it's just a bit of a duet from, do you have sound on that one? Cause I think they're, they're also speaking with Sam and Kimberly,

Speaker 2 (00:16:27):

Certainly helping her remember something, couple of reconstructions, wasn't it Kimball. There's a notion

Zoe Dunwoodie (00:16:36):

That memory is constructive and reconstructive and you see that happening as the dancers

Speaker 2 (00:16:40):

Try and reconstruct, reproduce the exact phrase.

Scott Delahunta (00:16:52):

And that's just a little glimpse into the memory experiment we did with the company with you guys. There's a paper that's going to come up where we're writing up the results. And I'd like now to segue into the next experiment with the locus of creativity with James. Thanks you guys. If we will, we are going to sort of move right into the next one in a way to sort of really turn a page and open up another kind of set of insights into this kind of the collaborative research that we did with the company.

James Leach ([00:17:27](#)):

Thank you, Scott. Hello. so Scott finished there on something about UX and how it's seems easier in some ways for dancers to remember material when they've either made it or performed it with, with other dancers, Kate and I were also interested in not just how memory works and how recall works, but also actually in how things are made and what kind of difference it makes to make something with another person rather than solo or on your own. And to look a little bit into the kinds of conditions and kinds of principles, which might lie behind either there being a difference between making things with other people or imagining and making dance on your own. So I'm going to let Kate just talk to you a little bit about how we, what our questions were and how we designed an experiment around

Zoe Dunwoodie ([00:18:13](#)):

This. So James comes from social anthropology as, as the base discipline and I'm a cognitive psychologist and we have quite different methods. And one of the kind of our undercurrents here was to find ways that we could work together and perhaps augment. If you like the microscope on creativity, by using a hybrid of our combination of our two methods, the aim was to really look at the, the effect of interaction on creativity and, and obviously a duet or a trio or even a larger ensemble is one way to get at that. It's an another one of those things we'd call a variable. So the experimental design around this, the things that we were manipulating to try and bring these processes into relief or to compare a dancer improvising alone. So solo versus a pair whether when they were improvising as a pair, whether they were highly familiar with the person they were improvising with.

Zoe Dunwoodie ([00:19:12](#)):

So there is a tendency for certain dancers to improvise together. So we perturbed that by also having dancers come together and improvise who weren't so familiar with each other in that context. And then we also just manipulated the kinds of instructions we gave them, whether it was solely movement based or whether it was some state-based kind of material that they would have generate. We counted lots of things. We tried to quantify things like the amount of material, and that's hard for a psychologist to necessarily quantify. So we asked the dancers to self-report the number of new ideas they felt they were creating in each of their improvisations, the quality of material. They commented on that as well. We haven't really gotten to uniqueness or variety, but we can, we have miles of data and James, the social anthropology, the ethnographic approach was to interview and explore way, create creativity resides in a qualitative kind of a way.

Zoe Dunwoodie ([00:20:06](#)):

We had 10 dancers, they were all experts. And then I've just put the tasks there. So in collaboration with Libby, we, we asked them to do a couple of different tasks to make choreographic material around the idea of a cube or a sphere or a cylinder. And they had two minutes. So there was a series of trials where they'd come out on their own or with a partner and improvise according to one of those directions. And after each trial, very diligently, the dancers, self-reported the number of species they felt they had generated, or the number of cylinders they thought they had generated in the trial. And we asked them some open-ended comments as well. Here's an I'll leave you to work out which task Kimball might be performing here. [inaudible]

Speaker 2 ([00:21:12](#)):

That's another example I do at this time, Kyle and Sam [inaudible].

