EDUCATION & TRAINING FOUNDATION

SHAPING SUCCESS ACTION RESEARCH PROJECTS

FINAL REPORT ON THE SHAPING SUCCESS AR PROJECT – INTRODUCING TECHNOLOGY FOR FUNCTIONAL SKILLS MATHS

Bishop Burton and Riseholme College

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For further information regarding the Shaping Success Action Research programme and this project go to https://ccpathways.co.uk/practitioner-research/otla-7/.

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Final report - Introducing technology for Functional Skills maths

Bishop Burton and Riseholme College

It makes us happy when learners give a wrong answer!

This project gave us the opportunity to take a holistic approach to Functional Skills (FS) maths. We developed a blended learning environment that helped to give learners the confidence to risk being wrong, and created a hands up culture where a comfortable classroom allowed deeper thinking and discussion around misconceptions.

Summary

The purpose of the project was to explore how we might increase engagement and help learners gain wider employability skills, whilst preparing them for their exams and helping them progress to GCSE level with confidence in their maths knowledge.

Whilst both Bishop Burton and Riseholme campuses cater to a wide variety of learners, Riseholme has a strong agricultural presence in the Lincolnshire area and is one of the main destinations for school leavers coming from farming backgrounds: Bishop Burton's agricultural presence is strong in the apprenticeship sector with learners coming from all aspects of the food industry, from field to fork.

This project helped to raise confidence in both maths and technology use and develop digital skills to help increase learners' employability skills as well as prepare them for progression through the FS levels, onto GCSE and (for apprenticeship learners) gain their full qualification and, for some, progress into higher education. Linking maths to the learners' vocational subjects helped them to see the relevance of the maths and this was very much valued by learners.

We developed highly effective digital and remote learning approaches that helped to support our learners through the pandemic, giving learners access to learning that would otherwise have not been possible. These remote/ blended approaches also helped learners' well-being by making them feel part of a community, whereas they may have been cut off and struggling alone otherwise.

To do this, we used:

- an online learning platform called Century which enabled learners to access ready-made assignments and topics called 'nuggets'.
- videos and presentations which aimed to guide learners through their learning journey (Appendix 2)
- Microsoft Teams (Appendix 3)
- Microsoft Forms (Appendix 4)
- worksheets
- one-to-one Teams meetings

- on demand tutorials

We took a holistic approach to ensure that the academic, emotional and mental well-being of our learners was being taken care of during one of the most demanding and unusual years in recent teaching history.

The use of technology increased significantly during lockdown, which created new challenges but also innovative ideas and methods to maintain engagement.

We have monitored and compared two different groups of learners over the last year; apprentices who are all 16+ and working in the food industry (from agriculture to butchers and slaughter men), and general further education learners who are attending full time BTEC courses on agriculture, animal care, equine, health and social care, and cookery to name a few. The FS learners also consisted of foundation learners and so represented a wider learner population. We have all had a steep learning curve but, hopefully, have ended this academic year with more positives than negatives.

Rationale

There is evidence that embedding maths into a learner's wider programme of study has a positive impact on learner achievement:

> *"For learners on the fully-embedded courses, 93 per cent of those with an identified numeracy need achieved a numeracy/maths qualification, compared to 70 per cent for those on nonembedded courses. On the fully embedded courses, 23 per cent more learners achieved numeracy qualifications."*
>
> (Casey et al., 2007:5)

These maths skills are gained in schools and then at college with an emphasis on the importance of Functional Skills maths as a valid and relevant qualification. There is not, however, a consistent embedding of technology and the use of technology within FS maths, despite the fact that most Level 1 and Level 2 FS maths exams are conducted online.

We thought that developing a clear understanding of the use of technology as a part of FS maths learning would not only give learners confidence in their online exams but would, in turn, increase their success rates and add a new employment skill to their repertoire.

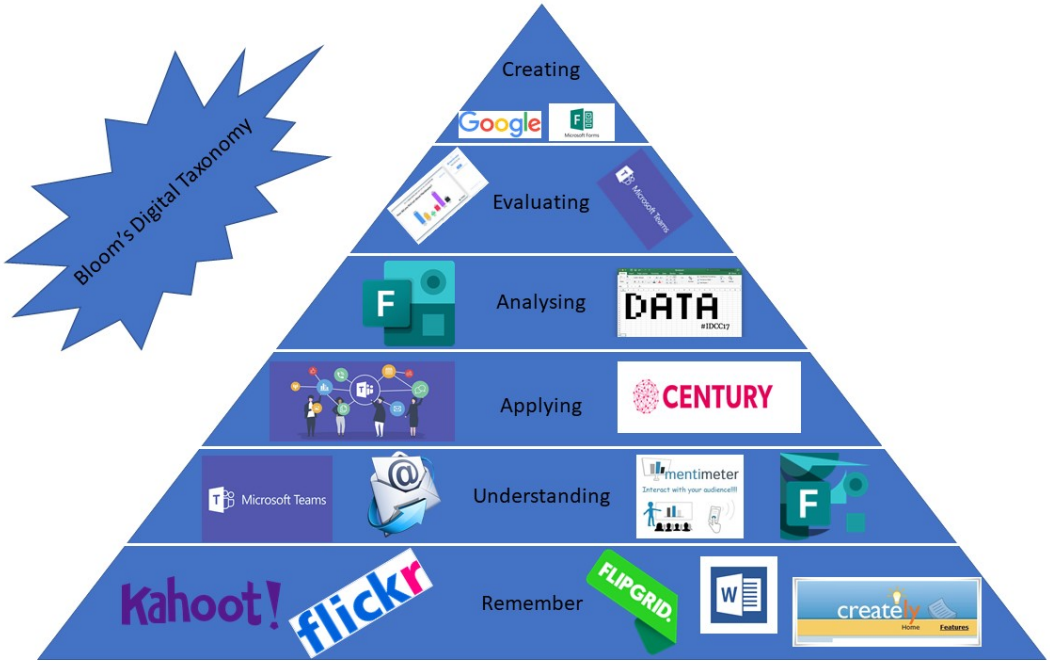


Figure 1: Bloom's Digital Taxonomy (Churches, 2008).

Approach

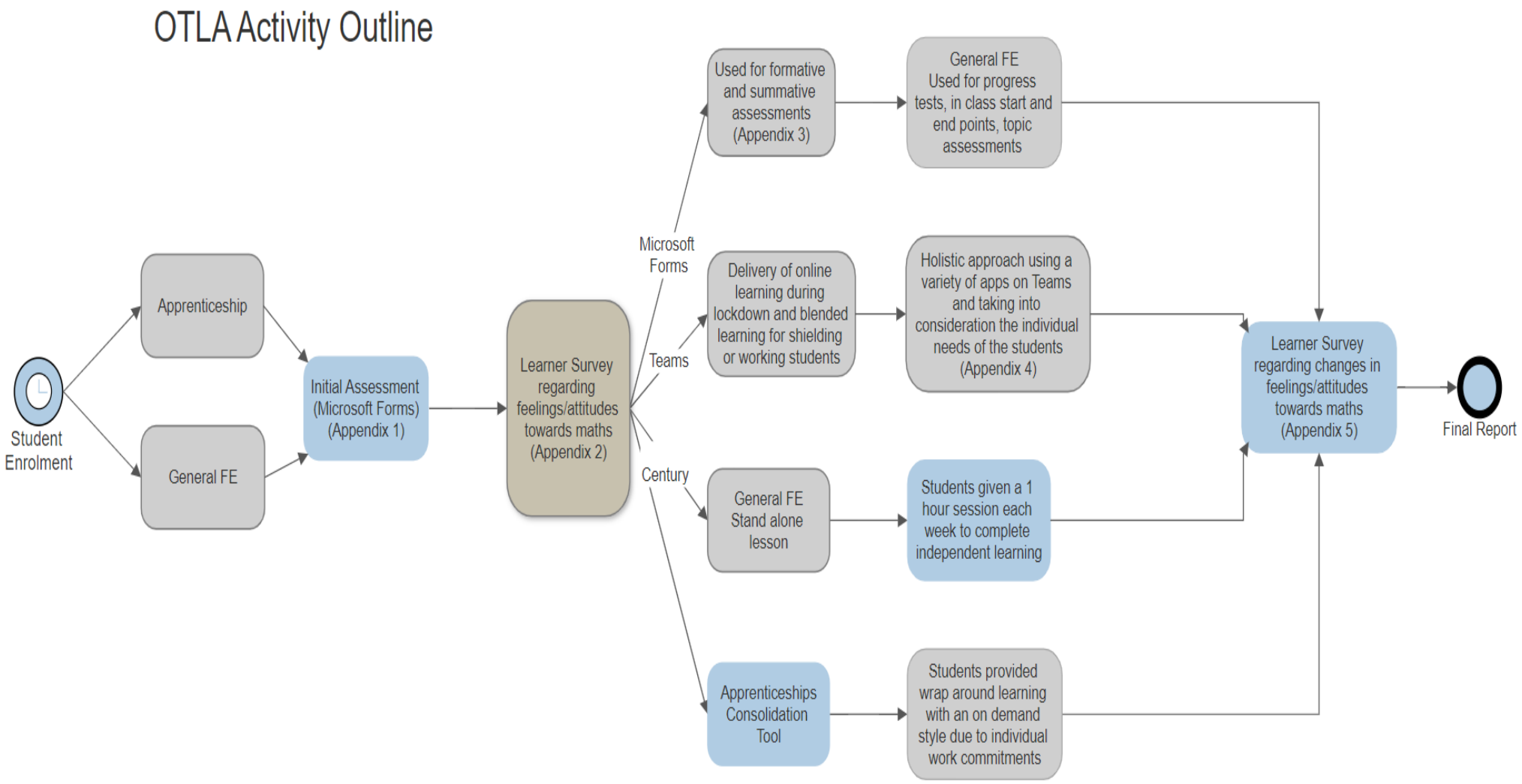


Figure 2: Project Approach

Professional learning: Evidence of changes in teaching, learning and assessment practices

Full Time BTEC Learners

Prior to the project starting, the country had been in a full lockdown due to the pandemic. During this time, we had used some online approaches but not fully across all our teaching.

During the first lockdown, we used Zoom to communicate within the department and all communication with learners was done via email and post. Learners were attending face-to-face sessions until the second lockdown when they were put into online sessions through Teams according to their timetables.

This change in teaching and learning was to be expected but did not come without its challenges. Digital poverty meant that not all learners had access to laptops or the internet. This was quickly resolved by the IT department loaning laptops to learners and the provision of internet dongles from a mobile phone provider which alleviated those in need.

The second challenge was those learners living in rural areas where broadband coverage was intermittent. This required a different approach to delivery, where learners had access to the same resources and lesson preparation as those that could attend the online sessions. This was done by posting out work with return envelopes. We utilised the class notebook on Microsoft Teams so the notebook contained links to all of the starter assessments and end point assessments, in the form of 'memory recall tasks', and 'how to' guides to help any self-directed study (Appendix 15 and 18). This was combined with access to support through emails and the chat function in Teams.

The adaptations that were made in the changes outlined above enabled learners to use technology more effectively to access learning online and created a blended learning approach that will continue to support learners who cannot access face-to-face learning.

The learners still needed to be assessed, so we developed in-class start and end point assessments that could be monitored and reviewed as soon as learners had completed them. The start point assessments consisted of a series of scaffolded questions based on the topic that was being covered in lesson. This helped to identify the gaps in knowledge and identify any misconceptions. In order to have accurate data, a progress check was done at the end of the topic, this was exactly the same as the initial memory recall task but with different numbers so a direct comparison could be made.

The data collected from these formative and summative assessments would prove vital in the centre-assessed grading process. The learners also worked on an online learning platform called Century. This was easy to move from classroom to online as it was accessed via the internet and not a college-owned piece of software.

Apprenticeships

At the beginning of the second lockdown, online learning had become the 'normal' way of teaching. Both tutors and learners became more familiar with the format and engagement was increased even further. Lessons became more fluent and broken down into smaller segments. Various lesson formats were trialled and it was found to work best if a taught session was followed by tutor-led worksheets, consolidated with a topic area on Century. If any learner was still struggling, a one-to-one Teams session was booked.

As an Apprenticeships tutor, when in college I regularly sat in main course lessons to observe the use of maths within the different curriculum areas. This allowed me to understand what the course tutors were teaching and overlay FS in a familiar format to the learner. For example, in Horticulture courses the area of vegetable beds or the volume of paint required for painting wooden decking for seating areas in gardens, which has become a popular alternative to a patio. This was a benefit to both learners and tutors.

The tutors let me have their scheme of learning and the topics to be introduced in advance and I was able to alter worksheets accordingly. This continued through lockdown. The main course tutor and I blended lessons so that FS and the main course become one subject. An example of this was in Horse Care: Learners had to calculate the weight of feed to give a working horse by calculating 2.5% of its body weight. The main course tutor led the session but when the calculations were needed I led the lesson.

For learners to flourish it is vital that they understand that FS maths is used in all aspects of life and that they know how to apply it. FS maths is not just about maths in a maths classroom.

Evidence of improved collaboration and changes in organisational practices

Apprenticeships

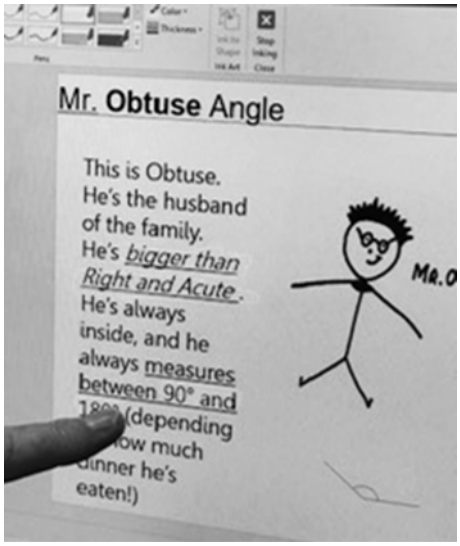
During the lockdown, most learners who had access to a computer had logged on to Century and engaged with the online learning. This was complemented by the taught sessions. These were arranged via Teams for the usual class times, but it was not always possible for the learners to attend, so an on-demand system was implemented.

All learners were made aware that they just needed to send an email and a one-to-one Teams meeting invite would be sent for a mutually convenient time. As some learners were at work during normal college hours, this included some evening sessions. As these sessions were used to reiterate a maths method, they only usually lasted around 30 minutes. They gave the learner individual attention on a topic that they may have been struggling with and allowed them to ask questions that they may not feel comfortable asking in a group setting.

In terms of group sessions, most learners liked to stay away from the camera and mute themselves when in group sessions. When teaching on a one-to-one basis, I have had 100% of learners using their cameras.

Even though not all learners became fully engaged, the class numbers did increase and so did the amount of work produced. Some of the learners still had difficulties accessing suitable IT. This was addressed by the college offering to loan laptops to those in most need. The implementation of this helped improve learner engagement. The online attendance increased by 35% due to it being more accessible to learners who were previously in digital poverty. This, in turn, not only improved topic knowledge but showed learners that they were important. One learner commented on the loan of a laptop; *"Really nice that I'm being trusted to look after it and bring it back and it's a bit above expectations that it was dropped off at my house!"* Employers whose learner engaged in this benefited and were happy to release the learner for several short sessions each week as this did not affect their businesses.

As it became more apparent that online teaching was to be a long-term necessity, more training for both staff and learners on the use of IT in the classroom was needed to ensure the learners had the best possible learning experience. The college laptop was not suitable for interactive, touchscreen teaching, which was preferable when teaching maths. I was able to borrow some more up-to-date equipment which meant that my screen could be shared, and I could annotate the information on the screen using finger touch and a drawing tool.



The feedback from my learners confirmed that they liked this new method more than the flip chart and their comfort with this new style of teaching was also increasing.

