Neale Blackwood:

It's been a while since I've recorded a podcast. So I thought I would start a new series on Dynamic Arrays. So I'm planning to do four, but we could do more. Feel free to send your questions in on Dynamic Arrays and we can maybe extend the series a bit. So I wanted to follow my series of articles. So I've written three articles on Dynamic Array, starting in May and finishing in July. And I will roughly follow the sequence of those. And then we'll do a fourth session where I'll look at some of the practical applications of Dynamic Arrays.

Neale Blackwood:

Now, Dynamic Arrays are a brand new feature in Excel. They are only available at the moment. Now I'm recording this in July, 2020, and it should be available for all of the subscription versions of Excel. Now that used to be called Office 365. Now it's called Microsoft 365. So they've had a name change and there's two different update paths or channels. One is a monthly one. So every month you get updates and the other is a six monthly one. So you get a really big update every six months. And so that one, the six monthly one has just recently received the Dynamic Arrays update. So pretty much all of the subscription versions should have Dynamic Arrays in the now. So you can stop playing.

Neale Blackwood:

If you don't have the subscription version, if you've got what I suppose, I used to call it the full version of Excel. You used to instal it off a CD or a DVD. These days, you just buy a voucher and you can download it. So the last full version of Excel was XL 2019. So last year's version. That version will not get Dynamic Arrays, okay? So that version is stuck in time back there. The next full version of Excel is probably going to be 2021 or 2022. It's every two or three years they release a new version of Excel as a full version. So it is a little bit of a wait. So that's the downside with Dynamic Arrays.

Neale Blackwood:

So if your whole company has it, then it's great because everyone should have it now. Whereas if you have a mixture, then there could be some issues between basically sharing files that have these Dynamic Arrays in them between older versions. And the reason they're doing that, Microsoft, is they want to basically encourage you to go toward the subscription version. So obviously when you hear what Dynamic Arrays can do, you'll probably want them. And so you may want to switch to the subscription version so you can get access to this update.

Neale Blackwood:

There's basically going to be the new Excel and the old Excel. So the new Excel is going to be with Dynamic Arrays and the old Excel is going to be before Dynamic Arrays. They are basically changing the calculation engine. And the calculations, the formulas, the functions, they all work a little bit differently using Dynamic Arrays. So there are exciting times ahead. These are definitely improvements. There will be more improvements. They are fine tuning some of the things as well for the... There's six new functions that we'll look at over the series. So we'll look at one today in this session, and then we'll look at more in the future. Obviously it will take a little while if people are not in the subscription version. It's going to be a couple of years maybe before you can now work with people if they're on the full version of Excel.

Neale Blackwood:

So that is frustrating, but you can use the time to become better at using Dynamic Arrays. So I just wanted to make it absolutely clear. There's no compatibility issues between the new Excel and the old Excel between opening file, sharing files, all that sort of thing. It only relates to the Dynamic Arrays component of the new Excel. So if you use those features, they are not compatible with the old versions, but everything else is compatible between the old version and the new version. There's no worries about sharing files that are using the current functionality. It's only if you start to use the Dynamic Array functions that you will have problems sharing files between the new version and the old version.

Neale Blackwood:

Now, do you have it? To find out the easiest way is just go into a cell type =SEQ. Now, if the word sequence pops up as a function, then you have it. If it doesn't, then you don't. So that's the downside. If you want to learn how to use Dynamic Arrays and you don't have them, you can actually use the sum product function to learn how to work with Dynamic Arrays. The sum product function has been around for pretty much all versions of Excel, and it works like Dynamic Arrays work. And some product function is my favourite function. It's Excel's most flexible function, and you can actually learn the techniques using some product. And then when you do eventually get the Dynamic Arrays, then you'll find it's a lot easier to convert over to how they work.

Neale Blackwood:

So the sum product function, and it's actually not the default sum product function that you need to learn. There is a hack with sum product involving brackets and multiplication symbols and things like that. So if you do some search on the internet, you will find out that you can do some pretty amazing calculations with sum product.

Neale Blackwood:

Okay, Dynamic Arrays. There's six new functions associated with them, but all of Excel's existing functions also can work like Dynamic Array. So there's a change to all of Excel's functions. We're getting six new functions, which can do some stuff that we've never been able to do before. Even Excel's humble sum function can now do some pretty amazing things that before you had to use an Array function.