Zoe Dunwoodie ([00:21:38](#)):

So just as the memory experiment is, is you saw those videos that you see memory unfolding before your eyes. It's, it's absolutely gold to a cognitive psychologist to see the lapsing and the successes in memory. The same here, we see creativity unfolding, very difficult to capture that in a laboratory where here situated in the studio of ADT. So it has an ecology about it. That is, is quite realistic. At least from a, an experimental point of view. They said the kinds of data we get out, this is a, a graph on the vertical axis. We're just counting the number of new movements. This is self-reported by the dancers. And you can see we're looking at that as a function of whether they did it alone or in a pair, whether the pair was a familiar or unfamiliar and the green and the yellow reflect the instructions that were given from a statistical point of view. There's not really much of a difference happening here. We're not getting, we're getting a few more ideas if you like in the, in the pairwise situation, but it's not statistically different. So the take home message here from the, the, the kind of quantitative aspect is that put two people together. You're not necessarily generating twice as much material, but what you might be generating or eliciting is qualitatively different material. And James was interested in following that up in discussions and interviews. So you might like to talk about that aspect of it.

James Leach ([00:23:05](#)):

Thank you. I as Kay said, I'm a social anthropologist. I've actually done my majority of my research in a very different culture from our own. And it's a culture in which creativity is understood in a very different way how that we're doing creativity studies here. So the idea was that I would bring some of that as a perspective in thinking slightly differently about what's happening when people are creating material singly or alone, and how that manifested was an emphasis or a focus on relationships on what happens between people, what is possible when there are two bodies in a space that isn't possible possible when there's, when there's one, one body and, and thinking about thinking very much about what it is that is beyond the individual, if you like something that is emergent emergent in the space between people and trying to find a way of getting it that we began to think that you could almost think of the relationship itself, something about the social that's manifesting itself in the relationship as a kind of material that the dancers are working with, that they are playing around with all sorts of things to do with what we expect of other people, how we anticipate what they want, how domination occurs, or how cooperation occurs.

James Leach ([00:24:21](#)):

And in fact, it it's that sensing of something that we could call social in between people which is providing some of that, some of what's material to them, to the things that they're creating. That's kind of interesting because it, it provides a point of, at PI provides an alternative point to thinking about creativity, which we tend to conventionally think of as something which happens in individual minds. It's something that happens within a person and in the individual mind of a person. And so we're sort of dealing here with a, with an alternative notion of creativity, which isn't about manipulating images somewhere that are in the back of the brain, but actually thinking about what interaction in real time with another person makes possible which is not made possible when you are, when you're just doing something singly. And so he actually said something very interesting about this at one point. So I wondered if she might just say something here for your benefit about that.

Speaker 2 ([00:25:22](#)):
Thanks. So, yeah.

Zoe Dunwoodie (00:25:23):

So we're discussing this yesterday. One of the cool things that was about working with maybe someone you hadn't worked with before, or as much with before was how you guys both kind of negotiated the space within like together. And that was, that was a really nice discovery in that I was able to kind of, you know, obviously discover how this person, this other person is moving and either try and try and sort of facilitate that, or whether I was going now, I'm going to lead this situation and you're going to follow me sort of thing. So that was, that was really nice and fun, I guess. And the, the other thing was also kind of discovering whether you are someone that is a, is a leader in improvisation like that, or whether you like to just kind of go with what the other person's doing or whether you both just sort of bounce off each other and work both as a leader and a follower. Yeah, so that was really cool, especially working with people you didn't really, we didn't usually work with. Yeah.

James Leach (00:26:42):

There's something to be explored there, which isn't just about space. And it isn't just about form, but it's also it's space and form in the context of relationships with other people which are unfolding, unfolding through actually being in the same space and moving. And that to an anthropologist is not completely alien from what we're all doing all the time as we are interacting with one another as social beings. So there's a certain sense that creativity is happening all the time in how we behave in how we unfold ourselves with other people in the world. And the dance studios turned into, turned out to be an extremely, a fascinating place to look in microcosm at the way that kind of unfolding happens in a very, in a very specialized and very focused environment. So Kate and I were able to look a little bit then about something slightly unusual as a study of creativity in this context, but there's also questions about how that and creativity unfolds and how it unfolds over time as a, as a process. And for that, we worked with David Kirsch who had experiments of his own around time course. And I'm going to hand over to David now so that he can present just a little bit of that. Thank you.

