![sigma - network for excellence in mathematics & statistics support](logo)

A report into the changes in Mathematics and Statistics support practices due to Covid-19

Acknowledgements

Contents

Table of Figures

Introduction

The Coronavirus pandemic came as a shock to the world. Nothing had been seen that was comparable since the Spanish Flu pandemic a century earlier. In the UK, people were placed under a semi-strict lockdown on Tuesday 23rd March 2020 to help prevent the spread of the virus. University campuses were closed to students and staff, which meant that everyone had to work from home, including maths and stats support practitioners. Very rapidly, support services had to implement online support methods that had, in the majority of cases, never been tested or trialled before. For this report, a survey was conducted to determine how maths and stats support practitioners in the UK, the Republic of Ireland and the rest of the world converted from traditional face to face support to online support. The survey aimed to take a snapshot of what was being offered in comparison to before the pandemic started, how services were being provided and if so how successful had they been, why practitioners felt students were or were not accessing services, what could be learnt going forward, and what practitioners felt they needed in order to provide an online support service that was of good enough quality.

The survey ran alongside the first ever **sigma Network** Online workshop organised by Dr Mark Hodds at Coventry University where practitioners from across the world showcased the systems and methods that were being used to support students during the pandemic. The video from that support workshop, which was attended by over 250 people, can be found at this link: **sigma Network** Online workshop video.

Headlines from the data collected in the survey are as follows:
- Many institutions were not prepared to offer online maths and stats support when the pandemic hit and had to work quickly to find solutions.
- Of those who were planning to put in place online support, a majority had not considered how to run an online drop in service. Instead they only considered putting in place one to one support that is usually booked in advance.
- 94% of UK institutions, 100% of Irish institutions and 88% of institutions from elsewhere across the world who were surveyed offered at least one form of online support service during the pandemic.
- Microsoft Teams and Blackboard Collaborate were the most popular choices of system for providing the online support.
- The vast majority of institutions saw a drastically reduced number of students use the services on offer when compared with normal times. 74% of UK institutions, 82% of Irish institutions and 63% of institutions from elsewhere across the world who were surveyed stated they were seeing lower numbers than in normal times.
- The average number of students who used an online maths and stats support service in an institution in the UK from March 2020 to May 2020 was 79 (taken from 17 institutions). For Irish institutions this was between 101 and 250 students and for institutions in other places around the world this was between 101 and 500 students. An exact average for non-UK institutions was not available due to a lack of data on exact numbers seen and therefore a range is used. However the overall average was 116 students (taken from 24

institutions) which is what some maths and stats support services would see in just one week or even one day in normal times.

- The suggested reasons for the reduced numbers included:
  - o Exams being cancelled or no detriment policies being put in place by universities thus students had a lack of motivation to continue studying;
  - o The general situation regarding the pandemic with students and staff looking after friends and family but also students taking up jobs as key workers to earn some money;
  - o A lack of advertising or advertising in the wrong way;
  - o Technological issues both for students and staff.
- Practitioners stated they often did not feel comfortable or trained enough in providing an online service that was of a standard that would be comparable to face to face and traditional methods.
- There was a mixture of concerns regarding examinations and being able to cheat by using maths and stats support services although this was mainly from UK institutions. Some institutions put in place policies and procedures to prevent cheating such as booking in advance, signing academic misconduct agreements, or stopping services altogether for the examination period.
- The majority of practitioners feel online support is not as good as face to face methods and expect the future of maths and stats support to be a mixture of face to face and online but with more traditional face to face methods than online methods.
- A big downside to online support suggested by practitioners is not being able to see student reactions as many do not use their webcams. This makes checking understanding more difficult than in face to face support. Furthermore, the sense of community that a support centre setting brings is lost when providing online support. Students no longer work together or work independently on problems and queries take longer to answer.
- Those who did not offer online support stated they felt they needed training, better equipment and a platform to be able to offer the support. Some felt there was too much going on to consider setting up an online support service at the time.
- Some positives of online support included being able break down barriers to support so that more students that would usually not seek support (such as shy, maths anxious, or distance learners on remote campuses) actually do come for support. Furthermore, it has allowed practitioners to stop and reflect upon their practice and convince others (such as managers or senior figures at institutions) that online maths and stats support is possible and that it should be continued.

The picture in the UK

Of the 97 responses received, 72 were from institutions based in the UK and of those, 54 were institutions based in England, 12 based in Scotland, and 6 based in Wales. No responses were received from institutions in Northern Ireland. For the purposes of the analysis, duplicates were removed for questions around provisions provided but were kept for qualitative questions to allow for richer discussions and analysis. When the duplicates were removed, 53 UK based institutions were left for analysis of provision, with 39 based in England, 8 based in Scotland, and 6 based in Wales.

What provisions did institutions offer before the pandemic?

To get a sense of what exactly has changed in the UK, the first question asked what provisions institutions had in place before the pandemic. Figure 1 below shows the results from this question.
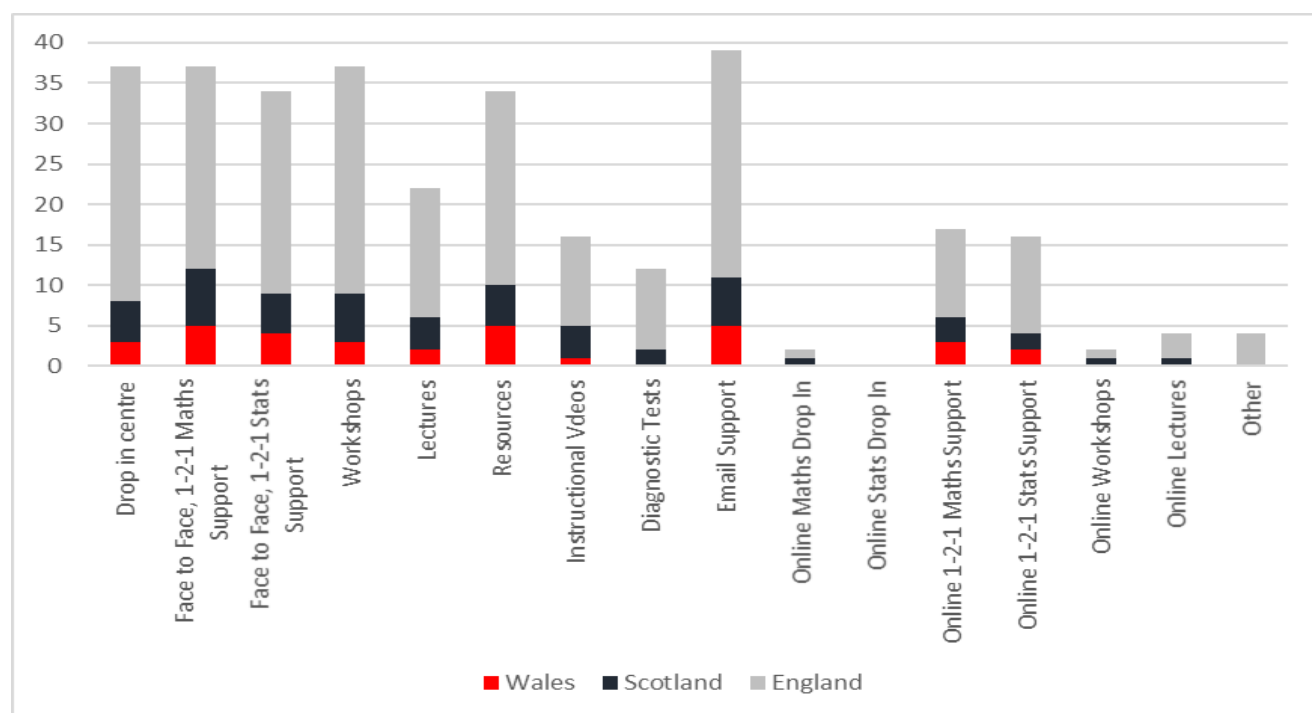
Figure 1: What provisions did institutions provide before the pandemic (UK only)?

The majority of maths and stats support services were offering traditional methods of maths and stats support before the pandemic. Indeed, 70% of UK institutions surveyed stated they offered a drop in provision, face to face maths support and workshops, and 65% of institutions offered face to face stats support. However, what is clear here is the reduced number of institutions who offered some form of online support. Only 2 institutions offered an online drop in service, both of them in maths support. No one offered an online drop in for stats support. 33% of institutions offered either a maths or stats one-to-one service online. Clearly, institutions who were offering some form of online support provision would have been in a better position to continue offering support when the lockdown was put in place. In total, there were 21 of these institutions already offering some form of online support. However, on top of this, a further 2 institutions were planning to put some form of

online support in place in the near future suggesting 23 institutions in the UK were either planning to support or were already supporting students online. Figure 2 below shows what these 23 institutions were planning to put in place, or already had put in place, in terms of online support.
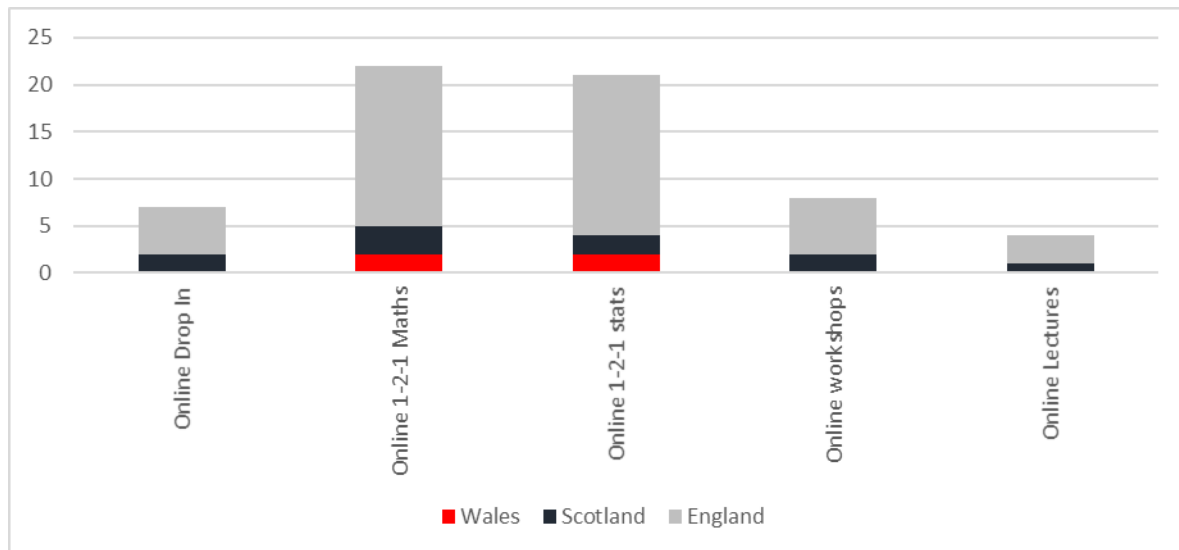
Figure 2: What were institutions planning to put in place in terms of online support before the pandemic (UK only)?

7 institutions were planning for online drop in sessions but nearly all (96%) were planning to offer online one-to-one sessions in mathematics and/or statistics. This is perhaps due to the difficulty of organising drop in sessions on online systems where you have to make sure you are not interrupted by students coming into the session. Indeed, the system used would need to have a breakout room or similar to be able to do this sufficiently.