"I found the one-to-one classes better than a full class lesson. It was easier to understand and fitted in around work". (Learner OB)	*"I prefer taught sessions to Century as I can ask more questions and it seems easier. Also, Century can be slow and doesn't always work"* (because of connectivity issues in a rural setting). (Learner RS)

"I never understood maths at school but now I can see where it is used in the workplace, I now feel confident to help others that are struggling". (Learner AE)	*"I had to work through lockdown so set lesson times meant I could not attend. Lessons on demand allowed me to continue both learning and working".* (Learner RE)

(Further learner feedback can be seen in Appendix 12).

Full Time BTEC Learners

The full-time courses have many tutors across different units of their course. Learners were expected to still attend in their normal classroom set times. This was divided between taught sessions and Century sessions. Tutors took different approaches to using the online learning platform. Some teachers introduced a topic, then students consolidated and built on their knowledge using the associated learning material (which Century calls 'nuggets' of learning, e.g. fractions), while other teachers assigned a whole course (e.g. Level 1 Functional Maths).

It became evident, where learners had been assigned the whole course, that they were completing tasks that did not necessarily relate to the taught content in class each week, which meant that some learners had to rely on Century to teach them the maths methods they had not yet covered. The data collected showed that, although learners did manage to complete the topics, they did not always have a full understanding of how to apply that method in different situations, where in comparison, those who were working on set assignments that consolidated their learning, showed an increase in understanding.

Top tips!	
Century	
Do	**Don't**
Create your own course	Assume that the pre-set course has all the required elements in for your group
Set individual assignments	Use as a first visit to a topic
Create course classes	Use as a replacement for teaching. Use it as a personalised intervention tool alongside taught lessons
Ensure diagnostics are completed first	Overuse in classroom setting. Allow the opportunity for students to work on their individual pathways allowing intervention time for those requiring additional support
Use as a consolidation tool	
Microsoft Forms	
Do	**Don't**
Make sure first and surnames are set as two questions	Use closed questions

Check all answers before gathering results	Underestimate its use
Create deeper thinking questions	Forget to click enlarge button for inserted images
Limit multi choice questions	Forget to click 'required' for all questions
Microsoft Teams	
Do	**Don't**
Set meetings within a reasonable timeframe	Have large groups that all need extra help
Ensure backgrounds are appropriate	Rely on all apps working
Use mute to ensure focus of topic when teaching	Forget to have a backup plan for on screen application
Familiarise yourself with apps before use	Forget to add support staff as teachers
Ask for permission before recording	Assume that others will understand your file order or placement of files

This approach also helped increase engagement and participation and was a benefit to learners' retention of knowledge.

The final change in approach was to look at learner wellbeing. Lockdown had a negative impact on learners due to feelings of isolation and this often had an impact on focus during lessons. During lessons, learners would discuss how they had not slept properly and were missing their friends and family. They described lockdown as 'depressing' and 'like being grounded' with other comments describing their college experience 'we didn't get a prom and now we're not even getting a proper college life'. The learners were missing the social contact they had in class and were feeling lonely and unhappy so we shifted the focus to become holistic and address all of the learners' needs, not just their academic ones.

I feel like I can be wrong and not be judged for it. I'm OK with saying I don't get it. (Student JH)	*Leigh cares if we are OK. She knows when I'm not concentrating because I'm hungry or tired.* (Student AS)
It's not like school. We don't move on until we get it and that helps a lot. (Student LC)	*We had a Disney Kahoot! Because everyone was down. It showed that we were more important than the maths.* (Student AD)

This shift showed learners that they were cared about and helped to build a stronger tutor/ learner relationship. This resulted in an increase in attendance and participation as well as giving learners a platform to showcase the things they had been doing to keep them busy during lockdown.

One example of this was when learners shared the things that had got them through lockdown. Learners showed pictures of their pets, artwork and stories that they had

written which gave a new depth to the knowledge already gained through short intervals in teaching when online (Appendix 5).

Another example is when the learners showed signs of screen fatigue so a question was posed to the group – what made you laugh this week? Not maths related but necessary to help the learners focus on the positives in their life. Learners shared stories of dogs stealing dinners, siblings singing badly and parents' cooking skills (or lack of). This personal sharing helped to solidify the group dynamics even further.

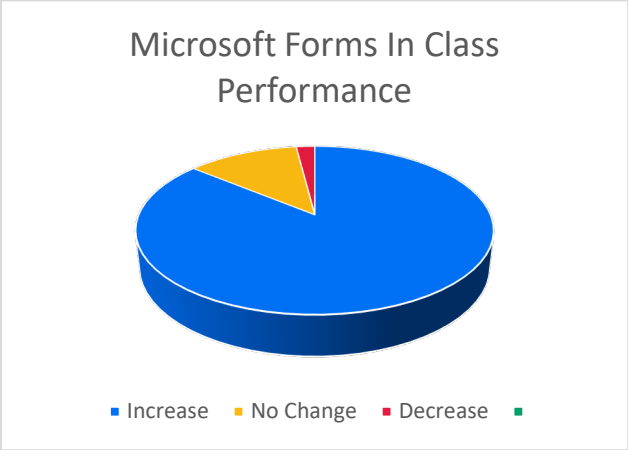
(Case studies are in Appendices 6 -12).

Evidence of improvement in learners' achievements, retention and progression

Microsoft Forms was used to track in class progress. A memory recall activity was given to assess prior knowledge, followed by worked examples, group and individual activities and then a progress check to assess progress made.

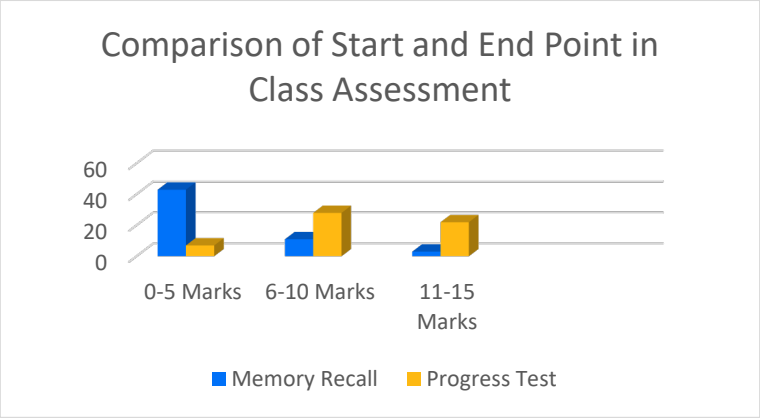
The importance of the memory recall and progress checks being similar was so we could accurately monitor start and end-point sub-topic progression. Combined with the whole topic diagnostic and progress test, these assessments of learning gave a holistic view of the learner journey for the academic year.

Learners, in general, made good to excellent progress within the lesson, with over 85% seeing an improvement in their skills. This monitoring of progress showed learners that small steps forward added up to large increases in knowledge. This not only improved confidence but also gave all learners the opportunity to stretch and challenge themselves regardless of their starting point.



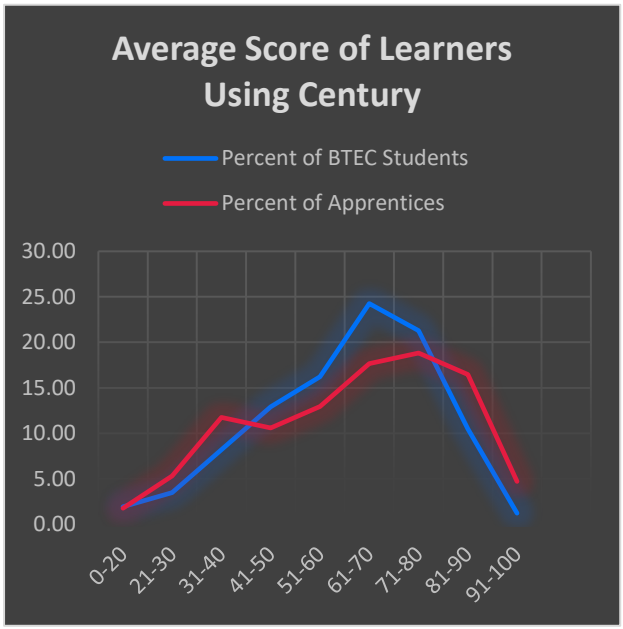
Microsoft Forms was also used to deliver Progress Tests to learners during lockdown and to those who were shielding. The comparison between paper-based assessments and online assessments showed almost no difference, with accessibility being positive due to the 'read aloud' feature on Microsoft Forms. The only negative opinions were around internet access and not being able to draw or create graphs and charts. This was resolved through multiple choice options.

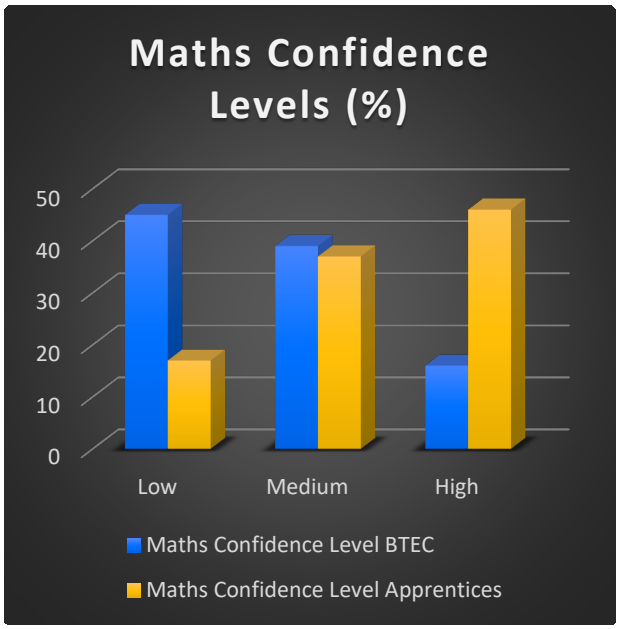
Comparative data below using Angles in a triangle shows the results of 57 learners' assessments. Full details can be found in Appendix 14.



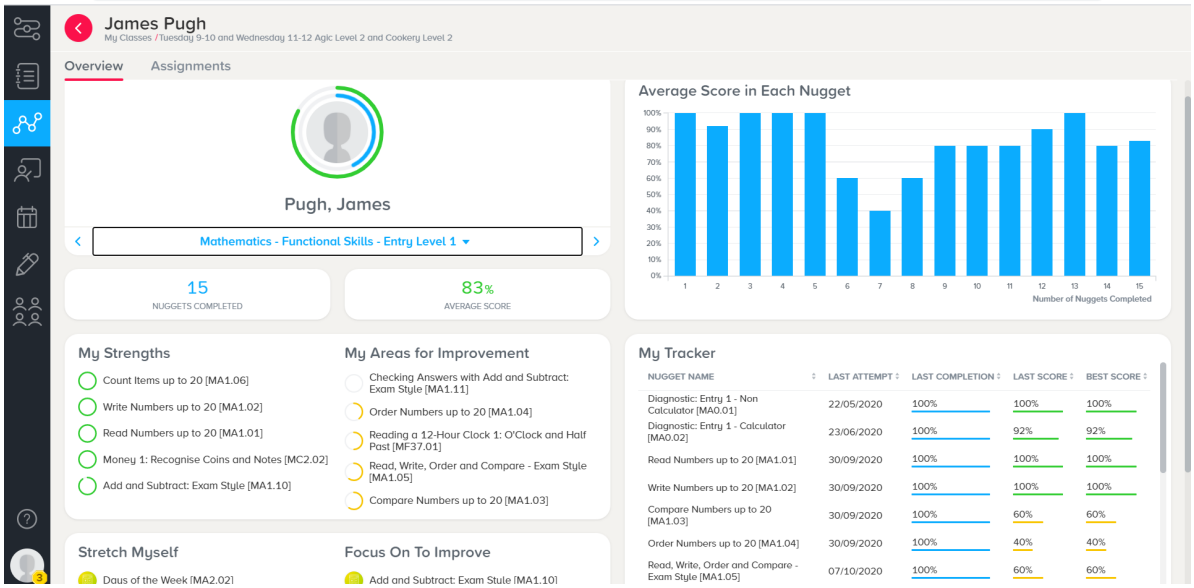
The biggest data collection was done through Century, as this was across all learner groups in the college.

A direct comparison of apprentices and BTEC learners shows that their average score was very similar but, in contrast to this, the confidence levels in learners varied on the lower and upper confidence percentiles with a smaller range at medium confidence. This could be due to apprentices using industry-related maths and being able to see the links or it could be due to age and experience.





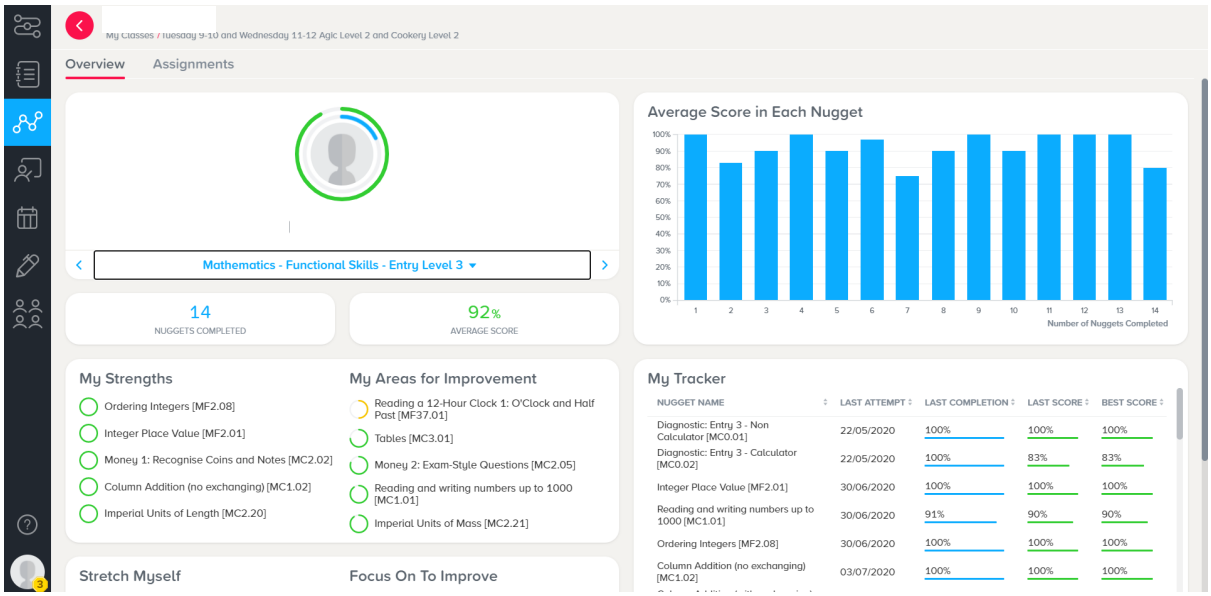
One example can be seen below with the nuggets completed by learner JP, one of the case studies.



JP started his learner journey at Entry Level 1 with high support needs. He was introduced to Century this academic year where his target grade was Entry Level 2. The dashboard above shows his capabilities at Entry Level 1 which gave him a great base knowledge to scaffold towards Entry Level 2. JP took to Century well and his confidence grew. As he saw his scores on completion of each nugget (topic, e.g. addition and subtraction) he wanted to do more.

At the initial start point, Entry Level 2 topics were not available on Century so JP moved to the next available level as a personal stretch and challenge.

Below is his Entry Level 3 dashboard.



JP passed his Entry Level 2 Functional maths.

The dashboard collates all the data from the individual learner and sets individual stretch and challenge tasks, identifies strengths and areas for improvement. This data collection does not stop at the dashboard. The tutor can go into each nugget

and view every question a learner has completed. Further information can be found in Appendix 16.