Speaker 2 (00:28:01):
[Inaudible]

Speaker 6 (00:28:03):

Kate and I had the pleasure of working together along with the dancers, of course on exploring the idea of whether creativity occurs more often in the first part of an activity or the middle or the later part of an activity. So what we're going to briefly cover the questions, we, the question we ask the method, the examples, some examples of people working it out

Scott Delahunta (00:28:30):
How we

Speaker 6 (00:28:31):

Developed a coding language, how researchers study dance, and then there'll be a discussion of some of the ways we're thinking about the topic. So the basic question was, is there a time when creative, our creative ideas uniformly distributed over a period of 60 minutes or 45 minutes, it would be valuable to know that because people often set aside 60 minutes in dance, for instance, to work on something. And if the big ideas are coming out after 40 minutes or 30 minutes, maybe it's good to come back and do it after a break. So we'd like to know it's a little efficiency concern. And when did the best ideas come?

These are always hard to determine. And what is the nature of ideas blending or merging or layering or developing. These are basic questions and how much individual differences there are there any generalizations to be found?

Speaker 6 ([00:29:29](00:29:29)):

So these are not true. These are just possible things that are patterns that you might find among single ideas. So the first one shows exploring an idea, but no real development, a little bit of novelty added. The second one up top here shows strong continuous development. It's not going in jumps or something. The third one is where you had an idea and then you drop it off. You reject it on the next. The last one is a very successful case where a new components are added or layering from other ideas new, small ideas added that's one thing or the, or now when you look over time more at a longer perspective maybe the ideas form in a step function, not likely, but maybe. So these are just ideas of what time course might look like. There might be patterns, but there may not be any patterns.

Speaker 6 ([00:30:26](00:30:26)):

So the method we used was to have Libya sign the dancers. They were tests that Gary came up with, but that he wanted them to form, but Libby develop them for the dancers. It was a choreographic task. We'll explain what some of those are in a second. And the goal was to make a minute of a viable phrase on the basis of that task. The dancers were videoing themselves so that they were sitting out in the room five or six dancers at, and they themselves turn the camera on and off and they talked into the camera so they could control things like that, that we broke the door durations that the dancers would be working on a given task into 15 minutes or 30 minutes or 45 minutes. And in the last day, the way we worked that was that they would say work on a phrase for 45 minutes at the end of 15 minutes, they would show what they had.

Speaker 6 ([00:31:27](00:31:27)):

So now they showed what, what have you accumulated? And then at the next, after another 15 minutes, so now they'd worked on it for 30 minutes. Now, show what you have. And then at the end of 45 minutes, now show what you have. So we, it's not a simple matter of just to count how much they have at each of the 1530 or 45, but that would be a first piece of data to take, which we haven't done that because it's a little more complicated than it might sound. So then they would get a new problem and the blast one just the one second further and for a different, okay. I you're right then they would code their own video. That's a novel thing where self coding that is after the video is collected either later that day or in a subsequent day, they would review the video and tell us where they had ideas and yeah, what happened.

Speaker 6 ([00:32:21](00:32:21)):

So one thing we wanted to do was to discuss with them, how should they code the video? I mean, how do you describe what goes on? So we sat around and we chatted for some period of time to come up with a coding language, which is next slide, please. This is more of that design that Scott was talking about. This is an example of the coding vocabulary, where to discuss the initiation of an idea, you could use the term, oh, I have the germ of an idea. Now, a whole chunk or major variation of that idea need to change. And I'm bored. I'm done with that idea. Or you reject the idea or a board. It then there was a development of an idea that would be the germ chunk or variation and a variety of phrases and terms. We didn't find all these terms or many of these terms appearing in the, their actual annotations, but

that's an opportunity then to either have them work longer, to develop mastery of the language or for us to adapt to what they did say.

Speaker 6 (00:33:23):

So here are the three tasks that were given out your body is a clock based on circadian rhythms, such as sleep or wake seasons day and night and tied. So we have this notion of circadian rhythms that appear in the body. So the think of the body as a rhythmic system, every cyclical system needs rest in order to continue. These are all ideas and suggestions that the dancers are going to use as stimulii to be creative in their body movements. This is a typical kind of choreographic task or problem set by the choreographer as a way of stimulating creativity. Another one was a representation of citizens, the life, death decay. And of course you talk about it when the bee presents it, they discuss the task in order to see what it is that they should be thinking about. And then they privately go off and explore it themselves with their body, rather than writing an essay on the topic.