What were institutions offering during the pandemic?

When looking at what UK universities have been offering since the pandemic began, it is pleasing to see that 50 (94%) institutions have been offering online support of some form. Figure 3 below shows what these institutions are offering.
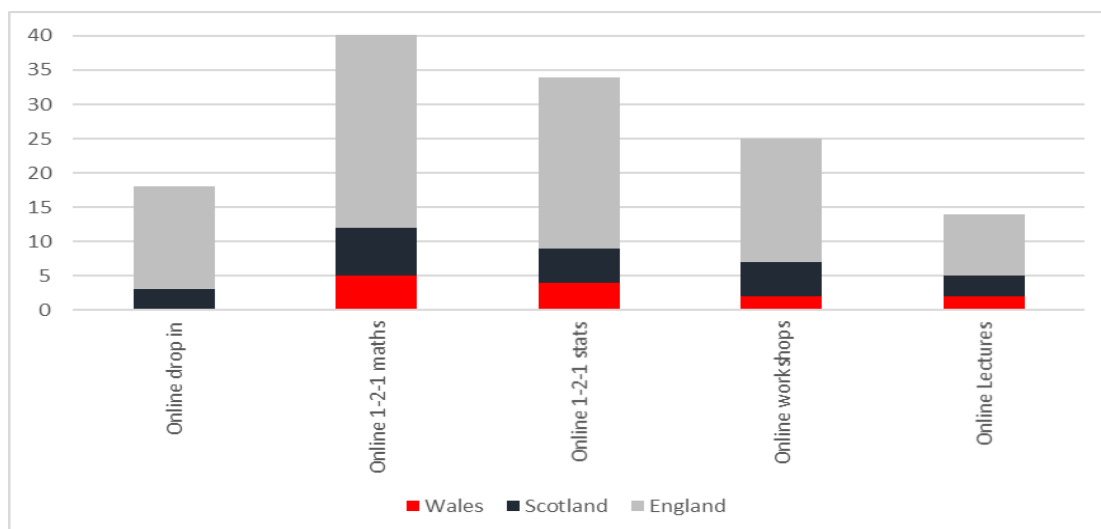
Figure 3: What online provisions were institutions providing during the pandemic (UK only)?

The majority of online support that took place was via one-to-one sessions. A lot of maths and stats support services were also providing online workshops, perhaps to reach more students at once. As is shown in the numbers of students interacting with support services later, the majority of students were engaged through workshops.

When comparing only those institutions that had planned to put in place some form on online support with what they actually did provide, we see a similar trend as shown in Figure 4 below.
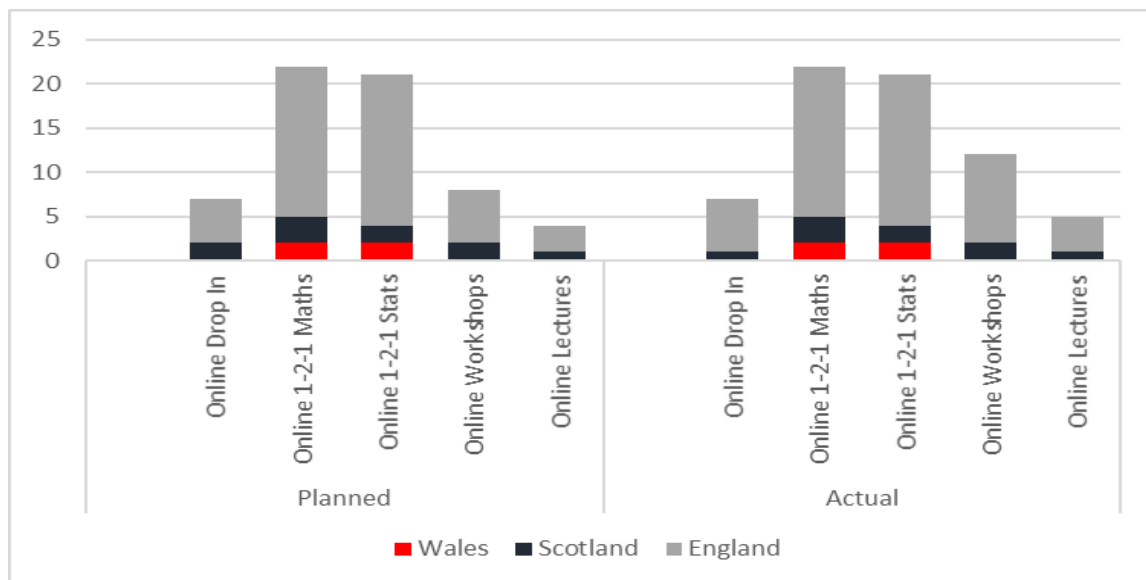
Figure 4: A comparison of planned and actual online support offered (UK only)

As you can see, the focus was on providing one to one support. Again, as stated previously, it appears a lot of institutions were providing online workshops to support their students, with a lot more institutions doing so than planned. It is interesting to note that these institutions are also offering comparatively more statistics one-to-one online appointments when compared to what was being offered by all institutions that were offering online support. Of the 23 institutions who had planned or were already offering online support prior to the outbreak of the Coronavirus, 91% were offering one-to-one statistics appointments whereas of the total 50 institutions who actually did offer online support during the pandemic, only 68% were offering one-to-one statistics appointments. It is perhaps that those who were planning to put online support in place had more resources and staff experienced in offering statistics support and were consequently able to offer more support.

What system were institutions using to provide the support?

One of the biggest issues is finding an online system capable of providing a level of support that would be expected by our students. Some universities have a system that has been paid for to offer online lecturing and staff will have been trained and asked to use that system where possible. Other maths and stats support services will have had to research and look at different systems to see which meets their needs. Figure 5 below shows the different systems that were used in the UK during the pandemic to offer support to students.
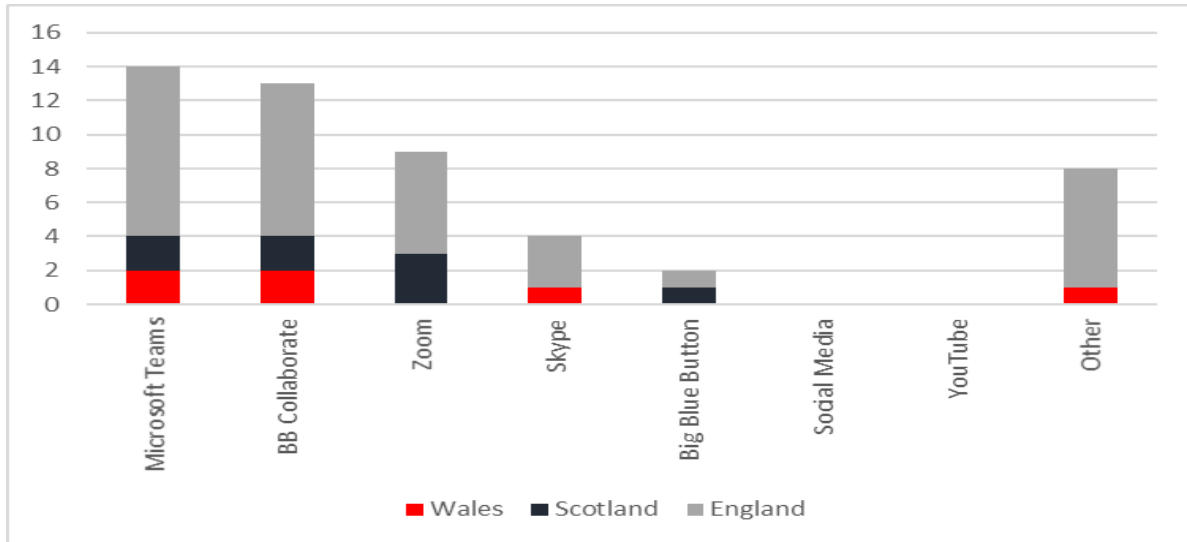
Figure 5: What system were institutions using to provide online support (UK only)?

The majority of institutions (28%) were using Microsoft Teams to provide their support with Blackboard Collaborate (26%) close behind. Most institutions will have access to Teams and a lot of institutions use Blackboard for their VLE (Virtual Learning Environment). Free, external software in the form of Zoom (18%) and Skype (8%) were also used, perhaps in situations where the institution had no access to services like Teams or their VLE did not support an online interactive service like Blackboard Collaborate does. Other systems used include Google Hangouts, and Adobe Connect. For an overview of some of the systems mentioned here and how they were being used to provide online support, please view the video of the **sigma** Online Support Workshop that took place on May 29th 2020 (Hyperlink available here: **sigma** Online Support Workshop).

How many students accessed your service?

A key issue is whether the support systems we are using and the service we are providing is supporting as many students as we would see during normal times. Figure 6 below shows that a high proportion of institutions in the UK (74%) saw severely reduced numbers of students accessing their service. Only 2 institutions said they saw higher numbers of students than they would normally.
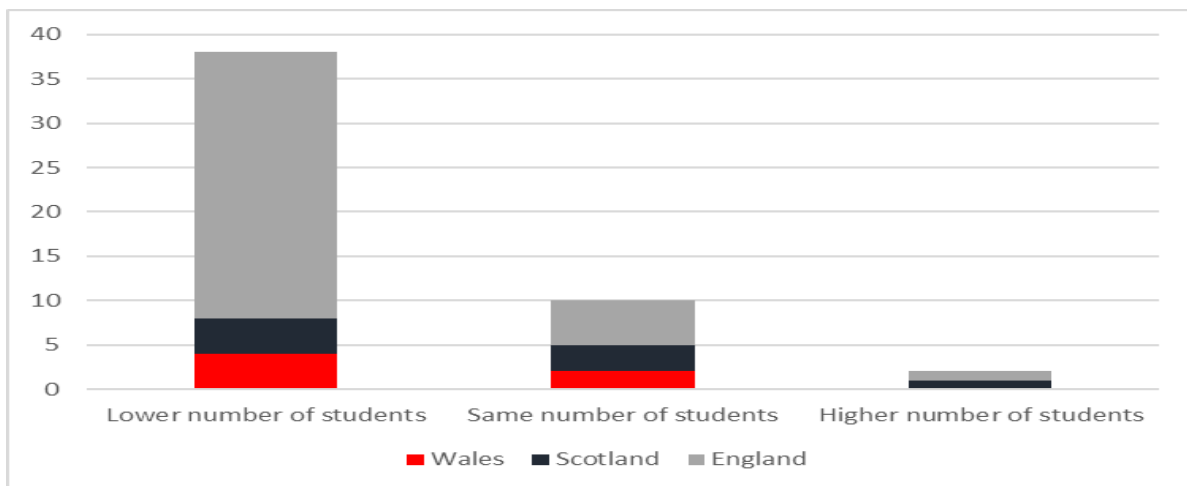
Figure 6: Did institutions see higher, lower, or the same number of students when compared with normal times (UK only)?