Learning from this project

When in college, all learners and staff have access to plentiful resources. Computers can be accessed with free Wi-Fi. Specialist IT staff are on site if any problems occur, and all learners have dedicated time within their timetable to attend class. In the beginning of lockdown, IT poverty within the apprentice learner cohort became very apparent. Apprentices were not able to access any bursaries, dongles or laptops due to being classed as working. Some became disengaged because of embarrassment in asking for help or admitting that they did not have the necessary equipment. Whilst this was a government decision, the college acted and loaned laptops to those in need. It highlighted the importance of recognising that apprentices are part of the college learner body and face the same barriers as 16-19-year-olds.

Likewise, not all staff were IT literate and only knew how to achieve the basics that were needed within their job role. This was resolved with focused, comprehensive training on online teaching and learning and the appointment of a digital learning technologist for support. It was also the focus of the college annual teaching and learning conference, with digital upskilling being a priority.

Both learners and staff engaged in a steep learning curve. Both parties relied on the help and support of peers. At this stage, main course learners had the option to loan college laptops which gave them an advantage over the apprentice learners. The main upskilling was that staff had to learn to navigate Teams and utilise the applications so a blended learning approach could happen. This had to be cascaded through departments and learners so that everyone felt confident enough to use it for teaching, learning and assessment.

Those members of staff who were quick to understand the technology, shared their knowledge with their colleagues and became mentors and problem solvers which showed the community spirit and cross curricular collaboration. This was especially felt at Riseholme where there is one main office shared by most curriculum area tutors. The Teaching and Learning Champion (TLC) went to every available training session and was on hand to support and guide the whole teaching cohort.

Learner engagement improved as the new way of learning became more familiar. Some learners still struggled to focus when not in a traditional classroom, but some actually performed better with no peer pressure or distractions. As tutors, we found new and better ways to deliver our sessions which in turn gave a much better learning experience for the learners.

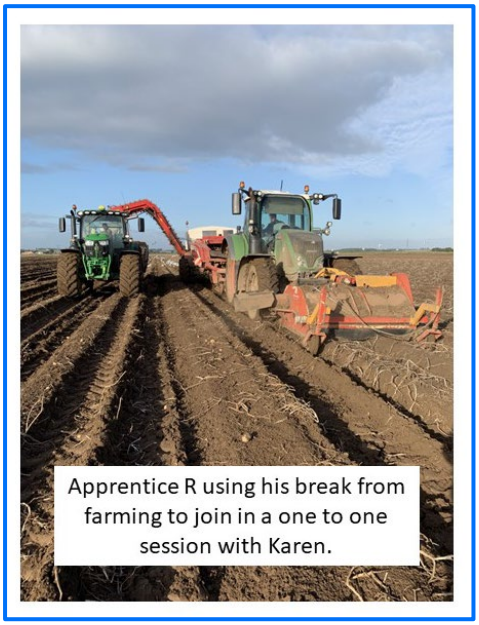
Apprentices

The new format for teaching apprentices is working well. They are having shorter taught sessions but can access extra help at any time. Both learners and employers like this format as it fits in easily around a working day.

Employers that need the apprentice working to fulfil orders, which may potentially keep their businesses afloat, can be resistant to them taking set hours out of the working week for study.

An example of this is learner R. He could not attend his timetabled taught session as he had to work. It was arranged that he attend at another time but again had to work and could not spare a full hour. I asked him if he had internet coverage where he works. He told me that he did at one end of a field. He sent me an email from his tractor when he got to the right spot.

I then held a one-to-one Teams meeting with him from his tractor cab. His boss was happy for him to take a small amount of time out of his working day and learner R was happy to be able to gain help on the topic. I followed the session with work set on Century, which learner R completed once he got home from work. Learner R's employer commented *"I can see the benefit of R doing his maths work but at the moment we are too busy to give him the time off he needs. It is fine for him to have a small amount of time, especially if he doesn't have to leave the farm to do it"*. Learner R said, *"this way I can keep my boss happy and continue with my learning"*. Both acknowledged that without the pandemic they would not be as busy and learner R would be able to spend more time studying.



Apprentice R using his break from farming to join in a one to one session with Karen.

Towards the end of an apprenticeship the learners have already completed all the taught sessions. Some may have attended the same class more than once. This is the time for self-directed study and revision. The sessions are tutor-led but assistance is only to help when the learner is struggling with maths methods. The learner uses all the notes, worksheets and PowerPoints used to revise before the formal exam. Mock exams are set and timings noted. Any corrections that are needed are addressed in the next session.

Learner R now feels comfortable within both the actual and the virtual classroom and, indeed, is often used as peer support to help the newer or less able learners. He stated; *"It's easier knowing I can get stuff done and still be at work. I don't have to stress about it and it's made it better when I see Karen at college because it's not been ages since I was last in."* While this peer support is predominately used to allow learners to vocalise their skills, by showing others how they address a task, they in turn are revising for that task in the formal exam. This is a positive for the learner for several reasons: the revision which will enable them to pass the exam; the confidence to help others without the fear of humiliation; and the translation to the workplace where the learner can offer help with tasks to other members of their workforce. It also helps the learner feel less conspicuous or nervous when completing the end point assessment as they already feel more comfortable speaking to others and explaining tasks.

Now the learners feel more confident in both their abilities and their confidence, they are more likely to ask for help. There are more emails from learners who would prefer a one-to-one session to go over a missed/ difficult topic since being in lockdown and this is due to the accessibility of their tutor through technology. Learner T was asked to undertake a spraying task at work. He calculated the chemicals needed. He wanted to check his calculations so asked for help. A short Teams meeting confirmed that he had the correct ratio and volume of chemicals. Learner T was visibly pleased that he had calculated correctly and was able to apply classroom tasks in the workplace.

Full Time BTEC Learners

The adaptations that were made in the move to online learning helped to empower and enable learners to participate in online learning and created a blended learning approach that will be continued in order to support learners who cannot access face-to-face learning.

Top Tips for Engaging Learners Online	
1. Recognise when students are getting screen fatigue	6. Let them do the teaching! Asking for students to share their methods instils a sense of pride and achievement.
2. Have a break in learning by discussing hobbies and interests, e.g. pets.	7. Mix it up! Make use of breakout rooms, interactive whiteboards and quizzes to keep things fresh and interesting.
3. Sometimes all you need is a Kahoot! to get focus back!	8. Silence is golden – it's OK to be quiet when students are working.
4. Mental wellbeing is important. Create a safe environment where students can share how they are feeling.	9. Ask students to show their understanding using memes in the chat (no rude ones obviously).
5. Allowing 10 minutes for students to share something they are proud of shows them you care and keeps them turning up to class.	10. Use the raise hand function for answering questions, then say 3..2..1 reveal! This helps to combat copying and identify misconceptions.

Learners who had not engaged in face-to-face lessons due to a fear of failure began to engage, first through the private message feature on Microsoft Teams, then to the main chat and finally in the face-to-face lessons. This new confidence has not only generated a classroom full of raised hands but has enabled discussions, peer support and a positive learning community. (Case studies of learners JS, JP, CA and MP can be found in appendices 6 -9)

The holistic approach to online teaching considered the learner as a whole person, beyond someone acquiring maths skills, and has resulted in a very positive relationship with learners. In addition, the college is hosting an art exhibition to showcase learner hobbies which is titled **'What got you through lockdown?'** (Appendix 5).

I think the biggest thing we have learnt throughout this project is that it is not just about the maths. We are all adaptable and resilient, but it helps when we know that we are not alone.

We are thankful that lockdown gave us the opportunity to fully understand that the holistic teaching approaches, such as blended learning, adaptation of resources to suit the classroom as well as online and a close monitoring of student well-being, yields the best results academically and emotionally. We were capable of not just thinking outside of the box but destroying the box altogether through innovative practice that is student focused.

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Appendix 1 – The project team

Project Role	Name	Job Role
Project Lead	Leigh Kellaway	Lecturer in mathematics
Deputy Lead	Karen Matthews	Lecturer in Functional Skills
Project team	Murooj Hussain	Lecturer in mathematics
Project Mentor	Lynne Taylerson (ccConsultancy)	
Research Group Lead	Gail Lydon (ccConsultancy)	

Appendix 2 – Century

Welcome to CENTURY

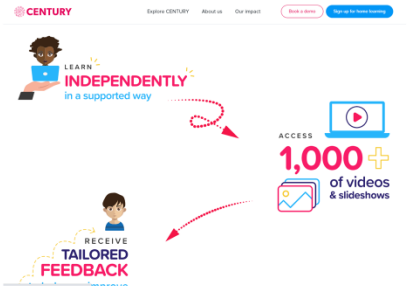
The Gateway To Your Independent Learning

What is Century?

CENTURY is an online learning tool for students. It combines artificial intelligence with the latest research in learning science and neuroscience.

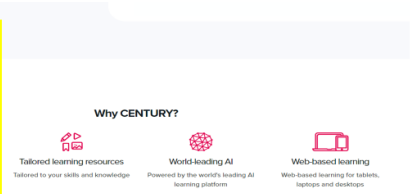
A new independent way of learning

It allows you to **take control of your own learning** and for teachers to get **real-time data on your progress**.



Century is student-orientated and tailored to your needs

The online platform **identifies your strengths, gaps in knowledge and misconceptions**.



How will we use Century?

You will complete **tasks assigned by your tutor** as part of your class work, homework or as an assessment.

You can also access specific topics within your course **to revise and practise.**

You will receive a list of suggested activities **depending on your progress**.

You are in control of your learning!

How to log in to Century

- **To log in use this link or type in** www.century.tech and log in to begin!
- **Your Username** if you area Bishop student is set up as your student number@bishopburton.ac.uk e.g. 20549567@bishopburton.ac.uk
- or Riseholme student:
- your student number@riseholme.ac.uk e.g. 20549567@riseholme.ac.uk
- **Your password is**: burton2020

CENTURY

Accessing Century

Please do not change your password.

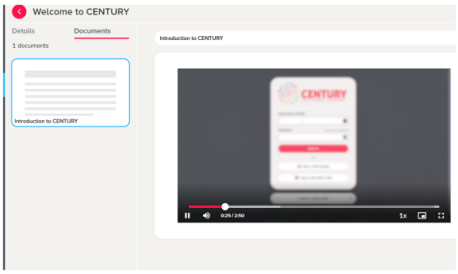
No one else will be able to access your account as they would have to know your student number.

The platform can be accessed from tablets and laptops on up-to-date versions of most common browsers. **The best browsers are Chrome on PCs and Android devices and Safari on iPads.**

CENTURY

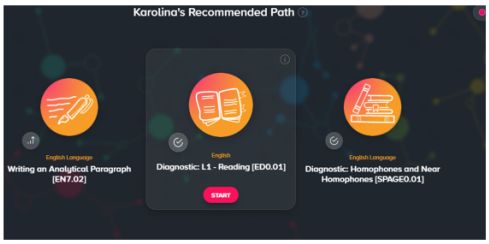
Introduction to Century

A video tutorial will guide you through all features of the platform.



Focussed on your individual needs

Diagnostic assessments will establish your starting point.

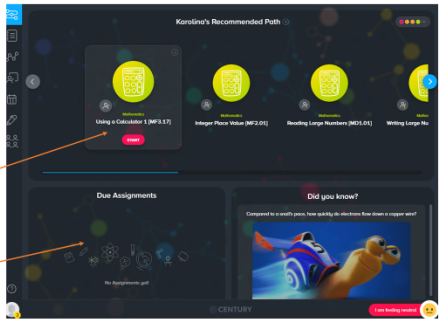


Your Unique Path

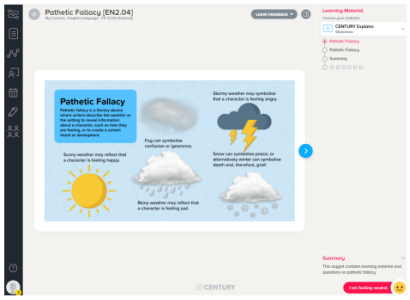
You will be enrolled on a course corresponding to your college Maths or/and English qualification e.g. GCSE Maths/ English Language Edexcel or Functional Skills.

It is divided into small steps called **nuggets** that will lead you to achieve.

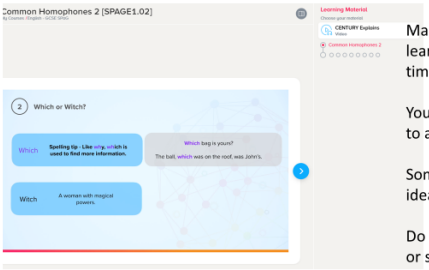
You will also be assigned **assignments** by your tutor that you **MUST complete** as part of your college course.



Each nugget includes learning material leading you step by step. Then you complete a **quiz or an activity** to check your progress.



Videos and presentations



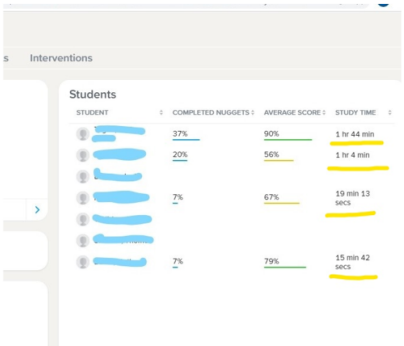
Each nugget includes a video and/or slideshow.

Make sure you go through all the learning material them every time.

You can pause, replay or go back to any particular point.

Sometimes it might be a good idea to take notes as you go!

Do not skip any part of the video or slideshow – you will be assessed based on its content.

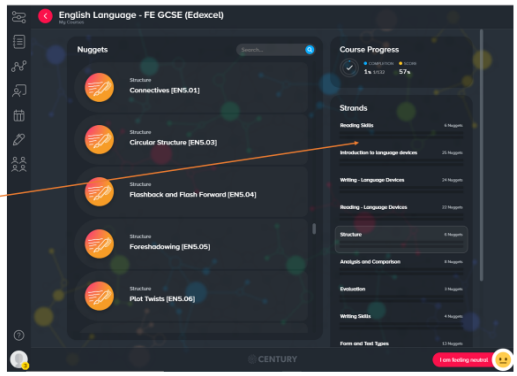


Don't rush...

Take your time with the learning material to give you a better chance of achieving better results.

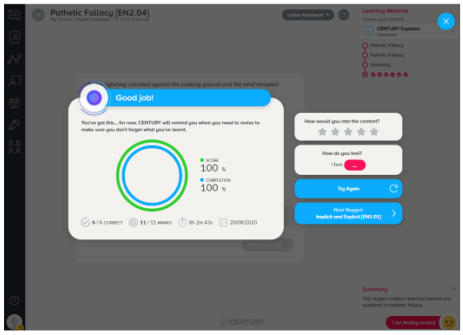
Your teacher can see how long you've spent on each activity.

You will see your course progress and strands to complete



Well done!

When you complete a nugget, you will be shown your score and assigned higher level activities.