Speaker 6 (00:34:27):

And the last one was using a pre-existing movement phrase, make some transformation. So for that, so take a preexisting phrase and then try some various ways in which you can introduce modifications in this way. So here's an example where Libby is explaining the task to everybody and people are noting down in their book, and then they ask questions. We have a physical setup like this. So that was distributed over a room considerably larger than this with cameras in the six places here is one. And now the next case, please. So here was task a as an example for you to see what was going on, the body has a clock. So here was Sam. Yes. Doing her first idea germ, the very first thing she did let's let's start it. It's going, that's going, she was very slow that day.

Speaker 6 (00:35:24):

So you can see that try it. Yeah. Okay. So, you know, this is really a germ. You're not going to perform this unless it's a different kind of performance, a very peaceful performance, perhaps. So she says after 45 seconds, I'm thinking about idea. Then after a minute, I thought of something else that continuous nature of a clock, that would be the next. So let's go to the next slide, please. Okay. So now she's in the continuous nature of a cloth, repetitive movements for a group of dancers. So this she's doing soon after that first one, and then not shown here, but then she goes on and she says, I blended the two ideas. And then she discusses what she's doing. Then at five 30, she's introducing a new idea. And then she abandoned the idea, okay. So this is the kind of descriptive account we have and here you have to hit it.

Speaker 6 (00:36:23):

So this is what she showed after 45 minutes, the first half when it loads up. So it's a, it's a, it's a slight mix, but this is coming out from maybe her second idea. And then with some, a launch and she worked that one out. She didn't seem to blend a whole lot of ideas together. That was the final one. So this is what her account looks. Oh, this is always account. Excuse me. This was always a description. How she introduced her ideas. Just to give you an idea of what the coding looked like, that the dentist produced. Next, please. Then here's an example. All of Thomas's Thomas chose a more discursive side style, but he's using idea one initiation. And we would go through these now looking specifically for the particular terms that they used to see if those might not be better, more congenial coding terms.

Speaker 6 (00:37:18):

Now when we study it, we take the code that they've written and we put it into an application like this. This one is called peacemaker, that Scott was involved in developing, and it allows us to click on the various areas, regions here. And it jumps to that part of the video that makes it easier for us to analyze it and begin to put things on to time and discuss things, write up things we can move on. I think. So you would like to see some findings. And so would we, but we're just in the process of collating that when you have it like this, it's nice to have the text that really saves us a lot of work, but there's still a massive amount of video to be looked at and to work things out. We're just in the process of that. And Kate and I are very excited by that possibility, but there are a few why don't you come up here and we'll have a little chat. Okay, well well, there are a few things that we thought are with thinking about in a more general manner about this topic.

Speaker 2 ([00:38:22](#)):

So one thing is

Speaker 6 ([00:38:27](#)):

Creative. Indian dance might be different than creativity in other areas. And one reason you might say that is because if you look closely at how people create, say, you're a designer, you want to create your first lamp or your first chair, what do you do? You look at hundreds of layers. Yeah. Thousands of chairs. You try to explore the design space. So you have the opportunity of interacting with resources that are indexed and retrievable can be put side by side. At the same time. When you look at someone create, say in language, you're writing, you write some ideas down, you have notes, you can organize them, bring them back, reread them. It's not like that for them. They depend when they're doing it, solo creation, they depend on their own recall or their own memory or their own thoughts about things. So you don't have that kind of interactivity with external resources.

Speaker 6 ([00:39:43](#)):

What you have is a stimulus. That's supposed to prompt creative ideas, but you can't compare them with things you can't say, show me 25 ways in which I could make that turn. So that's, that's a little different because the modern orientation is to see creativity along with many other cognitive processes to be on an aspect of extended mind, where we're closely coupled to the outside world. And we lean on the outside world in an important way, just as James was describing the interaction of two people, they create a space that didn't exist without two people. There are entities now created by co constitution between the two people that make it possible to interact in ways you couldn't interact by yourself. So we think interaction is fundamental to a lot of cognition and maybe dance could help people be more creative in other fields. One area that we're going to open this up.