Institutions were also asked to provide the rough number of students that had been accessing their services or, if they had kept a record, exactly how many students. This revealed that the average number of students seen from March until May 2020 in the UK was 79 with 28% of institutions saying they had seen roughly between 21 and 50 students in that period. This is a significant reduction for a lot of maths and stats support services. Indeed, a lot of services would expect to see 79 students on an average weekday or some would expect to see that many students in one morning. Those that provided online workshops stated that the majority of students were interacting with their services through these rather than through one to ones or drop in services.
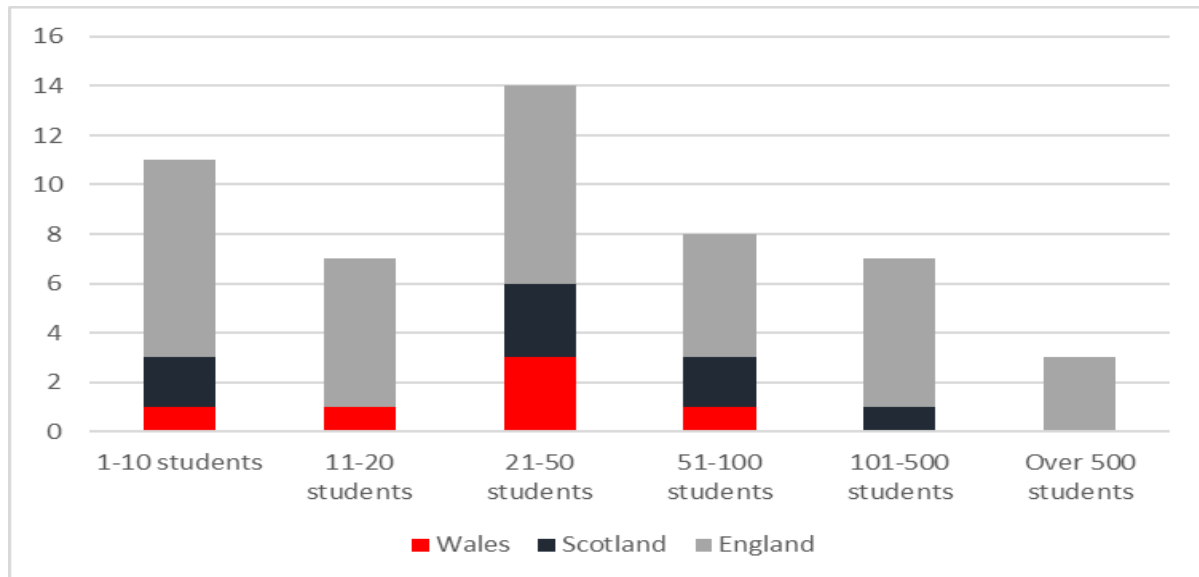
Figure 7: Roughly how many students had institutions seen since the pandemic started (UK only)?

To determine why there had been such a drop in the numbers of students accessing services, practitioners were asked why they thought this was the case. As mentioned previously, for this analysis, participants' answers from an institution that had already provided answers were included to add depth and knowledge to the discussion. The main reason practitioners felt numbers were generally lower was because universities had either cancelled exams, made them easier, allowed open book exams, or had no detriment policies in place. Practitioners felt that because of this, students were less motivated to work and less engaged with their learning. Alongside this, many practitioners felt that students were less aware of the service available or that they had not provided enough information through the right channels to the students regarding what was available. Indeed, one comment suggested that students were *"…surprised that a support service was still available*". However, it was also suggested that the messaging had to be correctly targeted as some practitioners felt the large amount of emails and information given to students made them feel overwhelmed.

Indeed, the whole situation with the lockdown was another reason many practitioners felt students were not engaging. Students would have had to travel home quickly, many of whom would have got jobs as key workers in supermarkets for example, or would have ended up caring for family members in difficult circumstances. Some students also would have travelled back to countries with limited or no internet access. Getting academic support would have been one of the last things on their mind during this period. Furthermore, without proper messaging, some students may have felt distant from the university whilst they were at home.

Some other reasons suggested for the reduction in numbers included lack of equipment, for both the student and the practitioner, technical issues, such as not being able to access programs off campus, having a reduced or limited service due to practitioners being less confident in offering a high quality service, and simply that students may not have liked the idea of discussing mathematics and statistics online.

A further interesting finding from this data is that many practitioners stated that they found mathematics support numbers had dropped off but statistics support numbers had stayed the same or were even higher. A suggestion for this was that due to the time of year, more students needed support with statistics problems than maths problems, and because statistics problems are usually to do with dissertations or projects, most of these methods of assessment were carrying on as normal.

As stated previously, 2 UK institutions reported an increase in student numbers from their usual numbers. The reasons suggested for this were that students who perhaps had poor social skills but good technological skills would find online support easier to access than face to face support. Furthermore, departments and schools within institutions were offering sessions that were linked to the session provided by the support service. This meant students were aware of the support available and did not have to go to a building which in some cases may have been in an obscure location.

Of course, the real reasons for why students were or were not engaging with support are known only to the students themselves. Therefore a future project should consider investigating the reasons for engagement and non-engagement during lockdown with mathematics and statistics support services by asking the students themselves for their opinions and reasons.

Have you had any difficulties in providing online support?

It has already been noted that one of the main difficulties in providing an online support service is advertising to students in the right way to ensure they are aware of what is available. However, it was important to discover what other difficulties practitioners encountered so that everyone can learn from them and improve their own services going forward.

The majority of comments (16) mentioned that the biggest difficulty was connection issues. Some staff members were in remote locations with poor broadband connections whilst others mentioned that students may have gone home to a country with restricted or limited internet access. Alongside this, practitioners stated that they found it difficult to use the software to its full potential and provide a high standard of service. Indeed, many found difficulties with using online whiteboards, sharing documents, or being able to type in mathematical symbols. Furthermore, students often did not have the right equipment, which was mainly headphones and a microphone but of course very few students would have had access to a tablet or surface to be able to write on the screen themselves, reducing the interactions between the student and the support tutor.

Another issue mentioned was that staff did not feel comfortable or trained enough in providing online support and therefore they saw that as a real barrier. They worried about using good practice and supporting students in the right way. Some practitioners mentioned that they had a lack of equipment themselves, sometimes

due to budget constraints set by the university. Those that did feel comfortable in providing support stated that a difficulty initially was finding time to learn how to use the software, training other staff members, or recreating materials for online use. In terms of the service provided, some difficulties mentioned were that queries were often taking longer to answer. This was because either there was a delay whilst a student attempted a problem and then came back to ask more questions or because there simply wasn't enough staff on hand to support all of the queries in a reasonable amount of time. In a normal maths and stats support service setting, staff would be on hand to support multiple students at the same time and would also allow the students to attempt problems whilst going to support other students. Online systems often do not allow for this to happen unless you have enough staff and breakout rooms to go in and out of. Within the support centre, you can also gauge a student's understanding by facial expressions or cues. Online settings often do not allow for this as many students do not share their webcams as there is no requirement to do so. Therefore some practitioners found it difficult to determine whether to move on from a particular topic or question because they were not fully convinced a student understood. A couple of practitioners also stated that they had issues of making sure that only their students had access to the support system as the links were often open to the public. A final difficulty suggested mentioned personal challenges, such as illness, caring for family members, or indeed just being a parent whilst working at home!

Is online support better or worse than face to face support?

With online support being a new form of support for many practitioners, it was important to see their opinion on it and whether they thought online was better or worse than the traditional face to face setting. Furthermore, what aspects did they consider were better online and what aspects did they consider were better face to face? Figure 8 below shows the majority of practitioners in the UK (54%) currently think online is worse, or is worse in more aspects than better, when compared to face to face support.
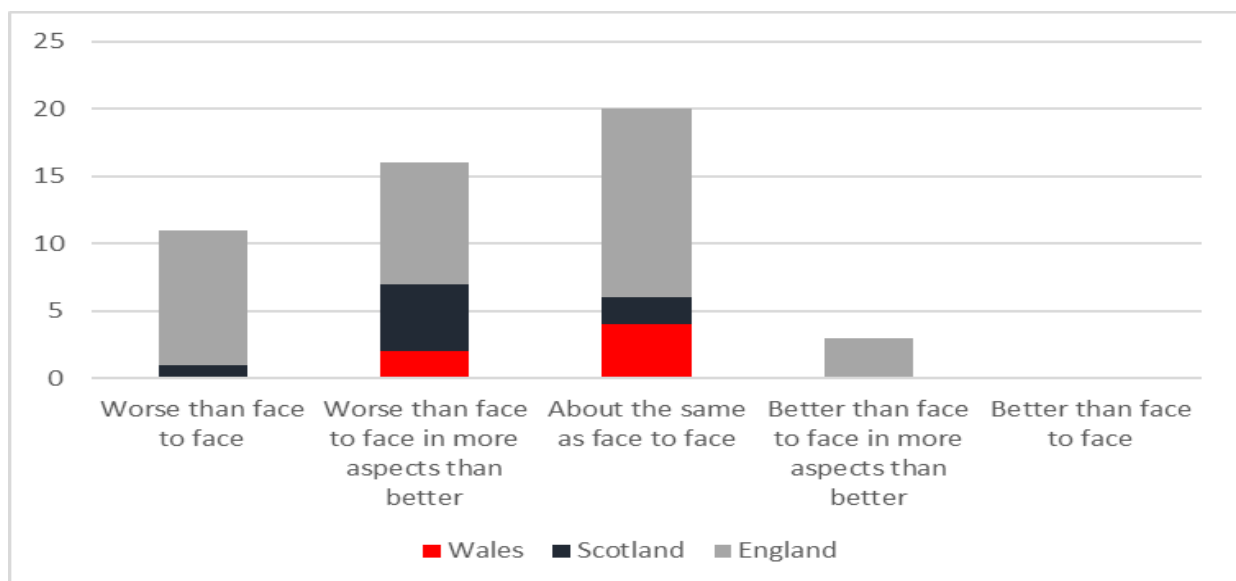
Figure 8: Is online support better or worse than face to face support (UK only)?

As you can see, no one suggested that online support was fully better than face to face support. 40% of UK practitioners suggested online support was about the same in terms of quality as face to face support.

Again, to determine what aspects were considered better online and what aspects were considered better face to face, the data from all UK practitioners, regardless of whether it came from an institution that had already submitted data, was analysed for greater discussion. The majority of aspects quoted as being better online than face to face were focused around the student experience, of which flexibility was mentioned the most (20 comments). Practitioners felt that the online experience allowed for flexibility, both in terms of how long you spent with a student without feeling you needed to move on to the next student, but also in terms of being able to access the support for the student. One comment stated that online systems *"save having to come on to campus for a 10 minute question"* which therefore increases interactivity as there is no commuting needed. This in turn is also of benefit for those students who are perhaps less confident or concerned about seeking support. 9 comments mentioned that online systems enable those students who would not normally seek support to actually do so. Indeed, online systems "*put students at ease when asking questions"* as they "*don't need to come to a physical space where they are [seen] as 'seeking support'".* A suggestion was that students therefore feel more comfortable in their own environment (3 comments) and "*…seem more free to be able to ask questions".* This goes hand in hand with accessibility and inclusivity (6 comments) which was another area that was seen as a positive for online support. Practitioners liked the ability to record sessions so that students could look back again and again but also that they could make the sessions accessible by adding captions for example. For inclusivity, practitioners felt it was good that they could offer a service to remote locations and satellite campuses (3 comments) meaning for the first time everyone at their institution was receiving the same support service.