Neale Blackwood:

Before we dive into Dynamic Arrays, I will go over Arrays a little bit. I didn't cover these in the article. Arrays are a special type of formula, but when I'm doing training and people ask about them, I usually say that they're like the dark arts of Excel. There's even got a secret handshake associated with them. It's control, shift, enter. So with an Array Formula, you have to enter the formula, but you don't hit enter. You don't press enter. You have to hold down the control and the shift keys, and then hit enter. And when you do that, Excel will put curly brackets or braces around the formula. And when you see those curly braces, it means that, that formula is going to work a little bit differently to Excel's normal formulas.

Neale Blackwood:

Arrays have been around for many, many versions. They are an advanced topic. You can do some magic with Array Formulas as well. They did have a couple of limitations. The first is hardly anyone knew about them. So when someone saw these curly brackets in the formula, they get confused. And also if you try and edit an Array Formula, and then instead of pressing control shift, enter, you just press enter, then

that formula will either return an error or it will return the wrong result. So editing Array Formulas always has that problem that you need to make sure that you do hit control, shift, enter.

Neale Blackwood:

There were two types of Arrays. There was a single cell array which returned a single value. And then there was what's called a range based. So you actually selected a whole range, entered the formula, control, shift, enter, and that formula was entered in the whole range. Both of those are now with Dynamic Arrays, pretty much redundant. So you don't need to use Arrays now. I think there are some very limited situations where you still need to use Arrays, but in general Array Formulas are now redundant. You can use Excel's normal formulas to do the calculations without having to go control, shift, enter. You may have also seen it CSE is another way that people write the control, shift, enter. So you may have seen that in some Excel forums. That's the Array entry.

Neale Blackwood:

Now, if you already use Array entries, then you are well placed to use Dynamic Arrays because they are so much easier than Arrays to work with. So Dynamic Arrays have a lot of advantages. Their main one is that they automatically expand, which was one of the problems with the Arrays. Arrays Formulas were fixed sizes. So if you had 20 rows selected in your range, but then you needed to extend it to 21, then that was a little bit of a problem. Whereas the Dynamic Array, as part of their brilliance is that they automatically expand based on what's required of their calculation. So we'll get into that a little bit more as we go through.

Neale Blackwood:

Now, there is one function that used to have to be entered as an Array, and it was the transpose function. So it was a really good idea, but it had a few issues when you try to use it. Now with Dynamic Arrays, the transpose function is brilliant. So I highly recommend you have a look at that. Transpose allows you to switch rows to columns, basically. So if you've got data going across the page, the transpose function can switch it to going down the page or the opposite. So transpose function with Dynamic Arrays is a really useful function.

Neale Blackwood:

Okay. Dynamic Arrays themselves. I will use an example that I used in the article, which is the unique function. So the unique function allows you to extract just the unique entries from a list. Now, in practise, that means removing the duplicates pretty much. So you won't repeat any of the codes from the list. So you'll get the unique entries. There is another spin on that, which I'll mention in a minute. But basically you remove the duplicates and you get a list of all the entries. That can be really handy for things like reports and also to drop down list.

Neale Blackwood:

So basically you just enter equals unique, open bracket, refer to the range that you want the unique entries from, close the bracket, and that's it. It'll give you a list. Now, the thing is you enter the formula in one cell. So let's say you enter that formula in cell C2. So as soon as you hit enter, that formula will actually spill down the columns. So there's some new terminology associated with Dynamic Arrays. The first is spilling. The formula will spill. Now it will spill down and across. Well, it may do either or both. So it can spill down. It can spill across and it can spill down and across.

Neale Blackwood:

What that means is the formula is in the top left cell of the range. That's where you enter the formula. So the formula is then entered down the column, but there are no formulas in the cells below or to the right. The formula only exists in the top left cell. Now this is a totally new concept in Excel. So it is brand new. The idea is you only have one formula in that range. And so if you want to change that formula, you change it in the top left cell. If you look at the other cells. So if we entered that formula in cell C2. If you select cell C3 and look in the formula bar, you will see the formula, but it will be grey. So it'll be greyed out. It won't be in the black colour. And if you actually press F2 to review it, it won't be there. It'll be blank.

Neale Blackwood:

Now, if you happen to enter something in a cell that's below where you entered your Dynamic Array Formula, and if that entry would stop that top formula from spilling down, you'll get a brand new error called spill error. So basically if you've got an entry in the cell, it's not going to override any entries below it. So you need to make sure that you've got enough space underneath after you enter your Dynamic Array so that it can spill down because this will spill down as far as it needs to go. So for the unique function, for example, it needs as much space as there are unique entries in your list. Now, depending on what your list is that could be invoice numbers or States or whatever you use it for. So it might be a long list. So you need to make sure that you do have enough space. So basically there shouldn't be anything underneath a Dynamic Array Formula.