Speaker 6 ([00:40:49](#)):

And so maybe you'll manage that. The one project that I have been involved with elsewhere is on understanding how arts based activity can enhance the classic innovation process that people do in companies or in various activities, design many areas. And the study consists in comparing people who have a 60 minute activity that might involve sculpture or dance and movement or drama. And so they do this little drama thing and the other people are doing the classic form of that. They tell you for brainstorming and the results are quite significant that when you add arts to a classic innovation process, say a four hour workshop, you get better results. So the study of arts and how arts can facilitate creativity or improve the social interaction between people. So one important difference is that for

instance, at the very beginning in a classic innovation process, you talk, people go round and they introduce themselves, and now they give their bone a few days and their background.

Speaker 6 (00:42:13):

And you suddenly say, well, I see that's somebody I should really respect. Or, and, and now you've may not interact with that person the way you would. It had you played together or had to work with clay together rather than introducing yourselves. So you create a different social space in which to interact. And that might be one of the facilitating reasons. Anyway, that's just to say that dance could help people be more creative in other fields it's being explored. And we think that what we're studying now about creativity and its time course could also have broad application. If there are any generalizations to be found, which there may not be.

Speaker 2 (00:42:53):

I don't know, that'd be great point to have a discussion, I think can open the floor to questions. Scott, do you want to come back? Do you want to come back up? Yeah.

Scott Delahunta (00:43:05):

This last point about the the process from the dancer's point of view, this one experiment seem to, because of the provided you an opportunity to really sort of explore your creative process, that the other two experiments didn't didn't do in the same way. So the memory experiment was any way different looking at memory locus. So creativity was a little bit different in how it looked at creativity different, but this looks specifically your ways of working in your own ways of tasking and kind of in a way, forced an analytic frame, but a frame that was derived from a conversation. So the coding corresponded to your ways of working. And I know that in the conversations afterwards that you said this was one experiment that you could see folding somehow back into practice if you did it regularly as done just as a one-off, it doesn't really function to shift practice, but it's the kind of the kind of idea that could come from a sort of science methodology of a bit more rigorous, a bit more systematically exploring something could enhance your own processes of something you shared. So I was just sort of closed that we might speak to that a bit, but we should open up, I think for, for people to, we have the mic in the back, but we always have a mic. So I would be very happy to share this one closer to the front for people who don't want to move from. I think we're supposed to use the mix very much because of the recording. And so, but I'm very happy to walk someplace with this one.

Speaker 2 (00:44:35):

Good to see you. Thanks. Thanks Scott. Something

James Leach (00:44:41):

That was coming up there all the time for me was the parameter of time. And obviously when you're doing research time as a resource and it's often a restricted resource but I think time's very important in creative practice. And as a practitioner, I know how important time is to me. I'm not a dancer, but I work closely with dancers all the time and collaborate with them. So I, I S I experienced creativity across these modalities. David's comments about extended mind in relation to James' work, connects to that. Cause for the artists, time is really the medium in which they engage in, what is primarily a hermeneutic process of interpretation and re-interpretation and scription and re inscription doing stuff. And then thinking about what they've done and reconsidering it and doing it a different way and all the time waiting for the penny to drop.

James Leach ([00:45:51](#)):

And more often than not the timeframe for that. And I've found this in my area, visual arts, but also in dance. The timeframe for that penny dropping is not minutes or hours might be second sometimes, but it's not usually minutes or hours. It's usually days or weeks or even months coming back reconsidering. And there is a kind of extended mind and it's the mind extended in time and through the, the means by which things are remembered and re articulated, which I guess is a kind of linguistic activity, but I don't mean linguistic has in language of English or German or, or coding. It's something else. So I, I guess my question is how do you, as researchers in the framework in which you're doing your research deal with these very different temporal modalities? Yeah,

Zoe Dunwoodie ([00:46:56](#)):