The other main area of positivity towards online support was the technological aspect. Despite stating previously that connection issues and a lack of hardware were big barriers, other technological aspects were seen as positives when compared to face to face support. For example, sharing links or documents and online quizzes is much easier and is instantaneous (9 comments). Furthermore, students online need to focus on one screen where everything is shared. In the face to face setting, students are often required to go between pen and paper and a computer which potentially makes it harder to focus. Indeed, due to the social aspect of the support centre setting, students often get distracted and use computers for reasons other than work. Sharing the screen also makes supporting mathematical programming problems much easier (4 comments). Practitioners stated they found supporting problems in LaTeX, Python, Matlab, R, SPSS, and Maple to name a few, was much easier online because both the student and the tutor could take control at any point and there was no waiting around for things to load.

The negative aspects that were described by participating practitioners mainly focused on the lack of successful communication methods that online support provides. 24 practitioners stated the biggest issue that makes online support worse than face to face is the lack of non-verbal communication. Being able to see the faces of students as support is provided is a great way to determine whether or not a student actually understands what you are telling them. The majority of students, according to this survey, will not use webcams when asking for support, or the bandwidth is not good enough to be able to see their faces and therefore "*[you] cannot see the reactions of the students so [you are] unsure whether they understand what is being taught*". Related to this is dealing with anxious students. Indeed, one practitoner stated it is "*Difficult to gague student anxiety levels, maths or*

pandemic related". A large part of being able to provide successful support is making the student feel at ease and not anxious, particularly if they are doing a subject with less mathematical content. Online methods of support appear to be making this a lot harder.

As you would expect, the technical aspects of providing online support were also cited as a negative. These included not having the right equipment for both the tutor and the student, which wouldn't normally be an issue in the support centre setting, not being able to work together using the same whiteboard, having a lack of training in the online methods, or general connection issues which add to the difficulty in communicating effectively. One practitioner stated that "*sometimes you feel like you speak to the void*" because you cannot tell whether or not a student is actually there and listening to you.

Sharing, collaboration, and checking progress was also suggested as something which is worse using online support. Students cannot work in a group like they may do in a normal support centre service, or if they can it is not as effective. Furthermore, the sense of community is lost online so collaborative working is much harder. In turn, this has been suggested as a reason why some students are not interacting with the support available.

Some final aspects that were cited as being worse than face to face is how tiring online support makes the practitioner. Looking at a screen for extended periods of time can really drain energy whereas in a physical centre, you are normally able to walk around and mainly look at work on paper. On top of this, time management is harder as students are usually working one to one online and ask extended questions. Normally students can be left to work alone after you provide some support but online it is usually just the practitioner and the student.

Were you concerned about cheating during exam periods and have you put any measures in place to prevent cheating?

One issue that maths and stats support practitioners have always got to be aware of is cheating. Usually this would be for coursework, where students might hide the fact that the problem they want help to solve is actually part of formally assessed work. However, due to exams being moved online during the pandemic and students having a set time period to complete it, there was more scope for students to use support services to cheat. Therefore participants were asked if they were concerned about students cheating through using support services and if they had put any mechanisms in place to prevent cheating. Figure 9 below shows how concerned practitoners were about cheating if their institutions were having exams.
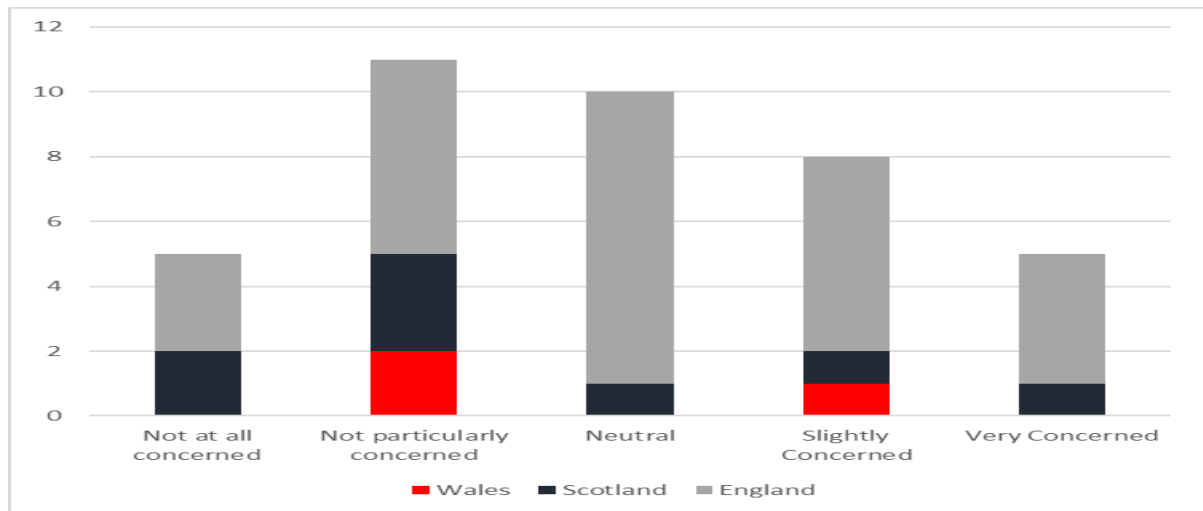
Figure 9: How concerned were you about cheating during the exam period (UK only)?

3 UK insitutions whose exam period had already taken place reported they had issues with students attempting to cheat whilst using their online support service. Despite this, there seemed to be a reasonably even split between practitioners who were and were not concerned by attempts to cheat. Perhaps this is because of the no detriment policy most universities have implemented or it is something they haven't really thought about due to it not being an issue in the past. However, it may be something that needs to be thought out more carefully for the future if assessments are going to be continuing online.

Of those institutions who have had exams or were having exams in the near future at the time of the survey, 17 had put plans in place to prevent cheating whilst 22 had not. Methods to prevent cheating including students having to book 24 hours in advance stating the topic and work they wanted to go through and from which particular module, signing an academic misconduct agreement when they booked, knowing which exams were happening when, or just simply not offering a support service whilst the exams were taking place.

Will provisions continue (or start) to offer online support once the pandemic is over?

Despite the drastic impact the virus has had on everyone's lives, it has provided us with an opportunity to explore new methods and adapt what we do in a short space of time. With that in mind, it was sensible to determine how many institutions were planning to continue, or start, offering some form of online support once the pandemic is over.
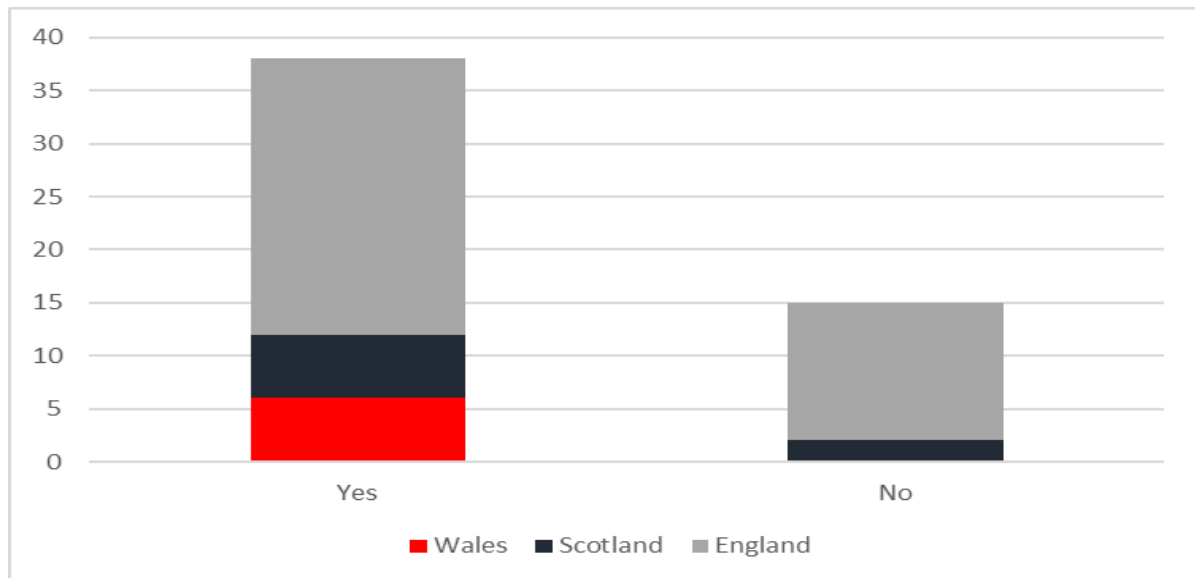
Figure 10: Will you continue to offer online support once the pandemic is over (UK only)?

Figure 10 above shows that far more institutions in the UK are planning to provide online support once the pandemic is over (72%) than not. However, of the 28% of institutions who said no, just under half said they would wait to see what would happen as, at the time of writing, it was unclear. The other reasons why practitioners stated they would not continue with online support were that it had not been as effective or convenient, the take up had been far too small to consider continuing, and that they had a lack of resources to continue providing it whilst providing other forms of support at the same time.

The biggest reason why institutions were planning to continue with online support is that it provides equal opportunities for distance learners and remote campuses. In turn it also provides more flexibility and accessibility for students regardless of whether they are distance learners or not. Some practitioners also saw it as a natural extension of services and that they received positive feedback on the service. Finally, some universities (3) stated that support services must provide online support from now on and therefore online support will definitely continue at these universities.

What do you think Maths and Stats support will look like once the pandemic is over?

A natural extension of the previous question is to ask what practitioners think maths and stats support will look like once the pandemic is over. Figure 11 below shows that the majority of practitioners in the UK thought that there would be a mixture of face to face and online support but with more face to face than online support. Again, for the purposes of this question, all practitioners in the UK who took part in the survey were included in the analysis.
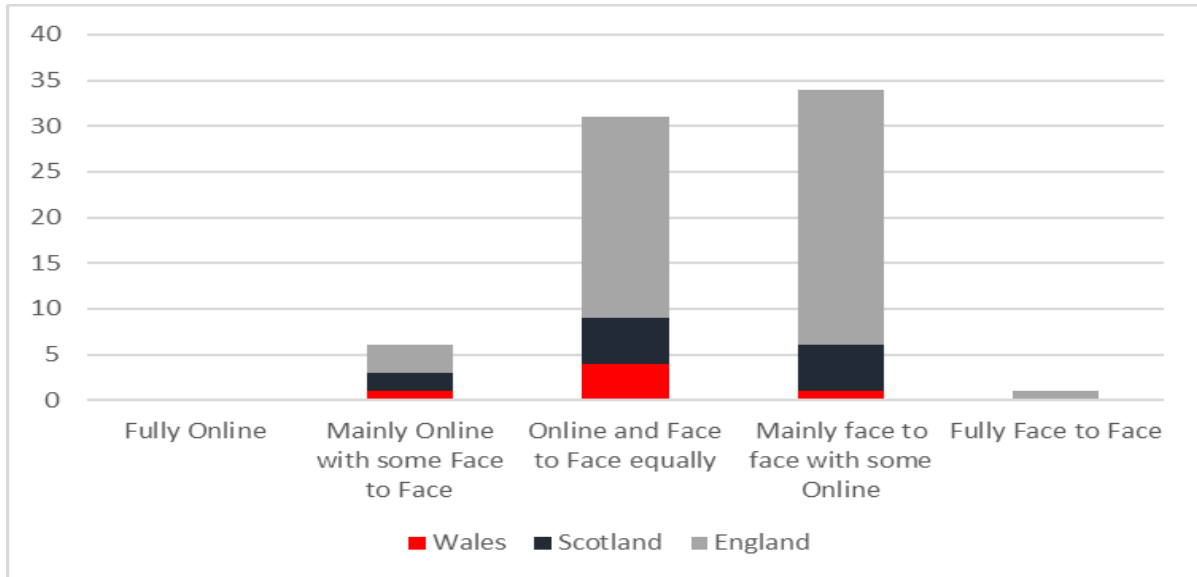
Figure 11: What do you think maths and stats support will look like once the pandemic is over (UK only)?