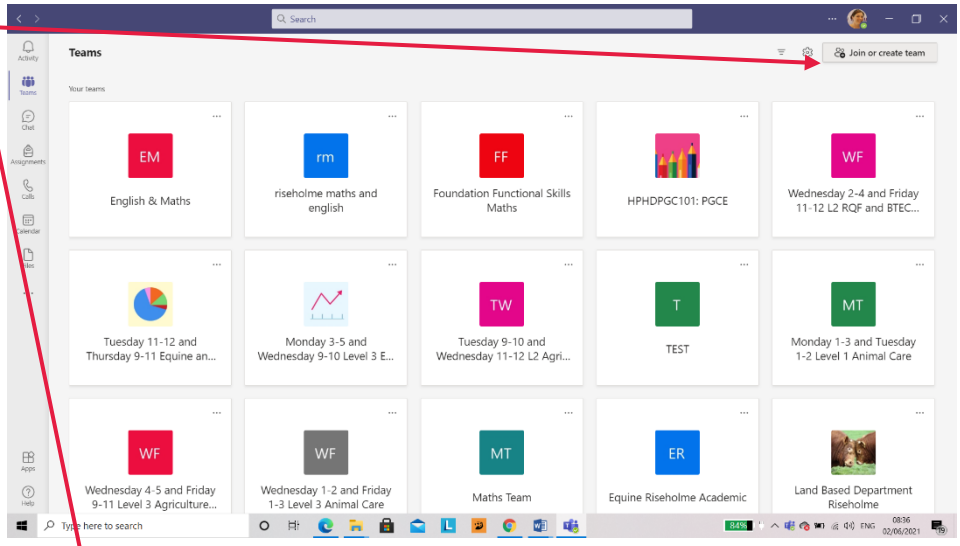
Working with your tutor

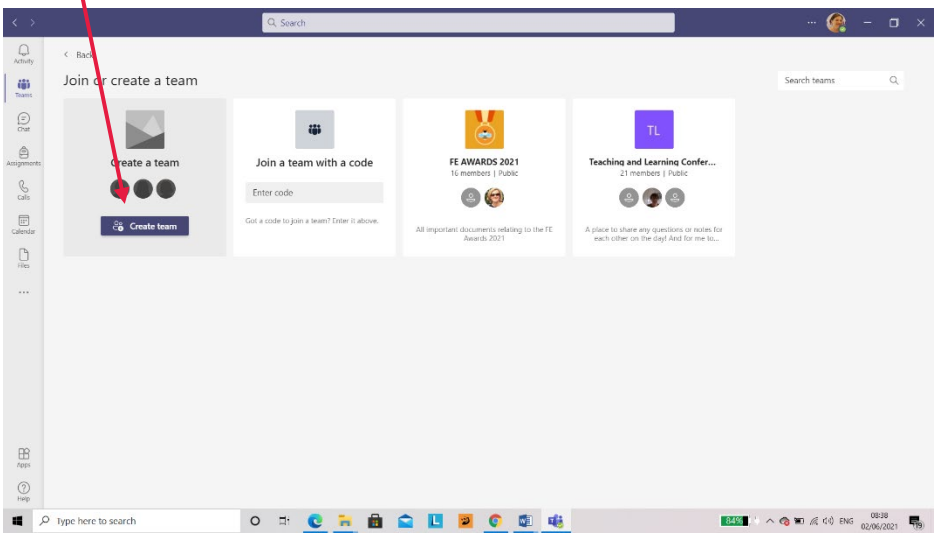
Your tutor will monitor your progress and will be able to address your needs better in the classroom.

CENTURY

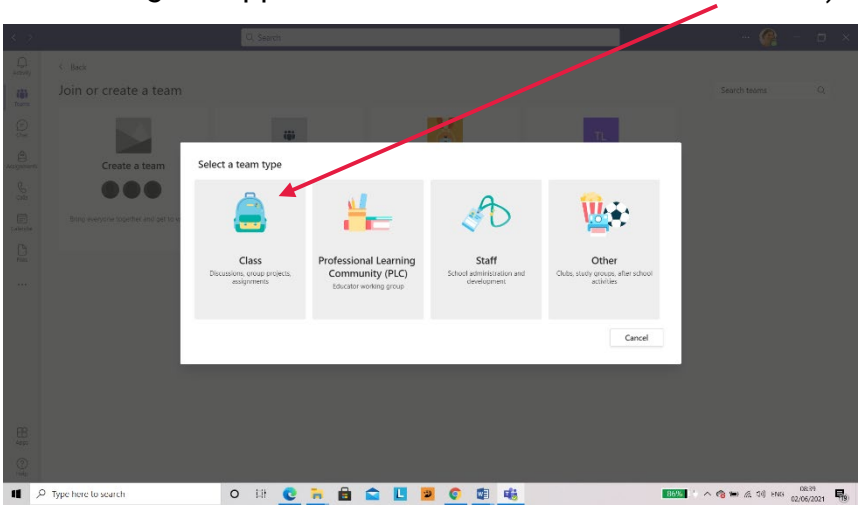
Appendix 3 – Microsoft Teams

Click on create a Team

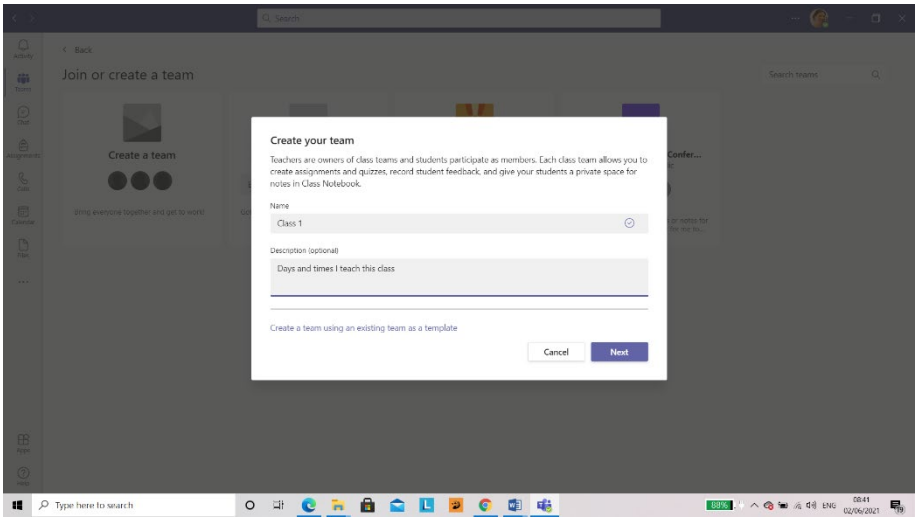




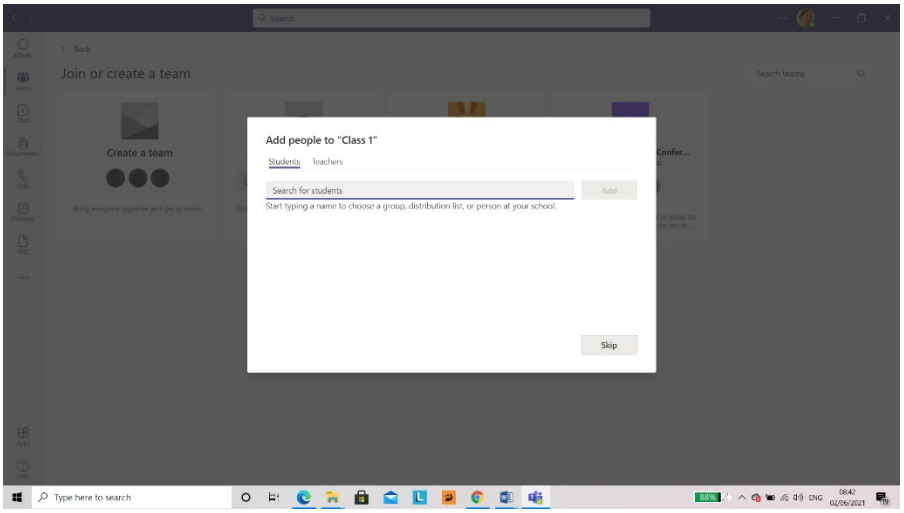
Select which Team you want to create. I have chosen to create a class. (I created a test team to practice using the apps until I found ones that worked for me)



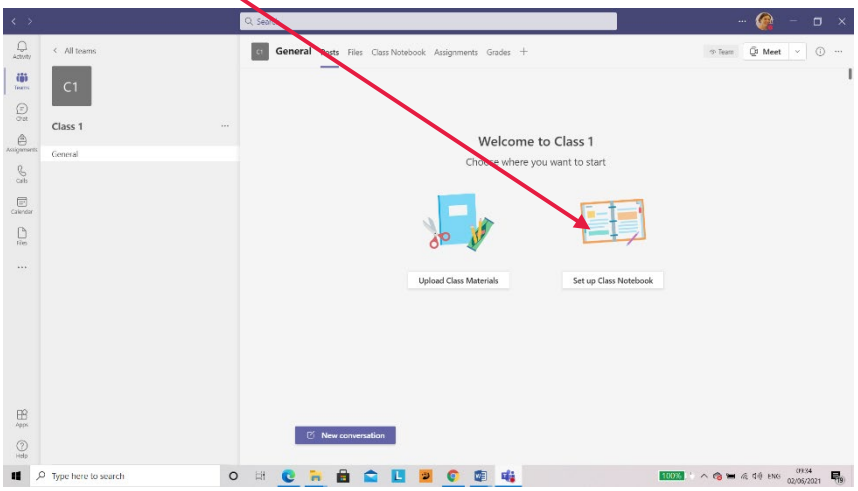
Give your Team a name and description



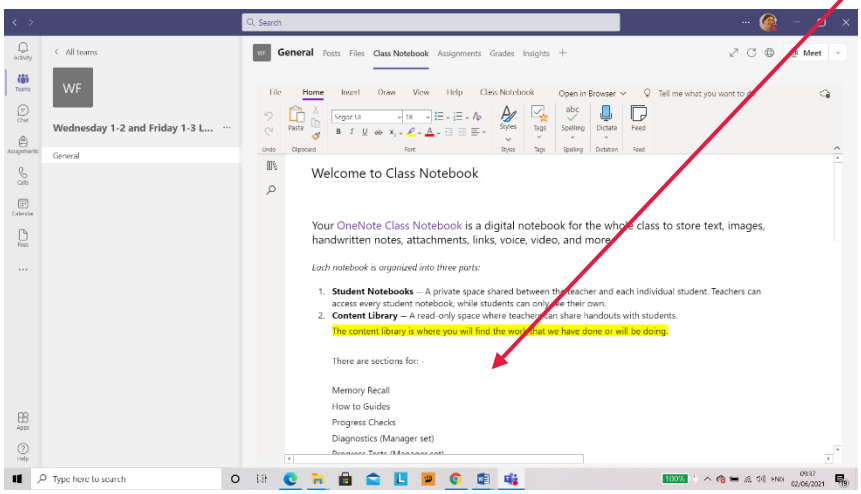
You now have the opportunity to add learners using their school/college email. Just start typing and anyone in your organisation will show up.



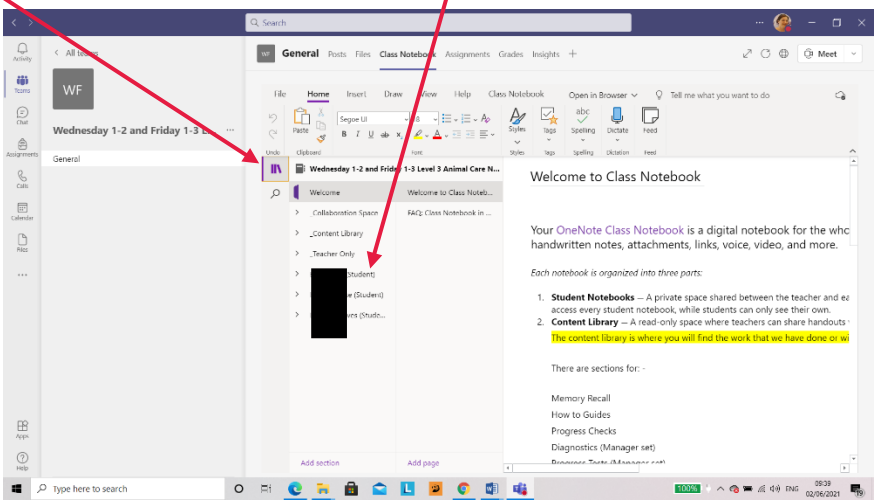
I have found that class notebook works for me but you may get along with files or assignments better.



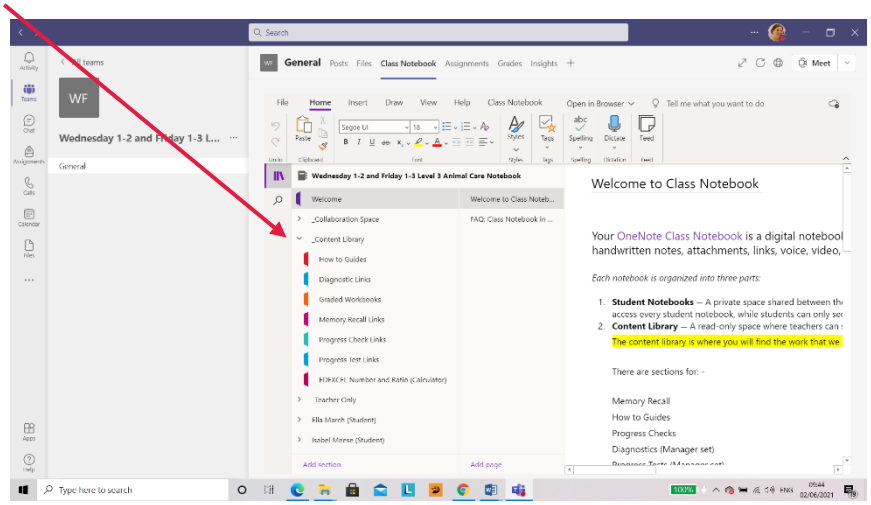
The main screen on class notebook tells you and the learner about it. I added some of my own notes which direct my learners to their work.



Click on the 3 little books/rectangles to open up the menu. Here you will see individual learner folders (these self-populate when you add a learner to the class) Learners can only see their own folder.

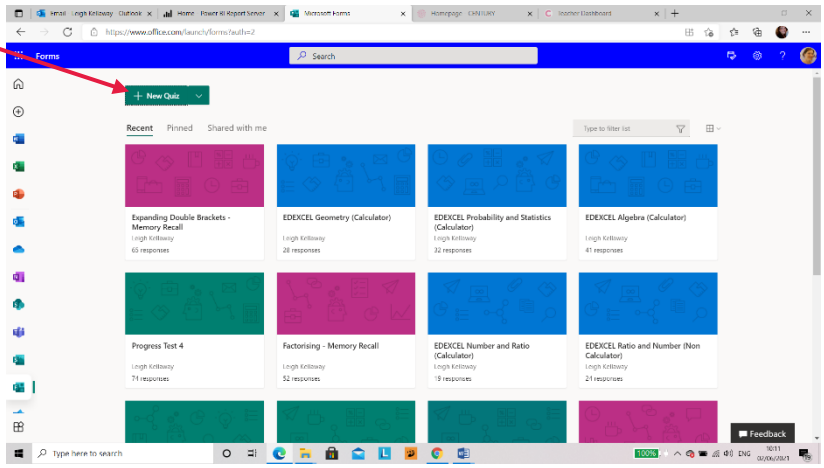


Use the content library to add sections in for different uses like homework etc.