Neale Blackwood:

Okay. So that's really different. So you enter the formula in the top left cell, that's where you edit it. And basically that's it. It copies down. It can copy across and the values are all entered. And as soon as you change... So for example, with the unique function, if you added an extra code to your list, as soon as you hit enter on that entering the new code, that code will automatically appear in your formula using the unique function. So it's worked just like Excel's normal calculation engine there. It's not like pivot tables that needs a refresher or anything like that because it's a formula or a function based, it automatically updates.

Neale Blackwood:

Now there's two new symbols that are associated with Dynamic Arrays. The first is the # symbol. So when you create your formula and let's say we created that formula in cell C2. You can refer to that list just by referring to the first cell and then putting the # symbol after it. By using the # symbol... So that's above the number three on your keyboard. You refer to the spilled range. So you refer to the top left cell, and then you put the # symbol after it. So it will be C2#. And that refers to the spilled range.

Neale Blackwood:

So for example, if you wanted to count how many entries there were, we could use =COUNTA(C2#). And that would count how many unique entries there were in that list that you had created using the unique function. Now, the other symbol is a symbol that Excel already uses. So the # symbol is a fairly new one. Though I must admit it is used occasionally with the hyperlink function. So the # symbol is used in other places in Excel. But in terms of formulas, it's pretty much a brand new use of the # symbol.

Neale Blackwood:

Now the other symbol is the @ symbol. So that's above the number two on your keyboard. And the @ symbol is basically used to tell Excel to calculate like it used to, okay? So the @ symbol overrides the Dynamic Arrays method of calculating. So sometimes you may not want to use the way that Dynamic Arrays work. And so you can go back in time and you put the @ symbol in front of the reference, and that will work in the same way as basically as you're used to, but in the old calculation technique. So the # symbol is related to the new way of calculating. The @ symbol is going back in time and working like it used to.

Neale Blackwood:

Now, if you open old files in the new Excel, then you may see the @ symbol scattered throughout your formulas to make sure it's working the way it used to work, okay? So the @ symbol should be left alone. So if Excel's put it in, then you should probably leave it there. So unless, again, you're changing the way the calculation is working.

Neale Blackwood:

So the @ symbol is already used by Excel in formatted tables. It basically means in a formatted table to refer to the same row in a different column. And that's a little bit like how it works in the formulas as well. It's telling Excel to work the way it references as the old way of referencing ranges. If you're not familiar with formatted tables, I highly recommend that you look at them because they work really well with Dynamic Arrays. So I did an article on formatted tables, which has a video. So check that out in the Excel Yourself link in the black website, and do a search for formatted tables. Sometimes when you create a calculation, now it might spill and you might not want it to spill. And so putting that @ symbol in front of the reference will stop the spilling as well. Okay.

Neale Blackwood:

So the six new functions are unique, which we've just looked at. There is a sequence function. So that you can create a sequence of numbers. There is a sort function, so you can sort lists, and that's doing that via a formula, not manually via the sorting option. There's a sort by, which is a related to sort. It just allows you another technique to do the sort. There's a filter, so you can actually limit what you extract from a table based on a formula. And lastly, there's one called Rand Array. So it's a Random Array. I can't find a lot of uses for it. I will try and explain a couple, but of all the six, the Random Array or Rand Array, I think is the least useful, especially for accounting, those types of things. It has its use for say Monte Carlo Analysis in maybe a financial model. That's the main thing I can think is used for apart from creating random values that you might use in training or testing.

Neale Blackwood:

Now, these functions, they all work very well together. So for example, you could get a unique list and then sort it. They work really well together. Also the defaults. Now a lot of these entries have a lot of different arguments and a lot of them are optional. And if you leave them out, in most cases, you'll get what you're after. So the default options in these new functions are pretty good. So in a lot of cases, you can get the result you're wanting without putting a lot of arguments into the function.

Neale Blackwood:

And just a reminder that you have to be careful sharing the files with other users who may not have Dynamic Arrays. That's the main thing to be aware of. Probably just start using them yourself if you have

them and do some testing, do some playing and have some fun. Because these are as I said, really, really powerful and they really make Excel even more flexible than it already is.

Neale Blackwood:

In the next podcast, I'll cover the June article where we look at the unique function in more detail as well as the filter function. So stay tuned for that one. Thanks for listening.