It seems clear that despite the uncertainty surrounding the immediate future at the time of writing this report, many practitioners were preparing to continue or start to offer online support in some form. Despite this, many do still believe that the traditional face to face methods are still the best methods of providing support to our students but should be complemented with online methods. This is shown in the answers to the next question and Figure 12 below.

To what extent do you agree with the following: "The pandemic has provided the mathematics and statistics support community with an opportunity to try new methods of support which will improve what we offer and the number of students who can access support in the future"?

Figure 12: To what extent do you agree with the following: "The pandemic has provided the mathematics and statistics support community with an opportunity to try new methods of support which will improve what we offer and the number of students who can access support in the future" (UK only)?

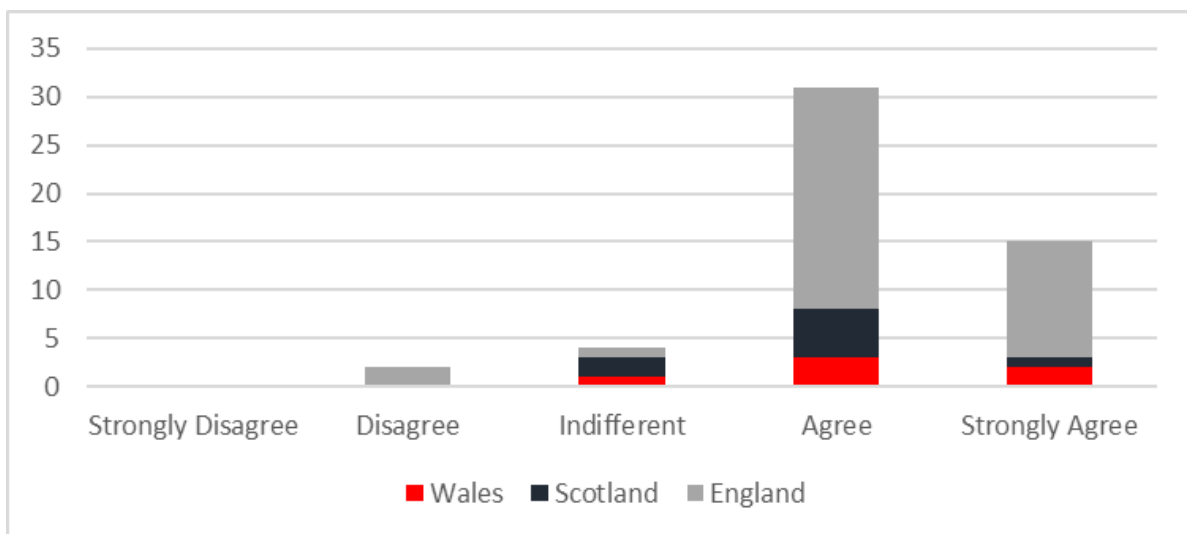90% of practitioners either agreed or strongly agreed with the statement suggesting that a blended approach for providing maths and stats support in the UK will be the best way to support our students in the future. The main reason for this opinion is

because it has allowed us to try new systems that allow access and flexibility. When this is complemented with face to face methods, it offers variety for students and could potentially increase the number of students we are able to support. Indeed, one practitioner remarked that "*students with anxiety [stated] that the online environment had made it easier for them to be engaged with their studies."* However, online support is something that was clearly being considered by a lot of practitioners before the pandemic but was not tested or implemented due to various reasons. Several practitioners (9) stated that the pandemic forced us to to try new things and get organised whereas before there was skepticism that online support would actually work. One quote stated "…*there was always some reluctance to do this in the past, it was done piecemeal and not really taken seriously by management. It has also given staff who may not have previously supported students online the opportunity to do so and so break that anxiety barrier"* with another stating *"…also many (managers) have been skeptical that such support would be possible remotely - now they have seen it works, and would therefore be more open to such ideas"*. Alongside this, practitioners felt they were now getting better access to IT support as it was necessary to be able to provide day to day activities and support. They felt that it enabled them to have more confidence with online support and were therefore able to re-evaluate their practice both offline and online: *"People have found inefficiencies and have attempted to resolve this - thus the future system should be more efficient [than] what was there before the pandemic"*.

Finally, practitioners were willing to continue with online support because they thought students would be getting more used to it, and students who were coming to start university in the next academic year would be more aware of how online learning works. It has already been suggested above that online support has enabled the more anxious students to reach out and obtain the support but also, more generally, some students may prefer and be used to online support once the pandemic is over: *"I think some students are more comfortable with meeting online and so may seek support when they wouldn't have face to face."* Despite this, many practitioners still think online support needs to complement traditional methods and that online will never be as good as face to face: "…*the primary type of support going forward will revert to face to face due to the benefit for looking over handwritten work (especially in maths) and ease of doing drop ins for students from various subject backgrounds"* and *"I think that 1-1 face to face support in person is the best - the gold standard"*.

Institutions not offering online support and the reasons why

In the survey, there were 3 institutions in the UK reporting that they were not offering online support during the pandemic. All 3 institutions were based in England and had various reasons for not doing so. One institution said "*it was felt that colleagues had too many other things to do as the pandemic started, especially with the shift to online…teaching and assessment"* and that it was more important to focus on getting used to lectures and tutorials online instead. Another institution was unable to offer support because their practitioner was on sabbatical and the last institution simply stated that it was not needed. It is possible that these institutions usually offer support from within a maths department using departmental lecturers, as opposed to a centralised cross-institution support service with dedicated staff, and therefore were unable to respond more positively.

A follow up to why they were not providing support was to ask what they felt they needed to be able to provide support. All 3 institutions said they needed a platform to

work on, training in how to use the platform and how to provide online support effectively, hardware to be able to write on the screen for example, and more staff to be able to carry out the support effectively and efficiently.

The picture in the Republic of Ireland and the Rest of the World

As the **sigma Network** membership extends to practitioners across to the Republic of Ireland and the world, it was pleasing to see that 19 institutions outside of the UK took part in this survey with 11 from Ireland and 8 from the rest of the world (denoted ROW in figures) including Australia, Czech Republic, Germany, Norway, and the United States of America. There were 25 responses from practitioners outside the UK but 6 of these were from institutions that had already responded to the survey and are therefore excluded from the quantative questions but included for the qualitative questions. This section of the report therefore looks at the answers given by practitioners from institutions outside of the UK and compares them to the answers given by UK practitioners.

What provisions did institutions offer before the pandemic?
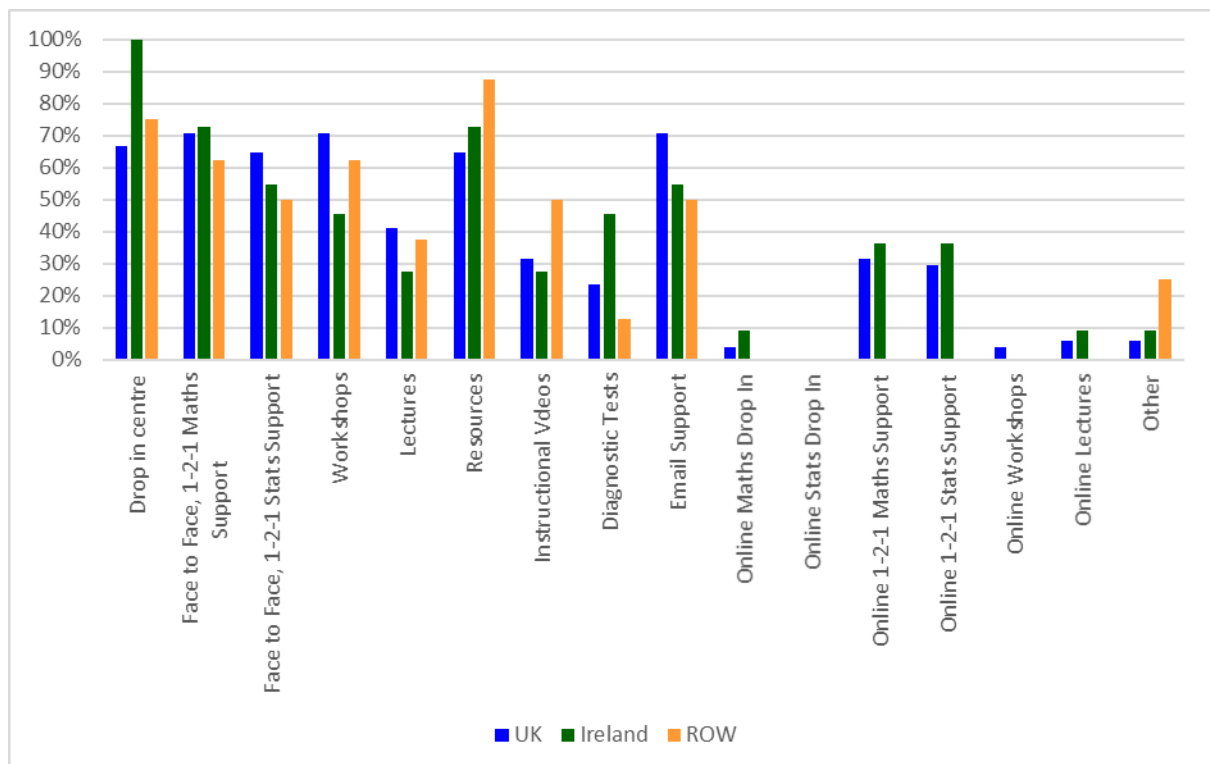
Figure 13: What provisions did institutions provide before the pandemic?

Figure 13 above shows that the provisions that were offered before the pandemic in institutions across Ireland and the rest of the world are comparable to that of the UK. For ease of comparison and better presentation of the data, percentages are used rather than absolute numbers. All 11 Irish institutions who responded to the survey had some form of drop in centre but again, no institution had an online drop in service in place for statistics support. Indeed, very few had online maths drop in

service in place but more had online one to one services available in Ireland. Other services included tutorials and co-teaching on modules.