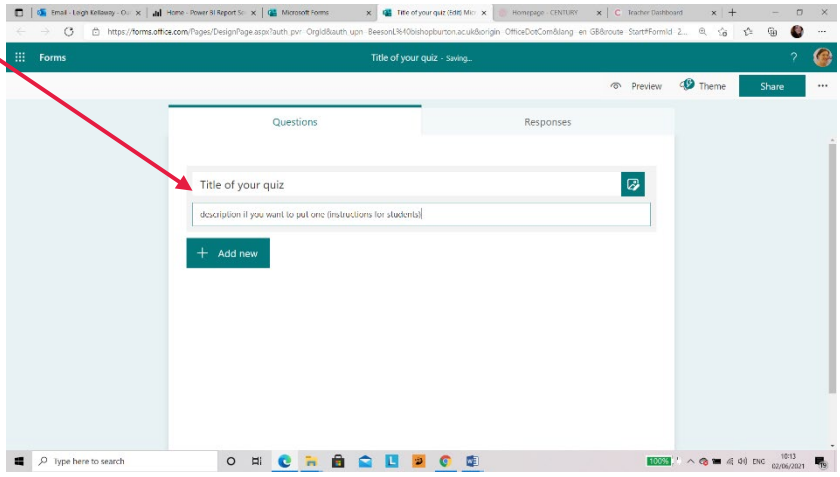


Appendix 4 – Microsoft Forms

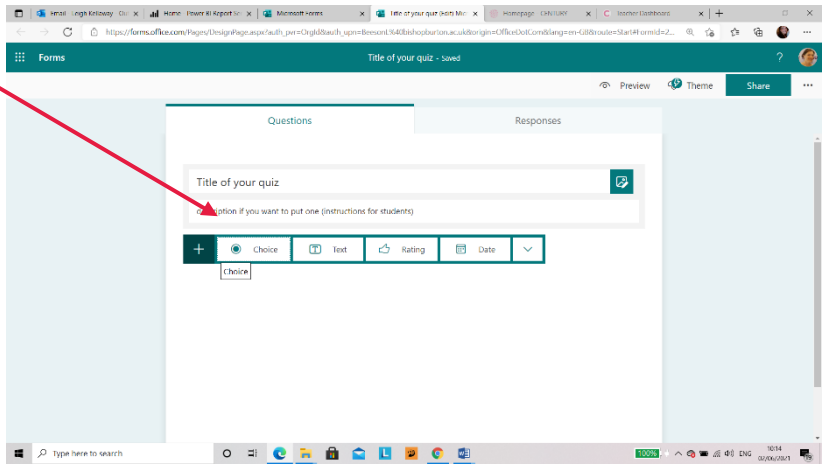
Select create new quiz



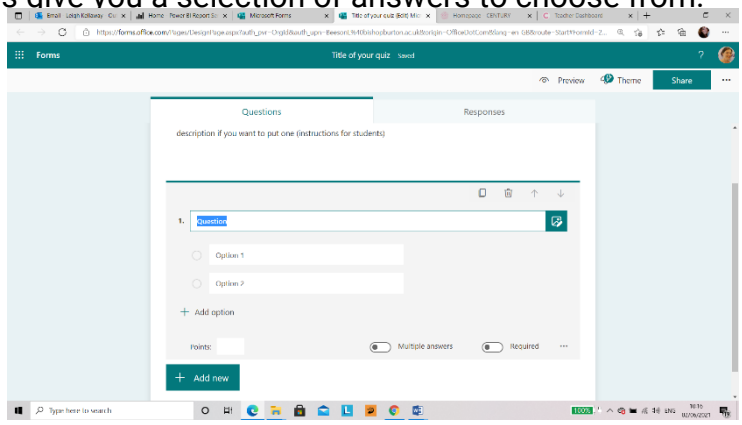
Give the quiz a name and description or instructions for completing the quiz.



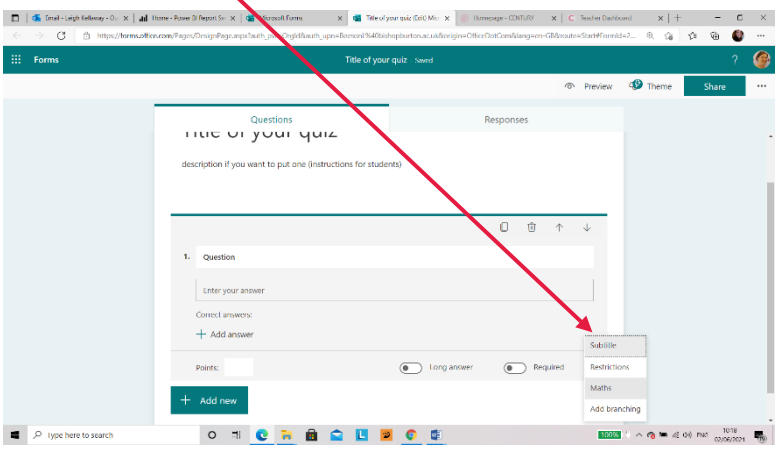
Select `Add New` to make a new question. Choose the type of question you want to add.



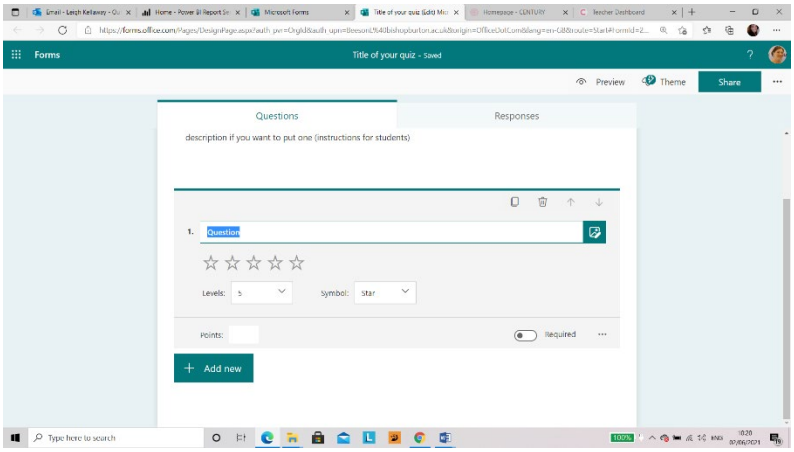
Choice questions give you a selection of answers to choose from.



Text questions gives learners the opportunity to type long answers or to show their working out. The three dots on the right-hand side give the options for it to be a maths question/answer.



Rating questions ask for a star rating. This could be helpful for checking learner feelings about a topic.



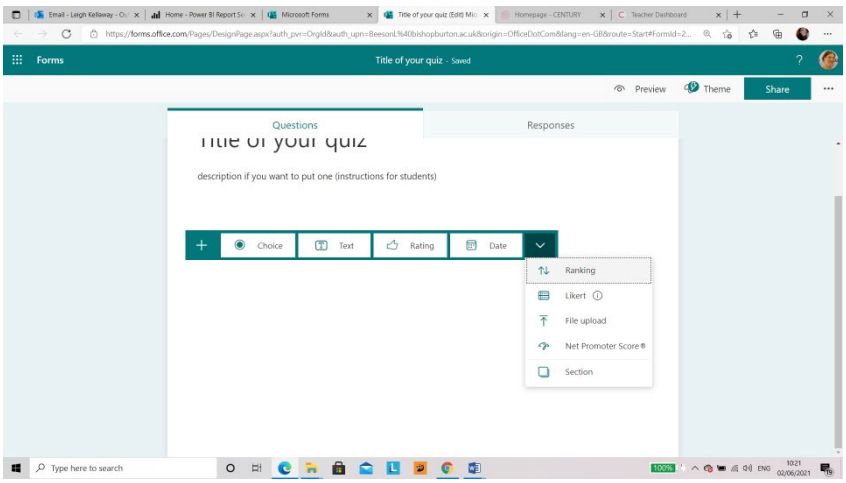
Date questions just give a date answer option. The drop down gives more options for question type.

Likeit (opinions)

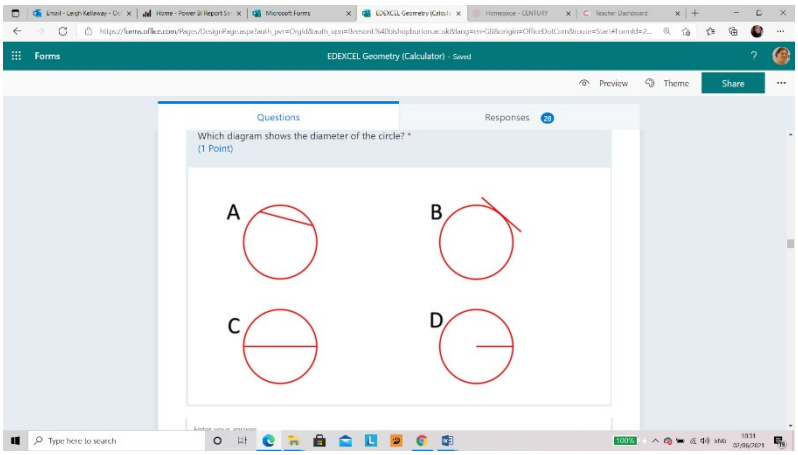
File upload (add texts or writing tasks)

Netpromotor (another opinion)

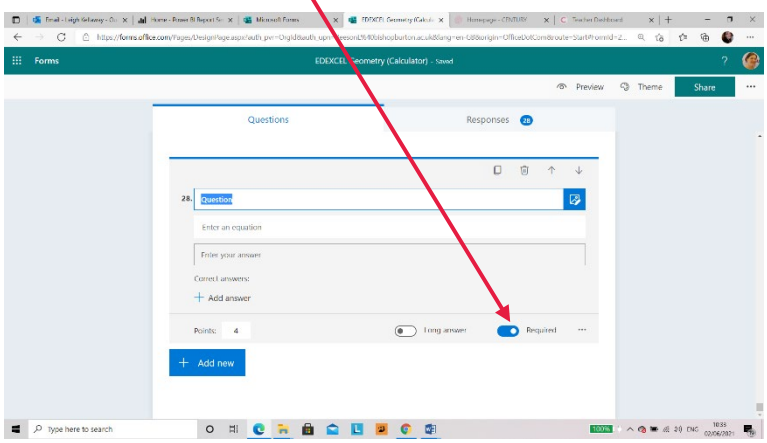
Section (creates a new section)



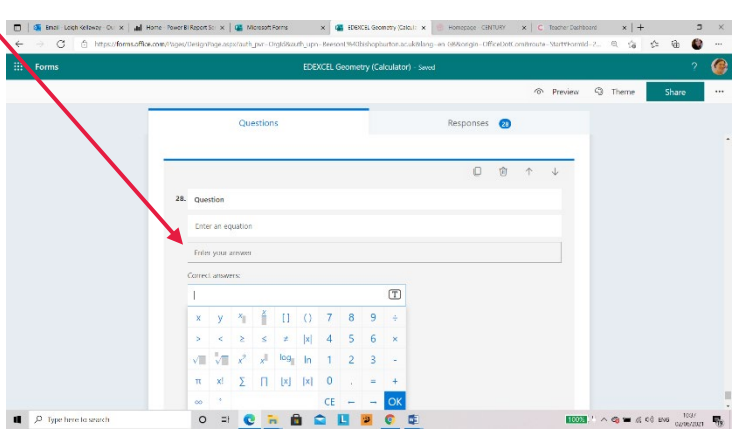
Inserting an image helps with maths questions as there isn't an option for learners to draw on a graph or chart so it is easier to insert an image with 4 options so learners have to identify the correct answer. (don't forget to click the enlarge button for the image)



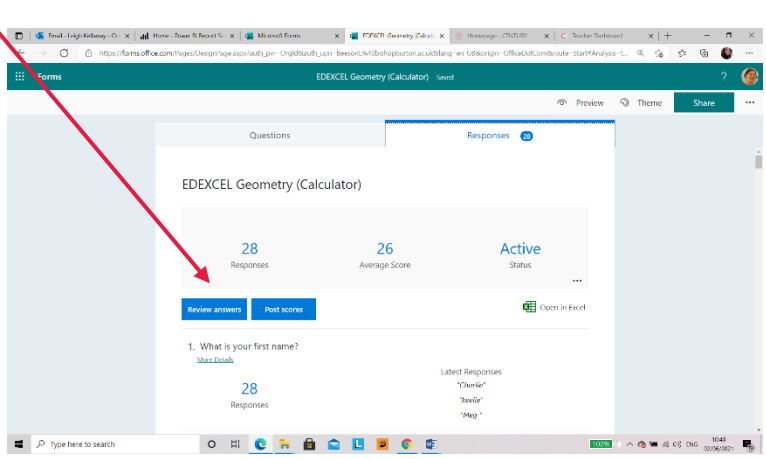
When creating a question – click the `required` tab so learners have to give an answer before submitting their work.



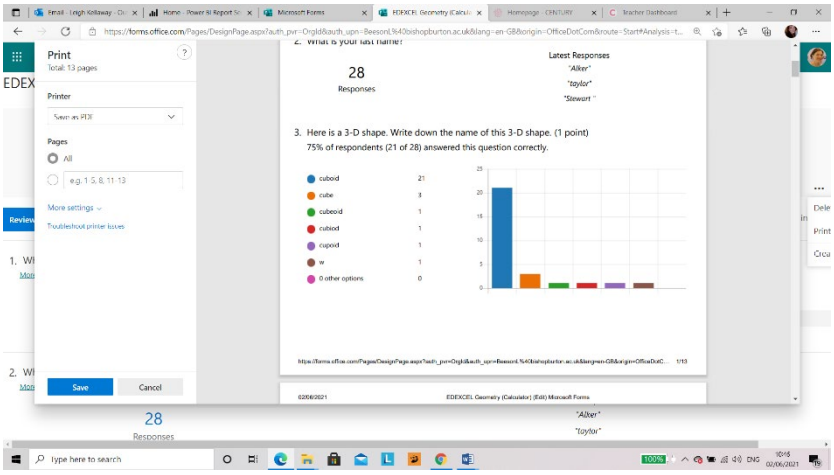
You have the option to add answers so it self-marks. Don't forget to check through them as it only marks an answer correct if it matches the one you put exactly.



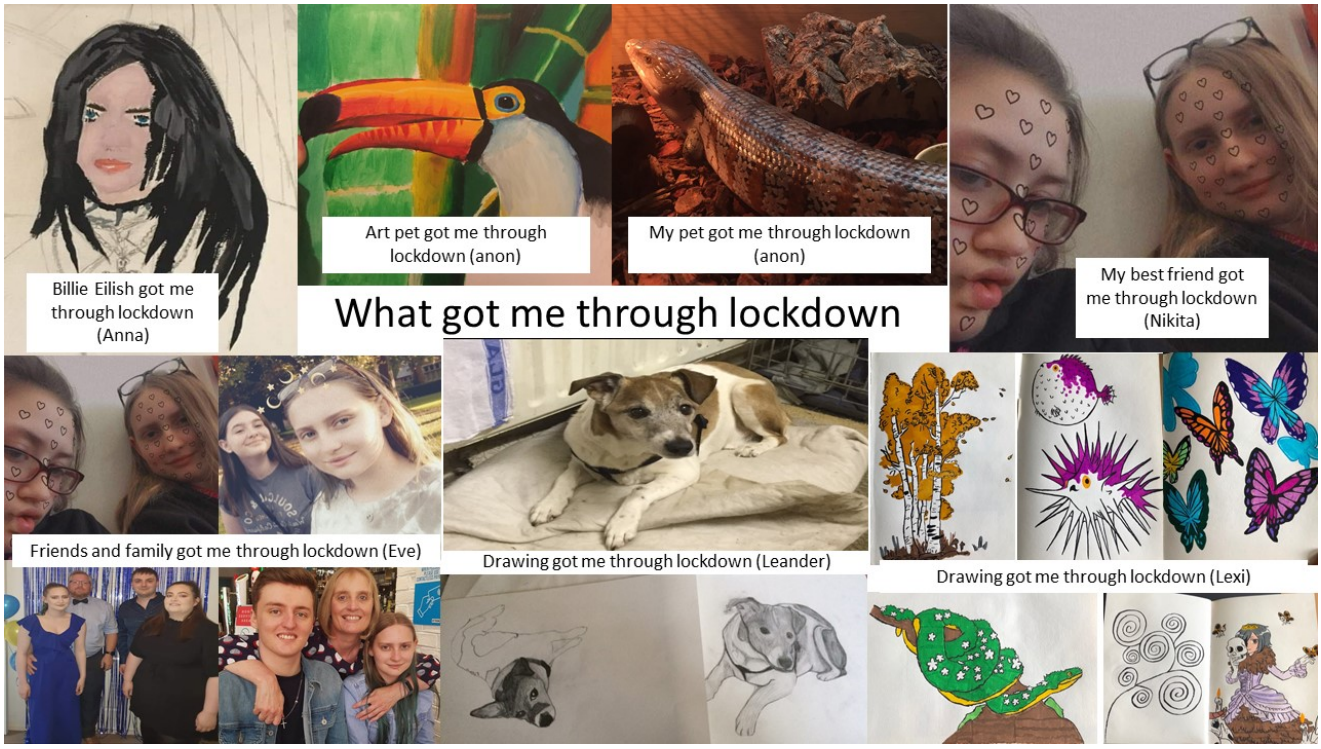
To see learner responses, click on the responses tab and review answers. You have the option to change/allocate marks and give feedback. Click post scores to send it back to the learner.