I think one of the interesting things that came to light yesterday from meeting again with the, with the company was reviewing some of the time course creativity material that we had and discovering that some of that beautiful material that we saw in the experiment was picked up and used and developed, and then made its way into nature. So one of the benefits of this kind of project is that it's longer toodle in a way, and it's it's, we can actually leave we, if we have the time go back and trace those kinds of things. The other wonderful thing that for the cognitive psychology side of things was that the company has a remarkable resource of its works over many years. And so there is an evolution of ideas and development of ideas that's captured in that, in that digital archive. And of course, we've got Gary and Elizabeth that we can speak with about those aspects. So it is there, we probably, probably don't always plumb the depths of it as much as we could, but it's captured in the documentation that happened. And we try and manipulate time, I guess, as we can. And to the extent we can and experiment,

Speaker 6 ([00:48:15](#)):

And the concept of efficiency, doesn't have to be at odds with the concept of just station. So efficiency, you go to your first time management class and they tell you break down the tasks into small manageable ones, even the activity of breaking down the tasks so that they're small and manageable is salutary. It's a good thing to do. It could be that your best ideas come out early, and then you should break. When should you take your breaks? It's not meant to be hard and fast or principle-based, or, but it's an interesting thing to study.

Speaker 2 ([00:48:56](#)):

There's a question down the back. I don't have my glasses on Scott. You're going to run out.

Zoe Dunwoodie ([00:49:03](#)):

I'm just interested in knowing what creativity is in dance and how do you actually measure that cognitively

Speaker 2 ([00:49:24](#)):

Gary, Gary,

Scott Delahunta ([00:49:29](#)):

Gary, would you like to answer them? Okay. Then one here and then back in the back, we might have to use that mic though.

Zoe Dunwoodie (00:49:40):

All right. I'll answer the beginning of that question, which is what creativity is in dance. We haven't some, sometimes I like to describe creativity as intelligence at play, and I know that you can obviously apply that Quip to any form of creativity, but I suppose, as a dancer, being creative with your body is to take all of the skill that you have and to respond to a set of tasks that you may be given by your director or choreographer. So a dancer is a whole lot more than it's a thinking, responding being, we're not just violins with legs. Dancers are creative in, they can generate material, but they're also creative in the performance space. So when a dancer is on stage, they are creating or bringing to life, breathing life into a piece of choreography by making many, many, many split second decisions about how they present what has been created with their input on them. So they bring a multitude of skills and personal nuances to performance and dance is a performance arts after all. So that is in a nutshell what creativity is in dance, how one measures that I will hand over to a scientist, we

Speaker 6 (00:51:10):

Finessed that problem by not trying to measure the actual quality of the act, just of the ideas, just the self recognition that it's one I haven't haven't done before. So we're just counting. I mean, what the really good ones are hard to know,

Speaker 7 (00:51:35):

W we tend to focus on the conscious mind and the greater decisions at that mix. The nervous system goes far beyond the mind goes throughout the whole whole body. And even the mind, mind itself is in various parts of the creative part, the motion part, the sensory part, et cetera, and then not necessarily connected. So each of those parts can make us at Microsoft decision outside of the conscious mind. And similar thing happens if you type in your knee kicks out, but there's no connection back to the conscious mind for that. And a pianist will apply, but there's no connection between the fingers. There's no messages back and forth between the fingers and the Brian. Most of the time they're, they're operating basically out, out of habit. So a predetermined program. So just suggest that the, we need to look much further than the conscious mind in, in, in creativity.

Zoe Dunwoodie (00:52:37):

I think that was the kind of assumption under the, you know, what's the difference between dance and running. And even in some of the interviews we've had with the dancers, there's a sense that what they're doing is intuitive. And as a psychologist, I'm trying to reverse engineer some of that because you're right, it's become habitual, it's become automatic, it's become implicit or unconscious. And then the challenge is to try and reverse engineer that, to try and find circumstances, to get back to how it's gotten to that point, because clearly there's been a, a learning process for it to become habitual or automatic, but you're right, of course it's a very precise and rapid system that is, is extremely efficient from a cognitive point of view. There's not so much consciousness once it's at that level. Well,

Speaker 7 (00:53:22):

The muscles themselves learn Tunis muscles learn a particular process. That's independent of the mind.