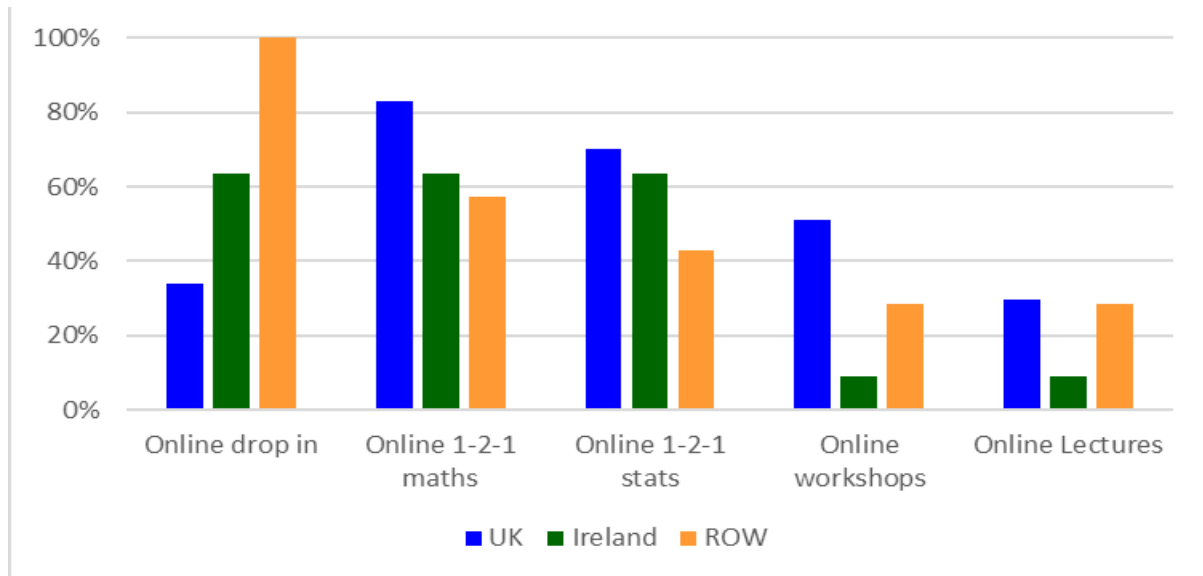Figure 14 below shows what online provisions institutions had planned to put in place.

Figure 14: What were institutions planning to put in place in terms of online support before the pandemic?

It is interesting to see that all 8 institutions from outside the UK and Ireland had planned to implement an online drop in provision at some point. Over 60% of Irish institutions had also planned for this which is significantly more than institutions in the UK. It appears that those who had planned to put online provisions in place before the pandemic in the UK concentrated on providing online workshops whereas outside the UK, the concentration was on taking drop in provisions online. It is possible therefore that practitioners outside the UK were slightly better prepared to provide online support than UK practitioners.

What were institutions offering during the pandemic?

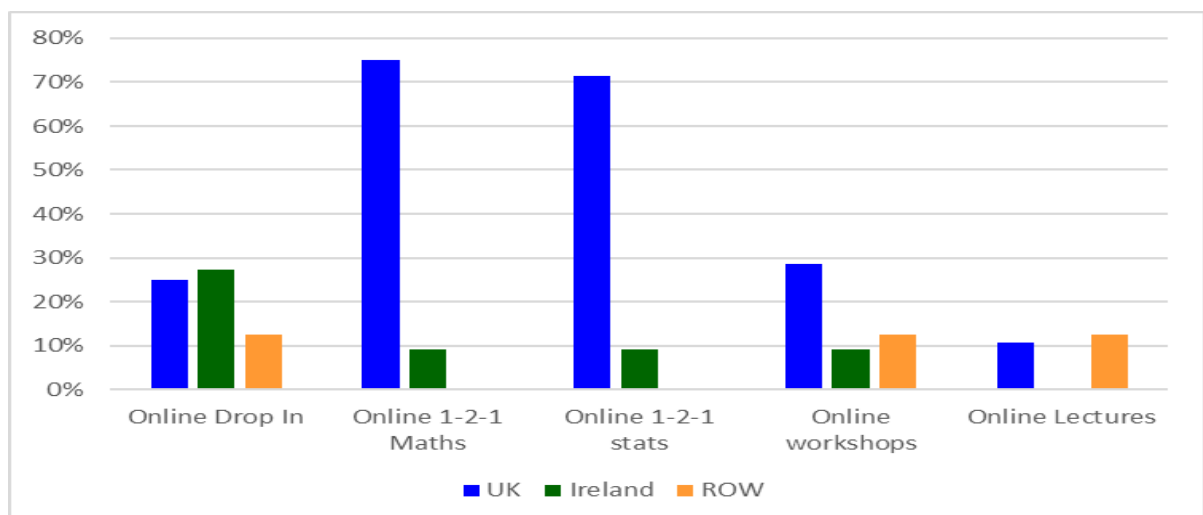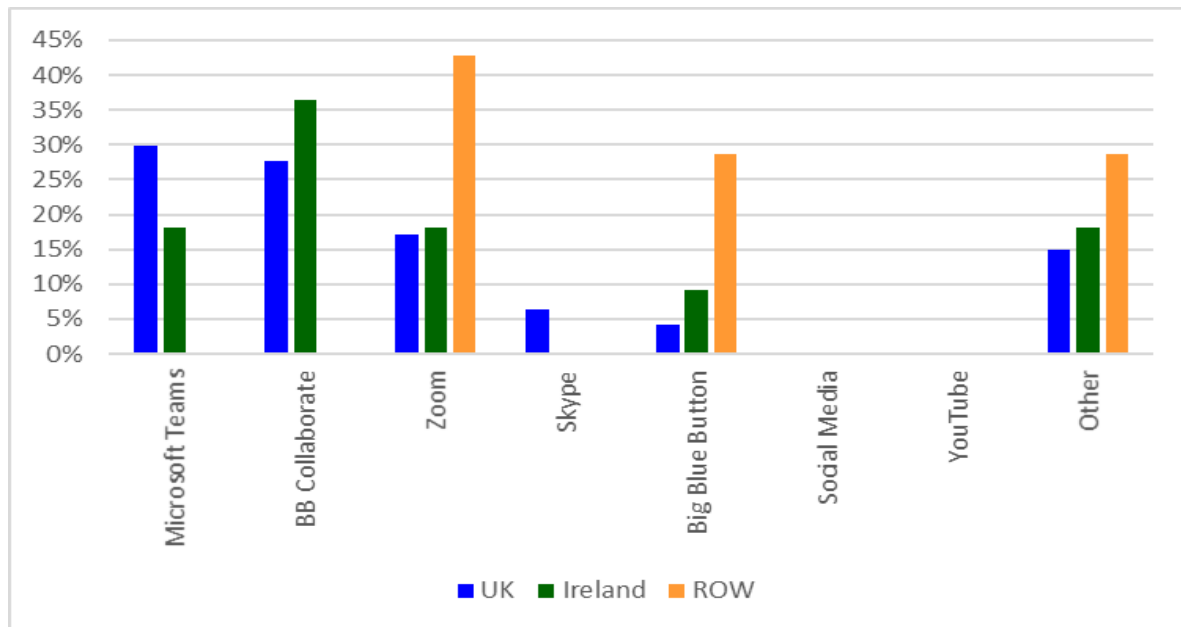Figure 15 below shows what institutions were offering during the pandemic in terms of online support.

Figure 15: What online provisions were institutions providing during the pandemic?

It is very interesting to see the vast difference in what was planned and what actually was being provided. Planned online support clearly may have taken several years to implement but only 12% of institutions outside of the UK and Ireland were offering an online drop in service when 100% who were surveyed were planning to implement an online drop in service at some time. Furthermore, very few Irish institutions were actually offering an online one to one service, with more offering a general drop in service. As the figure above shows, this is a different approach to UK universities who appear to have focused on one to one online support and workshops.

## *What system were institutions using to provide the support?*

Figure 16: What system were institutions using to provide online support?

Figure 16 above shows what system institutions were using to provide the online support. Similar to the UK, Irish institutions mainly used Microsoft Teams and Blackboard Collaborate but institutions outside of the UK and Ireland mainly used Zoom. Indeed, as part of the **sigma Network** Online Support Workshop, we saw a useful presentation on Zoom from colleagues in Australia at Western Sydney University. The other option here included systems such as Google Hangouts, Visicom (MAGIC) and pre recorded lectures.

How many students accessed your service?

We have already seen that UK institutions saw a large reduction in the number of students using services provided. Unfortunately this is not just a problem in the UK. Irish institutions and other institutions across the world also reported that, on the whole, there was a large decrease in the number of students using their services, as shown in Figure 17.
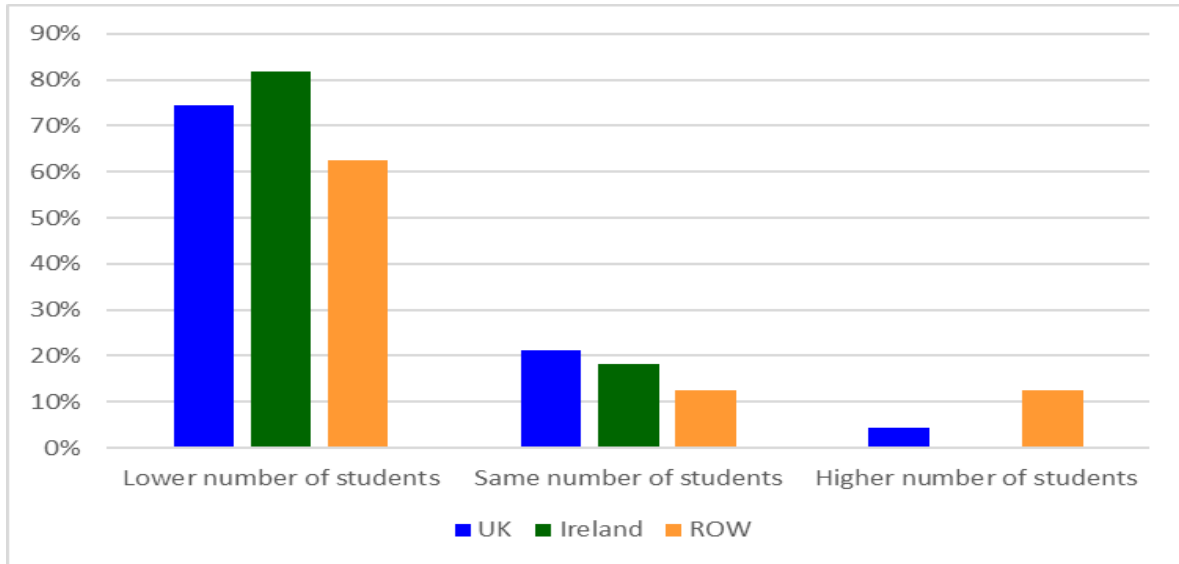
Figure 17: Did institutions see higher, lower, or the same number of students when compared with normal times?
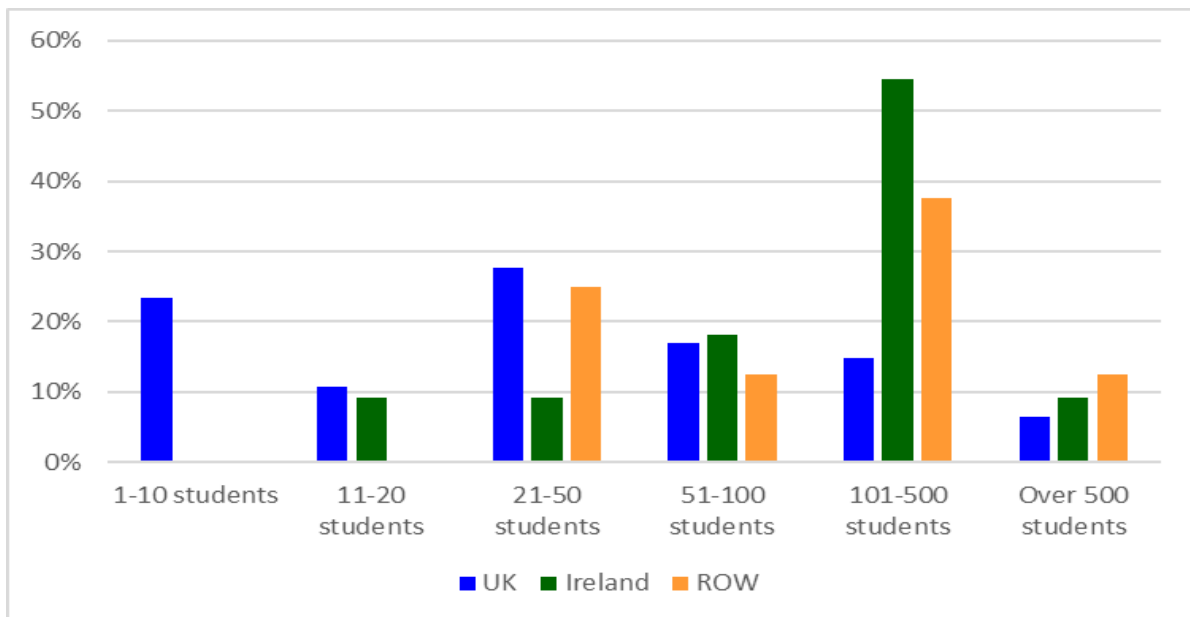
Figure 18: Roughly how many students had institutions supported since the pandemic began?