Click on the 3 dots and you can print a summary of responses. You can also print/save individual learner quizzes. The excel option lets you print a spreadsheet of responses.



Appendix 5 – What got me through lockdown



Appendix 6 – Case study, JS

JS is a Level 1 land-based learner in his third year of college. He has a history of anxiety and depression and spent the majority of 2019/2020 working from home due to his mental health. He is a reluctant learner who would prefer not doing maths and was very easily distracted. Initially he was sent paper-based work but he was not accessing the lessons so the work was not always completed.

JS was shown how to use Century and how to access his lessons on Microsoft Teams through the class notebook feature. Here was stored the PowerPoints from each lesson, the link to Microsoft Forms where his memory recall and progress checks were and finally, a How to Guide with crib sheets for the topic that was being covered. This ensured that he didn't miss any lessons and that he could catch up at his own pace. He also attended Teams sessions with his class when he felt up to it and a blended learning environment was created so support could be given.

JS began to attend the online sessions but wasn't engaging in Century. His preference was using the How to Guides and working through the tasks on PowerPoint. When he was in the face-to-face sessions, I continued this individualised learning for him by printing out the online content and providing him with a laptop to use in class.

JS' attendance began to increase; his participation became more focused and his reluctance lifted. He continued to work on Century in the evenings as he found it easier to do the work in lesson and then revisit the topic at home to consolidate. This blended approach helped to relieve a little of the anxiety that JS felt in lesson and, in reducing this, assisted in him attending more which then led to him getting to know a couple of his classmates better and gaining new friends. JS now attends full time and has been in every single lesson this term.

Appendix 7 – Case study, MP

MP is a learner who was working from home and unable to attend due to personal reasons. She attended all online sessions and completed her main course early. This meant that she was able to stay at home.

Whilst she was still completing work in a one-to-one online session, she still needed to feel part of the group to help with her mental well-being. Every lesson she was invited on Teams by one of her classmates and was included in the discussions both maths and non-maths related.

The decision was made to allow learners to invite her to the sessions as it helped her to continue the friendships she had gained in her second year of college. This inclusion not only helped her to continue her college experience whilst feeling secure, it also helped her to see how many of her friends cared about her.

Appendix 8 – Case study, CA

CA is a first-year learner studying Level 2 animal care. He is extremely shy and lacking in confidence so is very reluctant to ask for help, offer answers or participate fully in group activities. It was difficult to get responses when checking if support was needed.

CA was already using Century in lesson and, again, dd not ask for help nor indicate that he needed support. When we moved into online learning using Microsoft Teams, I was concerned that he would drift away from the lessons and that his attendance would drop.

When using Microsoft Teams to deliver lessons, I worked on questioning as an assessment of understanding. I asked learners to give responses in the chat using a 3, 2, 1 countdown so all answers were given at the same time. I also told the learners that they could use the private chat function to send their answers if they didn't feel confident to use the main chat. Several learners chose the latter option including CA. This was the first opportunity I had to assess his current, in class knowledge.

As each lesson passed, CA continued to answer in the private chat but after 4 weeks or so, he had the confidence to put his first answer in the main chat. This continued until he was confident enough to speak and then to show his working out on the interactive whiteboard in Teams. This increase in confidence may have been possible in the face-to-face lessons but the use of technology certainly had a significant impact as it gave CA a safe place to risk the possibility of being wrong.

Appendix 9 – Case study, JP

JP was beginning his 4th year at college at the start of the project. He is a Functional Skills learner with an EHCP (Educational Health care Plan) due to his additional needs. He lives on a working livestock and arable farm with his parents and siblings. He has one to one in class support.

JP began his Functional Skills journey as an Entry Level 1 learner. He needed support with reading and writing as well as understanding what the questions were asking him to do. In class he had extra time to complete tasks and was given additional resources like counters (for multiplication and division), clocks, spinning number wheels, units blocks (for addition and subtraction), multiplication grid and dice to help with tasks. JPs learning was slow and steady and his retention and recall was limited.

During lockdown, work was posted home to JP as his internet access was limited and his parents were working on the farm so were not always available during lesson times. The work was created specifically for JP and had clear instructions so mum could help him to complete it.

When we returned to college, JP was introduced to Century as an online learning platform. He worked on it with his in-class support reading for him as there was no `read aloud` function. JP liked that there was a video to explain the task, e.g. addition of single digit numbers; he also liked that the questions were displayed one at a time so it was easier to focus. The one thing that JP did not like was that he needed support with reading and this reduced his independence.

JP worked through the topics within Century as well as competing the paper-based tasks in lesson. His confidence increased as he was also working on Century at home and at weekends. This new way of working had a very positive effect on JP. With each topic he completed, he could see his progress. This had a positive impact on increasing his confidence which made him want to do more.

JP worked through all the topics for Entry Level 1 and successfully completed the exam. He did the same with Entry Level 2. Before he completed the whole of his main course, he was offered a job as a farm hand which he accepted and made the decision to leave the college.

Appendix 10 – Case study, R

Learner R could not attend his timetabled taught session as he had to work. It was arranged that he attend at another time but again had to work and could not spare a full hour. I asked him if he had internet coverage where he works. He told me that he did at one end of a field. He sent me an email, from his tractor, when he got to the right spot. I then held a one-to-one Team meeting with him from his tractor cab. His boss was happy for him to take a small amount of time out of his working day and learner R was happy to be able to gain help on the topic. I followed the session with work set on Century, which learner R completed once he got home from work. Learner R employer commented 'I can see the benefit of R doing his math's work but at the moment we are too busy to give him the time off he needs. It is fine for him to have a small amount of time, especially if he doesn't have to leave the farm to do'.

Learner R said, 'this way I can keep my boss happy and continue with my learning'. Both acknowledged that without the pandemic they would not be as busy and learner R would be able to spend more time studying.

Appendix 11 – Case study, A

Learner A, a middle-aged man, who has worked his whole adult life, when first introduced to Century commented ‘why are you giving me children’s work to do?’ he went on to add ‘just because I haven’t got an exam certificate, it doesn’t make me stupid’. I did enquire if we could have a version of Century that had graphics more suited to adults, but this was not possible.

Appendix 12 – Case study, J

I have also found that by offering one-to-one sessions, the learners that do attend, are much more engaged. Learner J said ‘thanks for sorting this, I didn’t like to ask in front of the others and while we are here will you just explain....’. He then did two more topics ahead of his class. At the beginning of lockdown, Learner J was doing the minimum of work. Because he now feels more comfortable with both online learning and knowing that he can access extra help at any time his scores have increased and he is now starting exam preparation in the form of mock papers.

Appendix 13 – Case study, B

Learner B works on a farm. He attends taught sessions and can answer all questions set in Teams learning. However, he is not good at self-directed study. Learner B's employer is very supportive and has set aside time in the workday as well as a space in the farmhouse in which to work. Learner B said 'I don't mind doing the work when you (myself) are here but find it hard to concentrate when I am alone.' Learner B's employer said 'he is capable and I want him to get these exams done as soon as possible. I can see that he will work if I am around and he can reach you with any questions he may have, this seems to be the best solution for learner B'.

Appendix 14 – Angles Data

The benefit of in class assessment is not only for the measurement of academic progress but for the building of confidence in the learner. Resit learners are often low in maths confidence so the measure of tiny in topic wins are extremely important in enabling learners to see that what they are doing makes a difference. This helps to prepare them for exams but also helps them to be willing to try the next challenge.

These assessments were adapted for use in a blended learning environment and online were converted to Microsoft Forms to enable access during a session or for self-directed study, depending on the home circumstances of the learner.

I will use a sample of 15 learners to demonstrate the increase in ability through these start and end point assessments.

The start point was given the name of Memory Recall and this was purposefully so that learners were not intimidated by the word `assessment`. They were also reassured that they had not done maths for some time and that in the current lesson, had not been taught the topic yet so it was ok if they didn't know.

ID	Start time	Completion time	Total points	What is your first name?	What is your last name?
1	09/03/2021	09/03/2021	2	[redacted]	
2	09/03/2021	09/03/2021	5	[redacted]	
3	09/03/2021	09/03/2021	10	[redacted]	
4	09/03/2021	09/03/2021	0	[redacted]	
5	09/03/2021	09/03/2021	6	[redacted]	
6	09/03/2021	09/03/2021	12	[redacted]	
7	10/03/2021	10/03/2021	6	[redacted]	
8	10/03/2021	10/03/2021	2	[redacted]	
9	10/03/2021	10/03/2021	2	[redacted]	
10	10/03/2021	10/03/2021	0	[redacted]	
11	10/03/2021	10/03/2021	1	[redacted]	
12	10/03/2021	10/03/2021	0	[redacted]	
13	10/03/2021	10/03/2021	5	[redacted]	
14	10/03/2021	10/03/2021	0	[redacted]	
15	10/03/2021	10/03/2021	4	[redacted]	

Both the memory recall and progress check carried a score of 15 and had the same structure of questions but used different numbers so an accurate measure of progress could be made. The scores from the memory recall above are a true reflection of the knowledge recall that the learners when first revisiting the topic without any new teaching.

The learners were walked through some worked examples, completed some pair and group work, spent time identifying misconceptions and were then given a progress check to see if they had improved in score.

ID	Start time	Completion time	Total points	What is your first name?	What is your last name?
1	15/03/2021	15/03/2021	3	[redacted]	
2	17/03/2021	17/03/2021	9	[redacted]	
3	17/03/2021	17/03/2021	15	[redacted]	
4	17/03/2021	17/03/2021	4	[redacted]	
5	17/03/2021	17/03/2021	10	[redacted]	
6	17/03/2021	17/03/2021	15	[redacted]	
7	17/03/2021	17/03/2021	9	[redacted]	
8	17/03/2021	17/03/2021	12	[redacted]	
9	17/03/2021	17/03/2021	12	[redacted]	
10	17/03/2021	17/03/2021	14	[redacted]	
11	17/03/2021	17/03/2021	12	[redacted]	
12	17/03/2021	17/03/2021	4	[redacted]	
13	17/03/2021	17/03/2021	9	[redacted]	
14	17/03/2021	17/03/2021	6	[redacted]	
15	17/03/2021	17/03/2021	14	[redacted]	
				[redacted]	

The progress check was done on completion of learning. The lessons were conducted according to the pace of the learners and they were given the autonomy to learn in a style that suited them. The results above show the individual progress within the sub topic of angles in a triangle.

It can be seen that each learner's progress is different, which helps the tutor to individualise learning pathways even further than an initial assessment and that continuous assessment is very beneficial to both tutor and learner.

Data collected this way throughout a topic will give an extremely detailed account of any gaps in learning, any intervention that is required and any reassessment of targets that needs to be done. The in topic progress has also proven to be a great boost for learner confidence.

Appendix 15 – Microsoft Forms Data

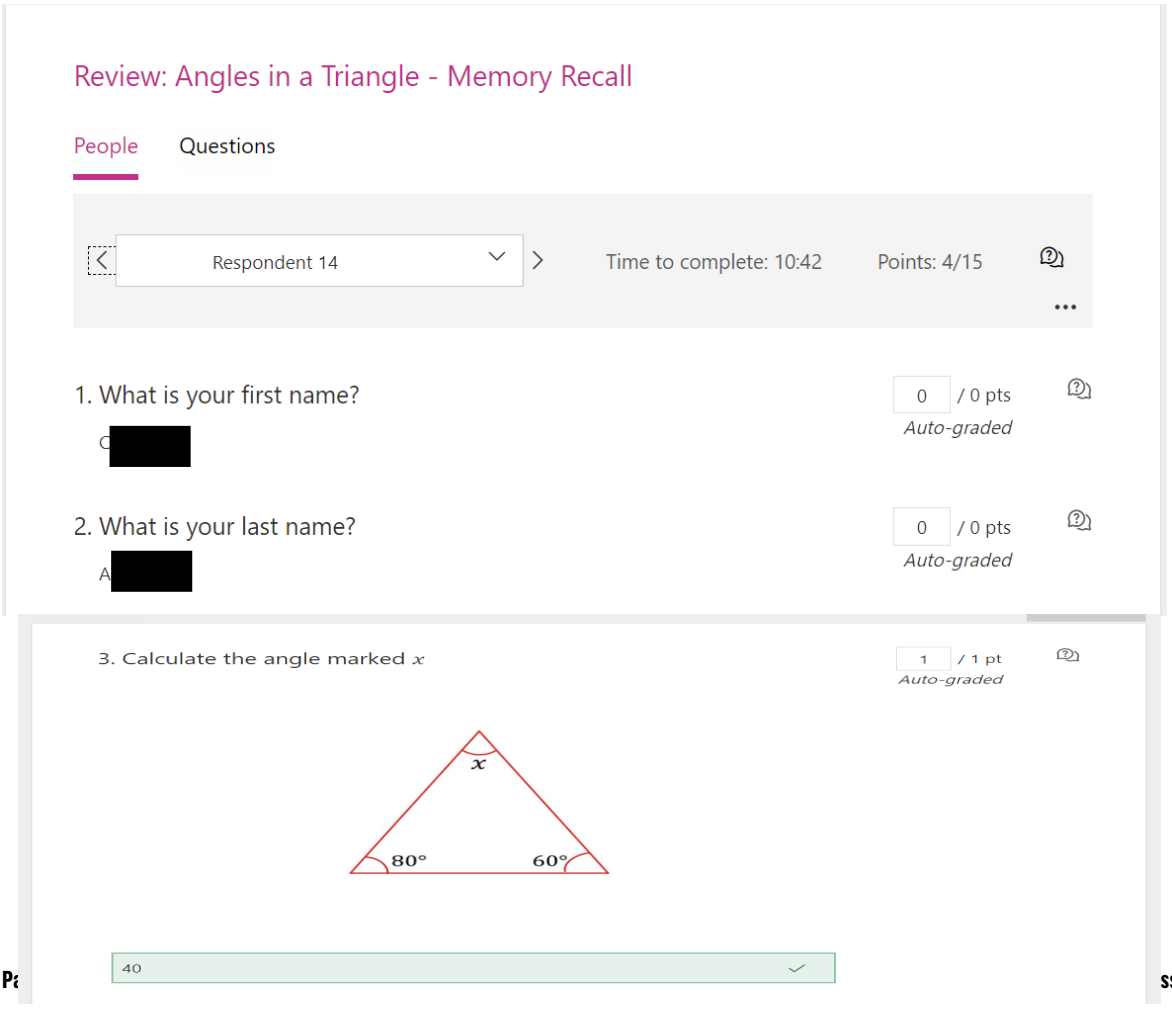
The progress check questions were the same as the memory recall but with different numbers. This was so we could accurately monitor start and end point subtopic progression. Combined with the whole topic diagnostic and progress test, these assessments of learning gave a holistic view of the learner journey for the academic year.

Learner CA's (see Appendix 8) progress within the topic of Angles in a Triangle will be discussed.

Before any learning begins, a memory recall task is completed by learners. The task was initially delivered by PowerPoint; however, the pandemic required a blended learning approach that was accessible to all learners whether at home or attending face-to-face (vulnerable learners and those with key worker parents/carers). Microsoft Forms provided a platform that proved beneficial and popular.

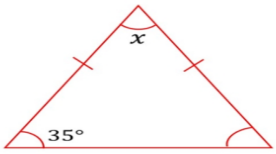
The decision to call the assessment of prior knowledge a memory recall was made so it did not intimidate learners. Resit learners often have barriers to maths whether it be feelings of failure or a belief that they can't do maths so they are less intelligent than their peers. Using the word `assessment` could be detrimental as it could trigger reluctance or refusal. It was made clear to learners that it was ok if they did not know the answer. If they did not know the answer they were encouraged to type `I have no idea`; `Never seen this before in my life` etc, with the reassurance that they hadn't been taught it yet so it's ok to not know.

CA's Memory Recall results.