Speaker 6 (00:53:31):

Well, the notion of mind, not so easy there are from a philosophical point of view, people have looked at many different conceptions of what the mind might be without going into that. The, I think one of the

points you made that bears repeating is that people are quite interested now in understanding how thinking can take place inside the census. So the heritage from the Greek or Roman tradition is that thought looks a lot like words in the head, but there's no reason to suggest that the only kind of thinking looks like words in the head, or sounds like words in the head, which are just auditory images, just like verbal image. I mean, just very misleading. Yeah. So to think of them like that would be to get, not give fair weight to when somebody is creative, visually or creative, can it kinetically or creative sonically in, in musical things?

Speaker 6 (00:54:42):

The, the push toward the extended mind is to say that when you put an instrument in the hand, say a violin under the neck and a bow in the hand, the mind because of its close causal, coupling to the instrument, begins to absorb the properties of the instrument and the way it works and jointly the two things produce something that depends in part on the way the instrument behaves. If you change the instrument in some way, you get different musical products. So your concern with taking it outside of what's called the center and pushing it more toward the periphery or to the sensory systems, and then out, even further, that's very current.

Speaker 8 (00:55:31):

Yeah. Thank you for a very good discussion and very informative. I'm a bit naughty or saying that we can't back this up. That I think we do think with the whole of our bodies. In fact, there are neurons throughout the whole system and movement enhances this and art and hunches as well. And if I can trespass a little bit, I'm been involved with early education, I'm now retired, but this word play comes up so often. And I know in my teaching experience, I tried as much as I could to transfer what I taught in science and mathematics and grammar, whatever into drama and to dance and anything artistic, but dance has particularly good. Any movement helps to consolidate memory, but also bring in an imaginative life. And I'm wondering if there's any cross reference with your research into what happens all the research here too, with cooperative interactive play with children, because I'm not, it's not on your topic directly, but I think there are, I have a lips and if I can put in a plug, I would hope in the sign world that we would keep many of the academics back from children, formal precious, and let them just play in groups in semi semi-supervised way with good materials, dance, a drama just missing with water and mud would enhance academics, social health, creativity, a whole range of things.

Speaker 8 (00:57:12):

I think we've missed out, but it's a bit off the track, but you might want to comment.

Zoe Dunwoodie (00:57:18):

I think it's perfectly on track. I don't know that I need to comment. Thank you for the connection with that. Someone mentioned play, and I think you said fun, Zoe. I think it happens in science as well. It's discovery, it's creativity. Brainstorming is freewheeling. It's fun. It's all of those conditions that give rise to, you know imagination and, and new new ideas. It's very much connected with play, I would imagine. And yeah, so I, I think you've captured it. I don't know that I need

Speaker 6 (00:57:53):

To say anymore. There's two things that can compliment that one is that in many creative contexts, people work hard to populate the environment with helpful resources that you could play with. So in some design spaces, there's something called a materials cart or an ideas cart and, or, or a closet, an

idea closet. And if you go in that closet, you open it up, it's filled with textures and it's filled with really cool little gizmos and all sorts of things that are utterly unconnected in any apparent way with the problem you're working on. But there's so much fun. They're stimulating like that, but different is the idea that random input can be facilitative in the production of creative ideas. So in algorithm design, it is shocking to think that some algorithms are more efficient and can find a solution when they have a random component, then provably then with purely step-by-step components, which someone has the thought would be ultimately the best. So you can prove that some solutions are find-able when you introduce a random component. Now, randomness is not an easy notion and we rarely have true randomness. We have pseudo randomness, but finding the right time and the right way to introduce randomness into what you're working on often proves to be a trigger. So I think all of us are fortunate enough to always play we're playing with everything, including words. So I think the resources are everywhere. And if you populate the environment with the right resources, your play is even more productive.

Scott Delahunta (00:59:52):

Thank you, David. I think we have run out of time in this session. It's a one hour session and we've been asked to keep it very, but I think we're, we're here. What's the transition time to the next spaces, 15 minutes or 20. So we're here. If those burning burning ideas, please just come and see us, but thank you very, very much for your attention and for attending the session. [inaudible].