Figure 18 above shows the rough numbers of students who had used the online services provided between March and May 2020. Non UK institutions seem to have done a lot better in terms of the numbers of students seen within their services however they did still report that these were large drops when compared to the usual numbers seen. This data is perhaps surprising given that UK institutions seemed to focus more on one to one support alongside providing online workshops, which would naturally have more students attending, and non-UK institutions focused on online drop in services, which would have had fewer students attending. The reasons provided for this were similar to the reasons provided by UK universities. These included that students were not aware of services, it was a difficult time for everyone concerned, engagement and enthusiasm for learning was reduced across the board, poor connections and technological issues and there was a lack of exams to prepare for.

Have you had any difficulties in providing online support?

The difficulties suggested by practitioners from outside the UK again reflect the same issues reported previously. Practitioners found that getting students to communicate with mathematical symbols online was very difficult. Overall communication was also difficult, again due to technical problems. Practitioners living in rural Ireland reported poor internet connections there so only email support was provided in those cases. On top of this, programs sometimes crashed and some practitioners had a lack of equipment to be able to carry out support effectively.

Once again, it is clear from the answers to the above question that practitioners across the world seem to be facing the same challenges. Going forward it makes sense therefore to work on these challenges together, share ideas and best practice to ensure that we can support all of our students in the best possible way whilst using online methods.

Is online support better or worse than face to face support?

Figure 19 below shows whether or not practitioners think online support is better than face to face support.
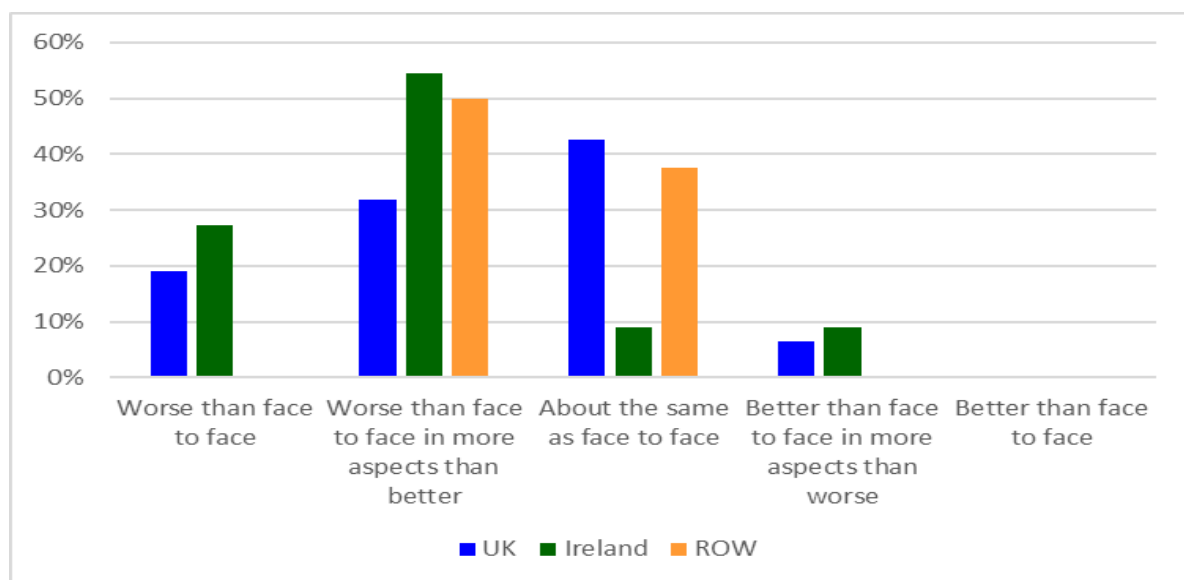
Figure 19: Is online support better or worse than face to face support?

The figure shows that there is consensus across the world that face to face support has more aspects that are better than online support. Again, the reasons for this were similar to the UK institution responses. Practitioners outside the UK felt students were not engaged as much online, there were too many difficulties with technology, and that it was difficult to get a sense of whether the student was understanding what you were telling them or not. Indeed, one practitioner suggested that you lose "…*the personal connection. Reading students' body language and getting a feel for where they are [is lost online]*" and another stated: *"You have to see the whites of learners' eyes to know if they are with you or not"*. Furthermore, practitioners from outside the UK felt that a serious flaw of online support is the loss of the social aspect and the sense of community.

Conversely, some of the positive aspects of online support suggested were being able to support students from across different campuses, flexibility and convenience for students, being able to re watch sessions via recordings at the student's own

pace, and seeing students who would not normally attend due to anxiety or embarrassment. One interesting comment stated: *"I noticed we had a small number of students engaged online that never came to the physical face-to-face support centre which made me think it (accessing online MLS) might be less of a psychological barrier than physically walking to the centre for help though I have not survey[ed] these new comers (online) to confirm this."*

Were you concerned about cheating during exam periods and did you put any measures in place to prevent cheating?

As discussed previously, online examinations meant that there was a greater opportunity for students to use maths support services in order to obtain answers to questions whilst doing the exam. The results from UK institutions showed that there was a mixture of concerns but over 40% of these practitioners were either slightly concerned or very concerned about cheating. Figure 20 below shows that institutions outside of the UK appeared to be more relaxed about cheating during examinations however it should be noted that examination periods are different in different countries. Therefore one of the reasons why non-UK institutions appear more relaxed is that practitioners in these countries may had yet to really consider it.
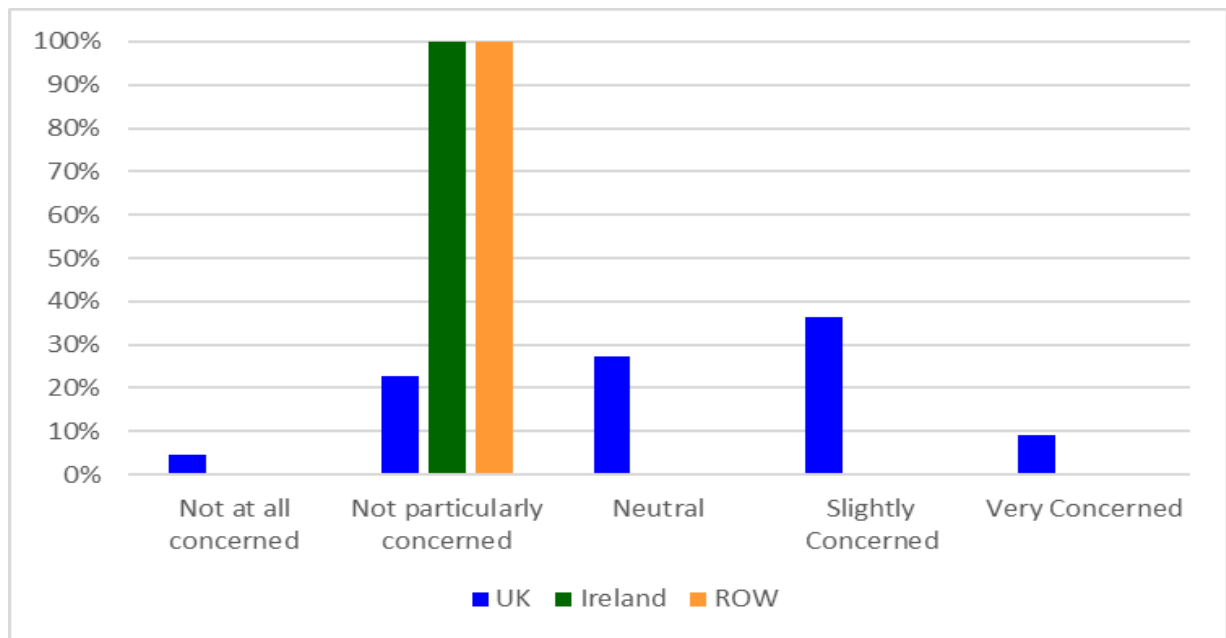

Figure 20: Were you concerned about cheating during the exam period?

Due to the more relaxed concerns regarding examinations, very few institutions outside of the UK had put in place measures to prevent cheating during their examination periods. Those that did used the same methods offered by UK practitioners such as cancelling all support, doing advanced appointments only, and signing academic misconduct notices.

Will institutions continue (or start) to offer online support once the pandemic is over?

Figure 21 below, with bars representing the percentages of institutions who said yes to the above question, shows that there seems to be support for continuing, or starting, online support once the pandemic was over. Over 80% of Irish institutions stated they would either start or continue alongside over 70% of UK institutions surveyed. Institutions from outside the UK appeared to be more reluctant to start or

continue offering online support with only 33% of these institutions stating they would do so.
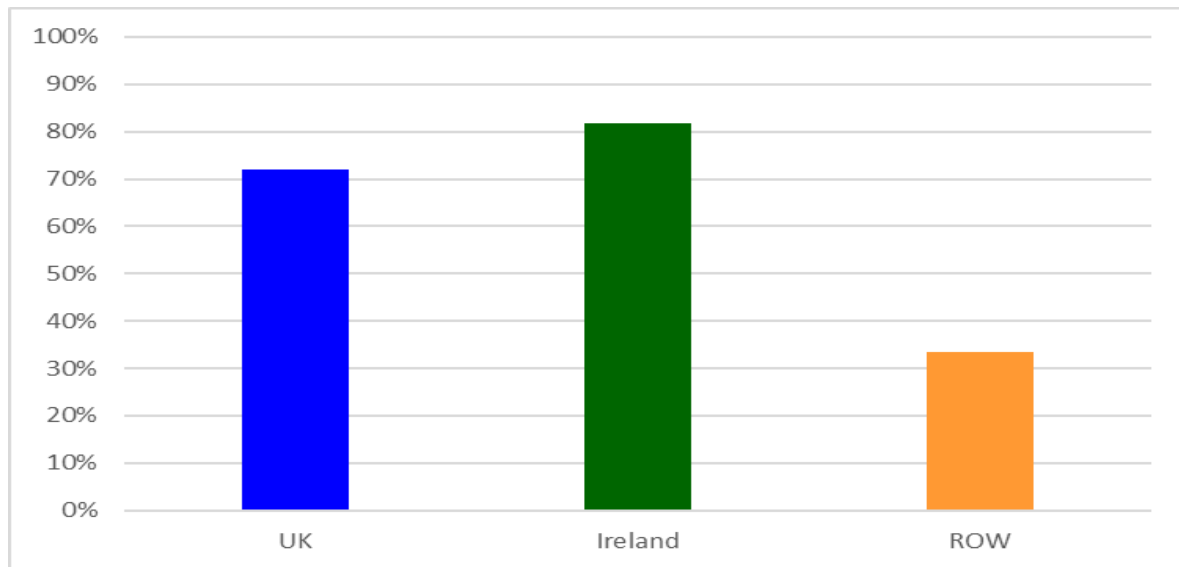

Figure 21: Will you continue to offer online support once the pandemic is over?