4. Calculate the angle marked x

0 / 1 pt
Auto-graded

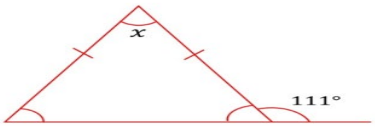


162.5 ✗

Correct answers: 110 degrees,110*,110,110deg

5. Calculate the angle marked x

0 / 2 pts
Auto-graded

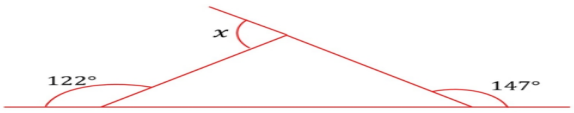


124.5 ✗

Correct answers: 42 degrees,42*,42,42deg

7. Calculate the angle marked x

0 / 3 pts
Auto-graded

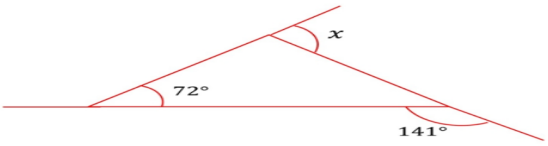


179.17 ✗

Correct answers: 91 degrees,91*,91,91deg

8. Calculate the angle marked x

0 / 3 pts
Auto-graded

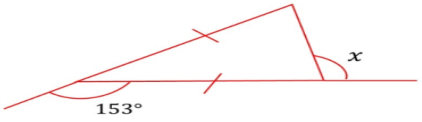


110 ✗

Correct answers: 111 degrees,111*,111,111deg

9. Calculate the angle marked x

3 / 3 pts
Auto-graded

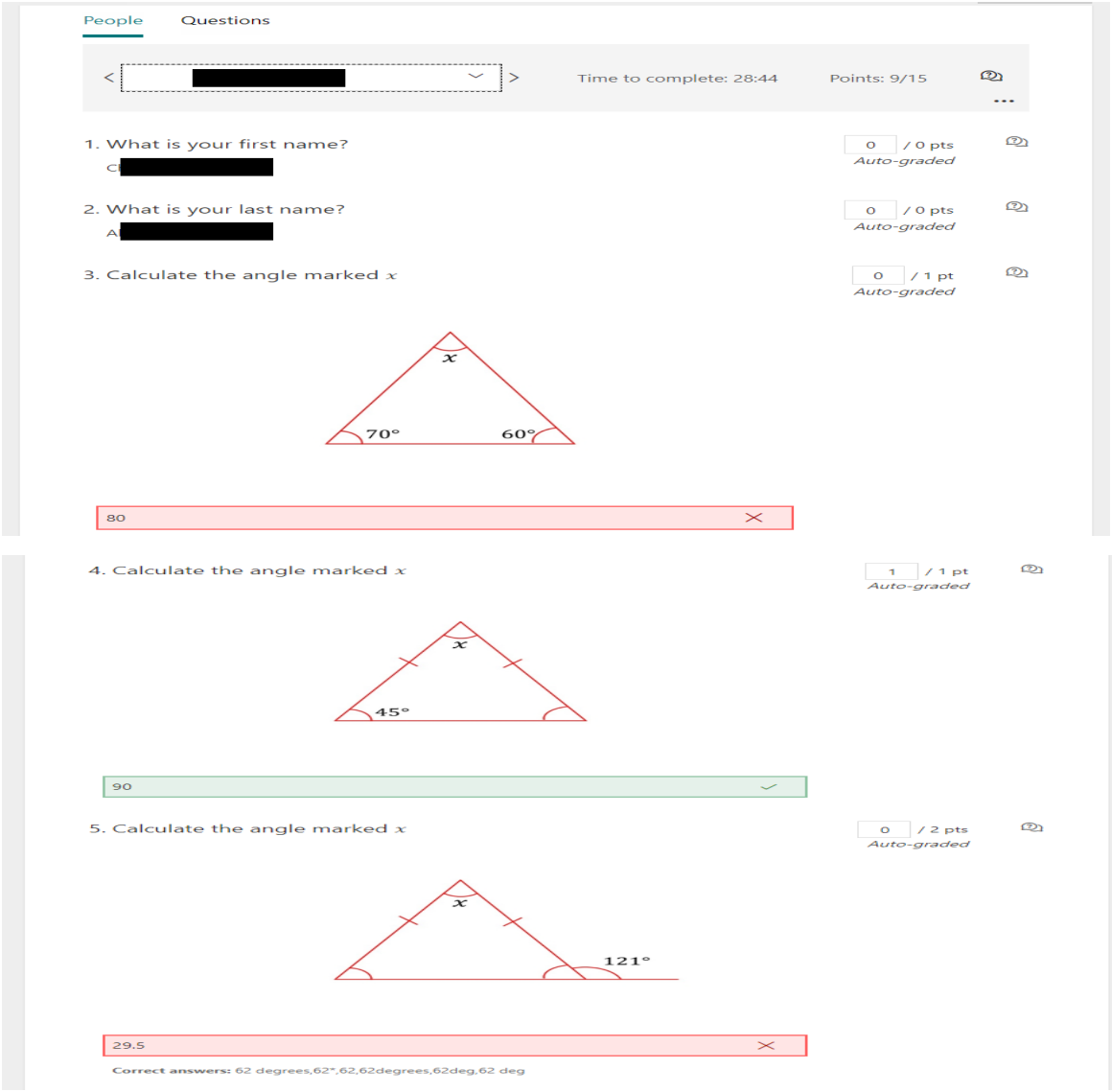


103.5 ✓

CA scored 4/15 on the memory recall task. The scaffolded questions helped to identify the areas that he needed to improve on as well as any misconceptions. It was clear that some incorrect answers related to the understanding of different types of triangle and this identified where the starting point of the lesson needed to be.

Worked examples and group activities were completed before a progress check was done by all learners. This not only provides data for the tutor but also shows the learner how far they have come in one lesson or even part of a lesson this builds confidence and helps break down the barriers to mathematics.

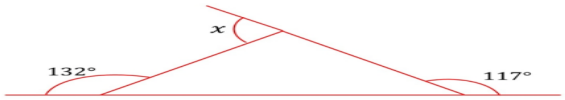
Below is the progress check of CA.



6. Calculate the angle marked x — 2 / 2 pts, Auto-graded

95 ✓

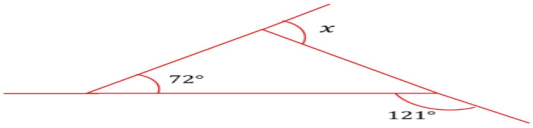
7. Calculate the angle marked x — 0 / 3 pts, Auto-graded



108.5 ✗

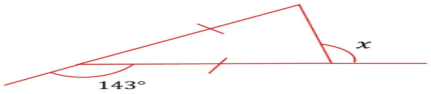
Correct answers: 111degrees,111deg,111 degrees,111 deg,111,111°

8. Calculate the angle marked x — 3 / 3 pts, Auto-graded



131 ✓

9. Calculate the angle marked x — 3 / 3 pts, Auto-graded



108.5 ✓

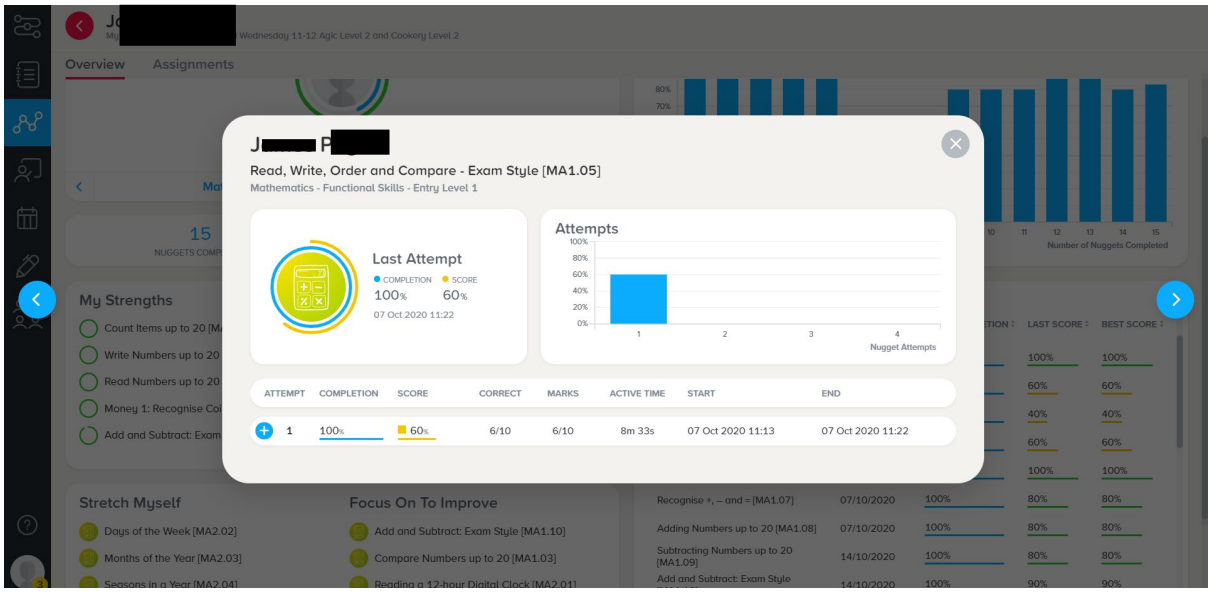
CA's score increased from 27% to 60%. It was clear that he still needed to work on angles in isosceles triangles and he was given a crib sheet and set extra questions as a homework task.

This progress helps the learner to see that they have improved but also gives the tutor evidence of learning, guidance when referring a learner for mentoring and identifies gaps in knowledge.

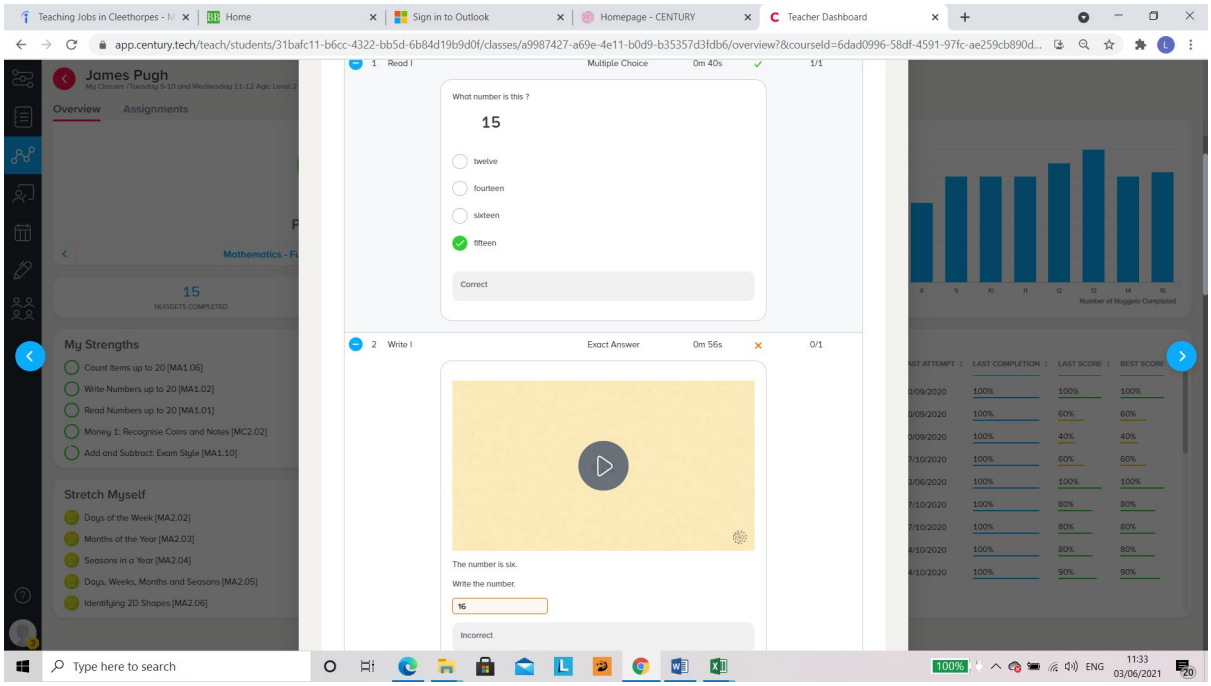
Appendix 16 – Century Data

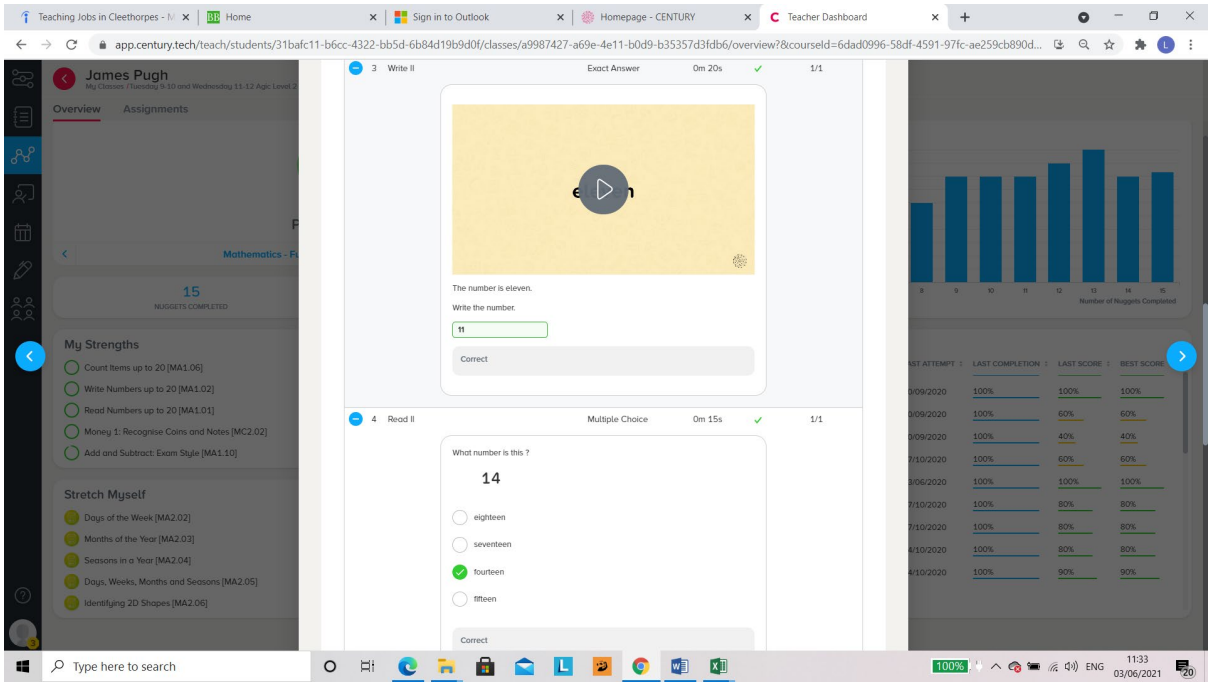
Century is an online learning platform that uses artificial intelligence to individualise learner pathways. Learner JP (see appendix 9) will be used throughout the discussion using his reading, writing and comparing numbers at Entry Level 1 and comparing this with the same topic at Entry Level 3.

JP completed his Entry Level 1 diagnostic with one attempt and a score of 60%.



Going into his diagnostic it is clear that he did not fully understand comparison of numbers or how to write some numbers.