The main reason suggested for not continuing or starting online support was the fact that it was under-utilised during the pandemic and given the amount of staff time and effort it takes to run an online support service, these institutions felt it was not worth continuing. However, these institutions did state they would continue to provide online workshops and recordings as these seemed to be going well.

The other reason suggested for not continuing online support was that there needed to be an evaluation of such services alongside clarity and certainty with what is going to happen in the near future. Practitioners from outside the UK suggested that the online systems did not work as well as hoped but there were indeed some benefits. Therefore, they suggested, a proper evaluation was needed once it was known what would happen in the future. A very large majority of practitioners again stated that face to face and traditional methods were better than online, which is shown in the next section below.

What do you think Maths and Stats support will look like once the pandemic is over?

Figure 22 reflects the fact that maths and stats support practitioners across the world have embraced online support methods however they believe that face to face methods are better than online methods. The reasons for this have already been discussed, with practitioners from Ireland and elsewhere agreeing with the sentiments suggested by UK practitioners. Again, Irish colleagues and colleagues elsewhere stated there is some benefit to online support, such as reaching students who do not usually come for support in traditional settings, however the benefits of face to face support outweigh the benefits of online support. Therefore it seems that maths and stats support practitioners, on the whole, would like to see a blended approach which is mainly face to face with some aspects of online support, particularly in statistics support and through workshops, once the pandemic is over.
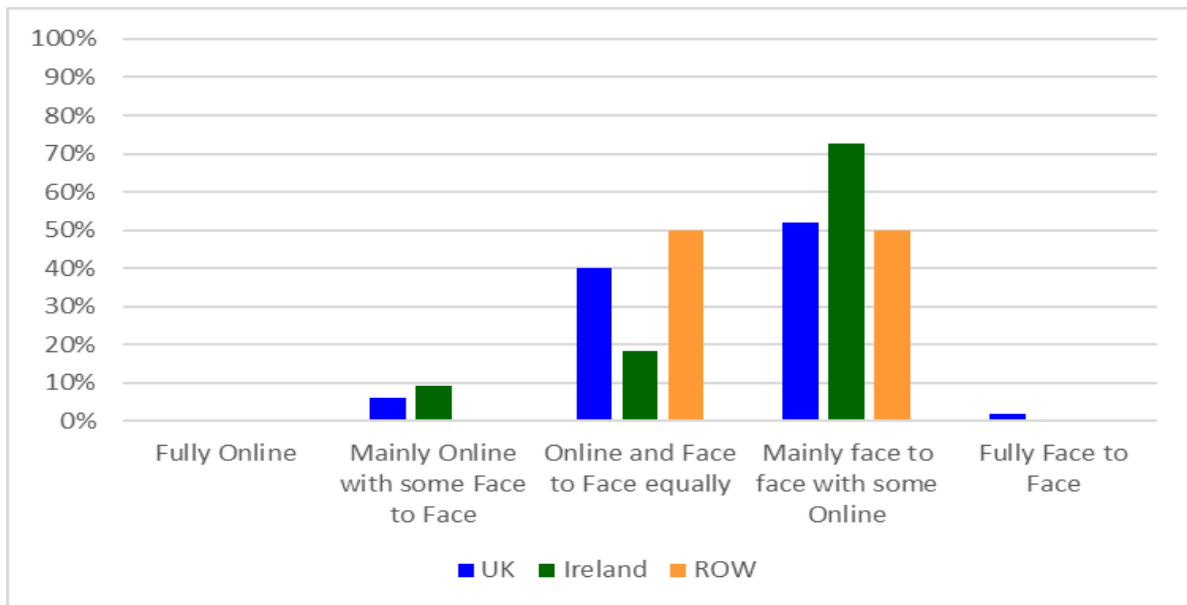
Figure 22: What do you think maths and stats support will look like once the pandemic is over?

To what extent do you agree with the following: "The pandemic has provided the mathematics and statistics support community with an opportunity to try new methods of support which will improve what we offer and the number of students who can access support in the future"?
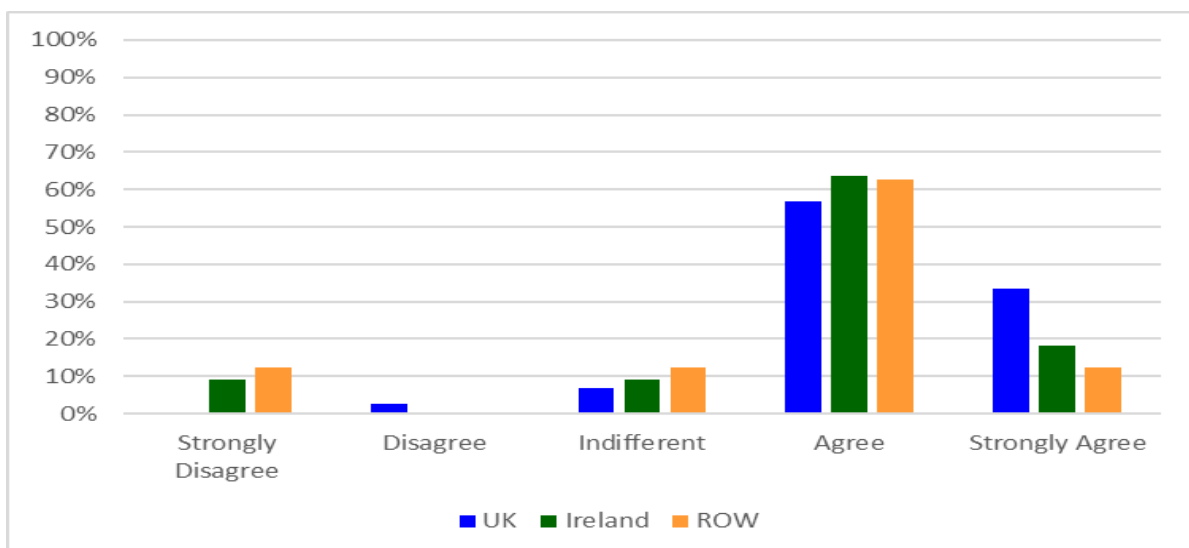

Figure 23: To what extent do you agree with the following: "The pandemic has provided the mathematics and statistics support community with an opportunity to try new methods of support which will improve what we offer and the number of students who can access support in the future"?

Finally, Figure 23 shows the extent to which practitioners think the pandemic has provided new opportunities to use online methods of support which will improve what we offer in the future. It is clear that many practitioners at least agreed with the statement, with over 80% of Irish colleagues and 70% of colleagues around the world agreeing or strongly agreeing with the statement. However Figure 23 shows that some practitioners from Ireland and across the world strongly disagree with the statement. The reasons given for this were that as a community we were *forced* into doing it by the pandemic whereas we should have been doing it already, and

secondly, previous attempts at using online support have been unsuccessful and were under used by students.

Conversely, being forced into trying something new was also suggested as a reason for agreeing with the statement, something echoed by UK practitioners as reported previously. Indeed, one Irish practitioner stated: *"As awful and stressful as all of this situation is, I would probably have been planning to do online support for the next 5 years, and then planning again for years after that, and so on. This was a kick to get started because we really want to help students and discuss what is working, what is not, and experiment with online teaching. During our usual busy semesters, experimenting with online teaching is not something we have the luxury of, as students need our help then and there and we help them as much as we can."* However, another practitioner from outside the UK was more cautious stating: *"Whether these improve the provision of the service is still questionable"*.

Summary and Conclusions

This report has shown that Maths and Stats support practitioners have managed to develop ways to support their students remotely in a very short space of time under unprecedented circumstances. The survey has shown that practitioners were very rarely providing online support as an option before the pandemic began and few had plans to put in place some form of online support in the future.

Practitioners from across the world reported that students accessing support services were vastly lower than the numbers of students they would see in normal times. The reasons suggested for this were the general environment, where students were either supporting family or themselves throughout the pandemic, lack of equipment or technological issues, both for the tutor and the student, a reduction in motivation to learn, due to either cancelled exams or no detriment policies, and through a lack of advertising, or at least advertising through the right channels. It will be interesting to see how this changes with the new academic year where students will come more prepared for online learning as they will be more aware and used to the challenges of using such systems.

An interesting point to come from the data is that statistics appointments and statistics support in general, despite being provided in fewer institutions, saw either an increase or saw similar numbers to those seen in normal times. It appears students like to obtain statistics support online, probably because it is easy to share screens and programs that can be worked upon together. For mathematics, this is much harder although very few practitioners commented on the numbers of students seeking support for programming packages, particularly outside the UK. It may be due to the time of year; many students in the UK at the time of the survey would be concentrating on dissertations and reports which were, on the whole, continuing as normal, whereas examinations were either cancelled or put online.

A major positive seen by most practitioners is the fact that online support allows for more students to access services and reaches out to students who may not seek support normally. Practitioners reported seeing students who would normally shy away from support because they were too anxious or afraid to ask questions for fear of being judged. Indeed, online learning allows flexibility and anonymity for students. On the other hand, the benefit of anonymity for the student makes it harder for the

tutor as facial expressions and general connections cannot be made. Therefore it is harder to determine whether a student generally understands the advice they have been given and are not just being polite when they say yes they do understand.

One drawback reported by most practitioners, particularly in the UK, is the time it takes to set up and answer questions. In the traditional setting, students can be left to work on a problem whilst others are seen. This allows for a community atmosphere where students can come together to work on problems and for the tutor on duty to see more students. Online support removes this and practitioners reported that time management is more difficult with students asking more and more questions than they would do normally and learning is made harder as there is less independence. The sense of community is definitely something many practitioners said they missed whilst providing online support.

In conclusion, it appears that online support is here to stay however much more needs to be done to make it as good as traditional methods of support. There are indeed many drawbacks to online support and most practitioners surveyed believed that face to face support was better in more aspects than online support. However, despite this the major positive is that practitioners have had to attempt something that was rarely being used before the pandemic, allowing for reflection on current and future practice. Furthermore, students who previously needed access to support but were unable to attain it, either through fear of judgement, maths or stats anxiety, or because they were distance learners, are now accessing support via online methods. It appears that online support has levelled up the access to support which is vital for universities when showing access and participation plans. Indeed, these will be of more importance going forward with students coming to university in the UK having not taken any formal A-Level exams. Whatever happens in the future, maths and stats support practice has changed forever and hopefully for the better of all of our students.

Further resources for mathematics and statistics support are available at:

www.sigma-network.ac.uk

www.mathcentre.ac.uk

www.statstutor.ac.uk