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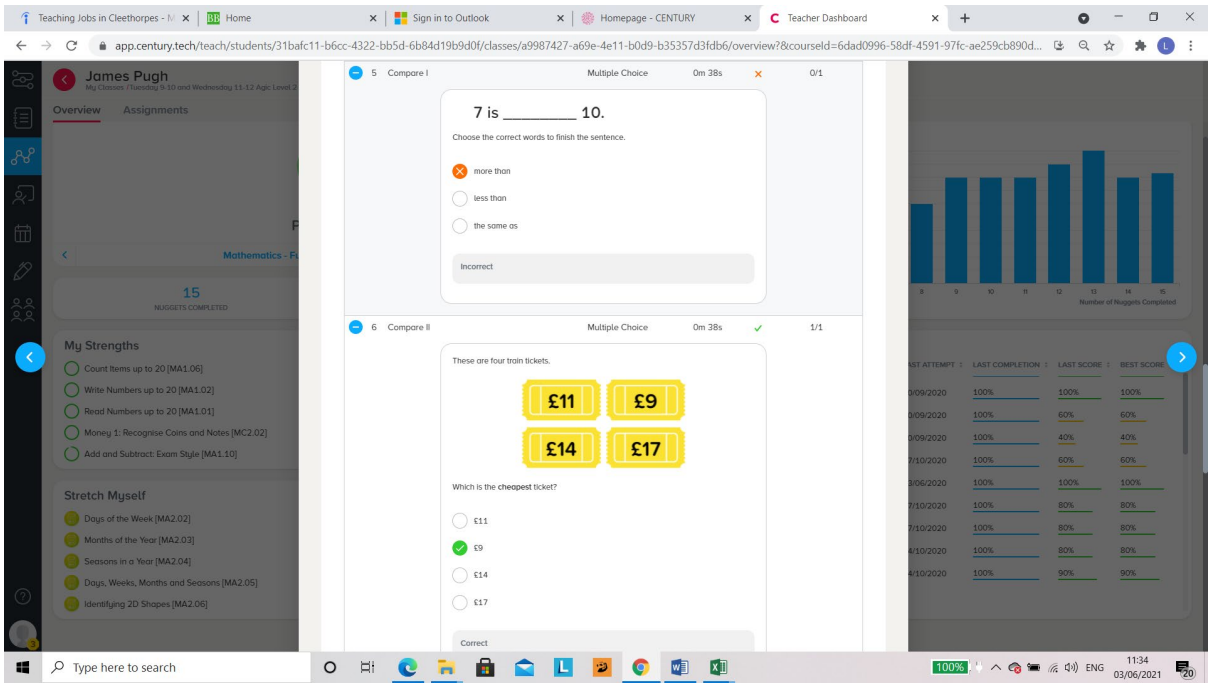
James Pugh
Overview
Assignments
15
NUGGETS COMPLETED
My Strengths
Count Items up to 20 [MA1.06]
Write Numbers up to 20 [MA1.02]
Read Numbers up to 20 [MA1.01]
Money 1: Recognise Coins and Notes [MC2.02]
Add and Subtract: Exam Style [MA1.10]
Stretch Myself
Days of the Week [MA2.02]
Months of the Year [MA2.03]
Seasons in a Year [MA2.04]
Days, Weeks, Months and Seasons [MA2.05]
Identifying 2D Shapes [MA2.06]
3 Write II
Exact Answer
0m 20s
1/1
The number is eleven.
Write the number.
11
Correct
4 Read II
Multiple Choice
0m 15s
1/1
What number is this ?
14
eighteen
seventeen
fourteen
fifteen
Correct
Number of Nuggets Completed
Type here to search
100%
ENG
11:33
03/06/2021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James Pugh
Overview
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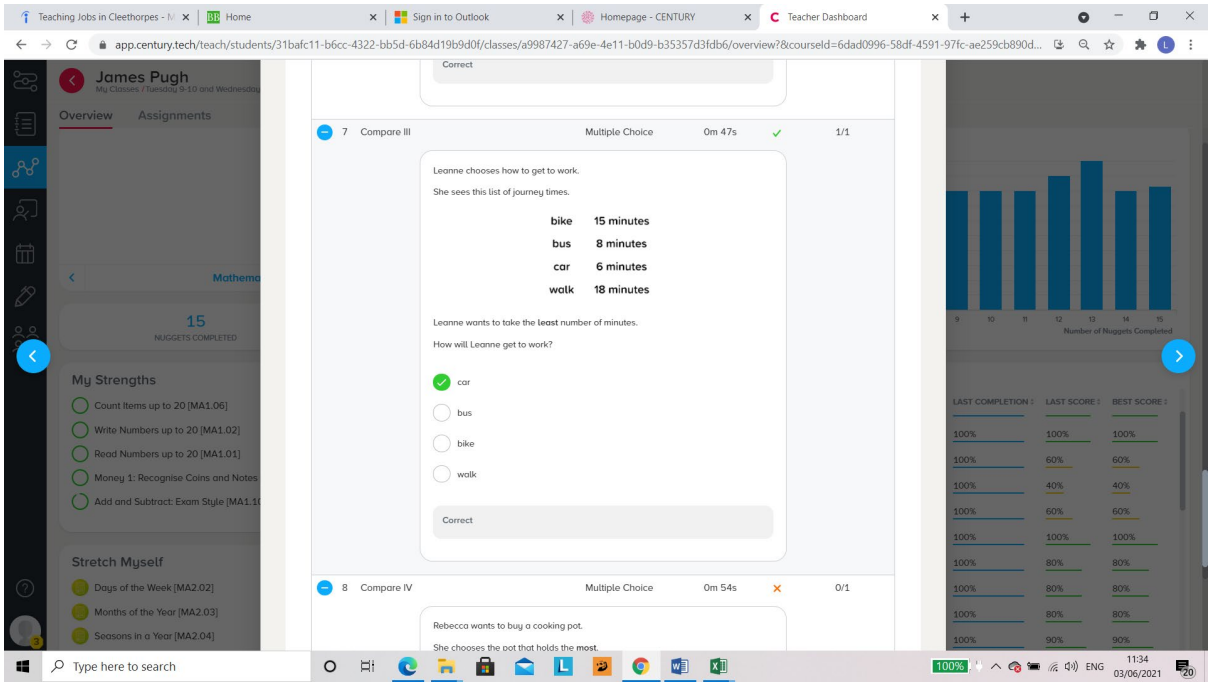
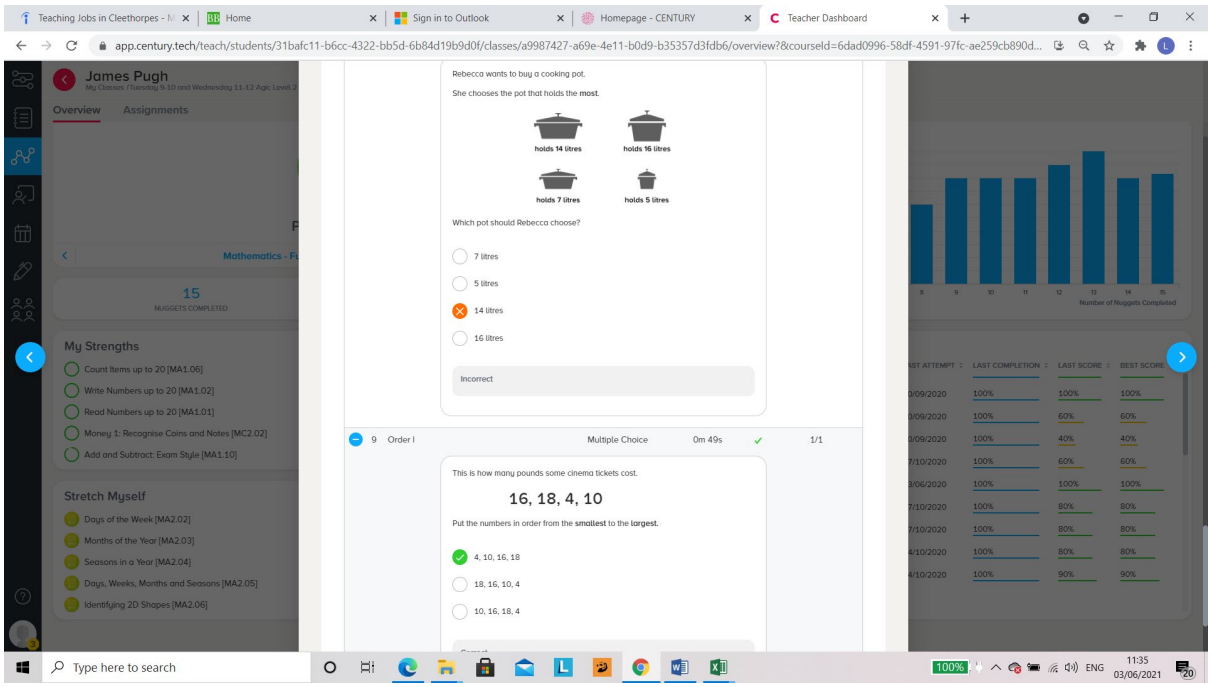
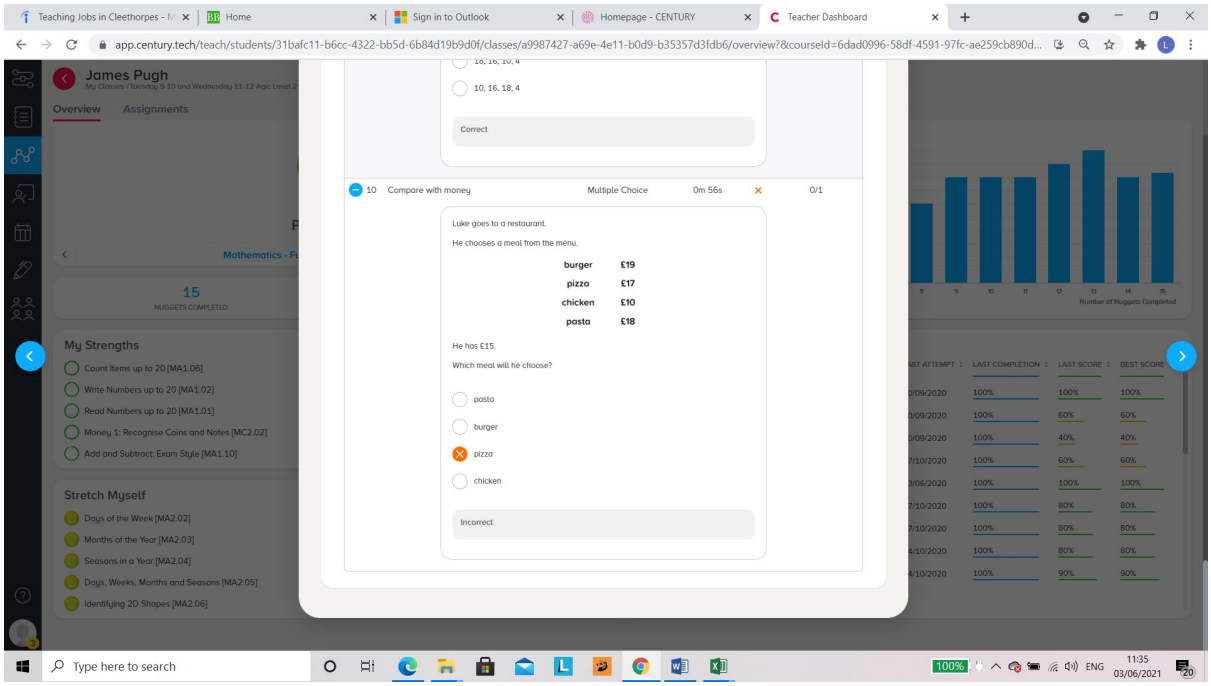
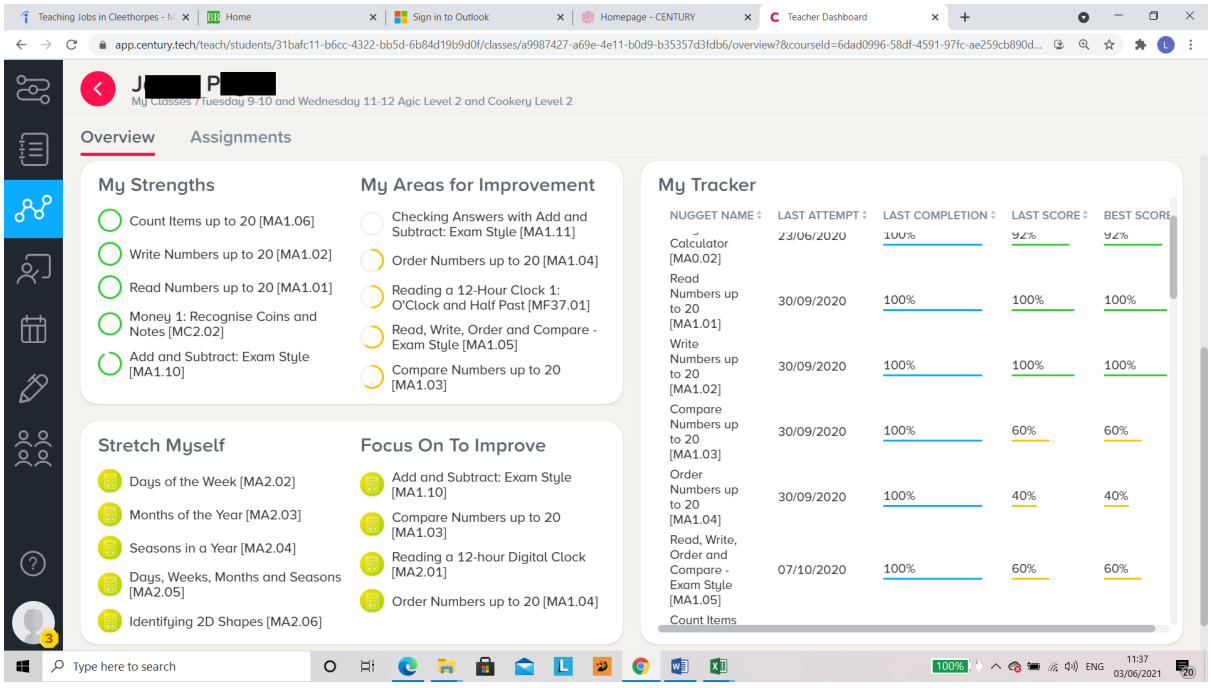
15
NUGGETS COMPLETED
My Strengths
Count Items up to 20 [MA1.06]
Write Numbers up to 20 [MA1.02]
Read Numbers up to 20 [MA1.01]
Money 1: Recognise Coins and Notes [MC2.02]
Add and Subtract: Exam Style [MA1.10]
Stretch Myself
Days of the Week [MA2.02]
Months of the Year [MA2.03]
Seasons in a Year [MA2.04]
Days, Weeks, Months and Seasons [MA2.05]
Identifying 2D Shapes [MA2.06]
5 Compare I
Multiple Choice
0m 38s
0/1
7 is _____ 10.
Choose the correct words to finish the sentence.
more than
less than
the same as
Incorrect
6 Compare II
Multiple Choice
0m 38s
1/1
These are four train tickets.
£11
£9
£14
£17
Which is the cheapest ticket?
£11
£9
£14
£17
Correct
Number of Nuggets Completed
Type here to search
100%
ENG
11:34
03/06/2021


James Pugh
Overview
Assignments
My Strengths
Stretch Myself
7 Compare III Multiple Choice 0m 47s 1/1
Leanne chooses how to get to work.
She sees this list of journey times.
bike 15 minutes
bus 8 minutes
car 6 minutes
walk 18 minutes
Leanne wants to take the least number of minutes.
How will Leanne get to work?
car
bus
bike
walk
Correct
8 Compare IV Multiple Choice 0m 54s 0/1
Rebecca wants to buy a cooking pot.
She chooses the pot that holds the most.


James Pugh
Overview
Assignments
My Strengths
Stretch Myself
Rebecca wants to buy a cooking pot.
She chooses the pot that holds the most.
holds 14 litres
holds 16 litres
holds 7 litres
holds 5 litres
Which pot should Rebecca choose?
7 litres
5 litres
14 litres
16 litres
Incorrect
9 Order I Multiple Choice 0m 49s 1/1
This is how many pounds some cinema tickets cost.
16, 18, 4, 10
Put the numbers in order from the smallest to the largest.
4, 10, 16, 18
18, 16, 10, 4
10, 16, 18, 4

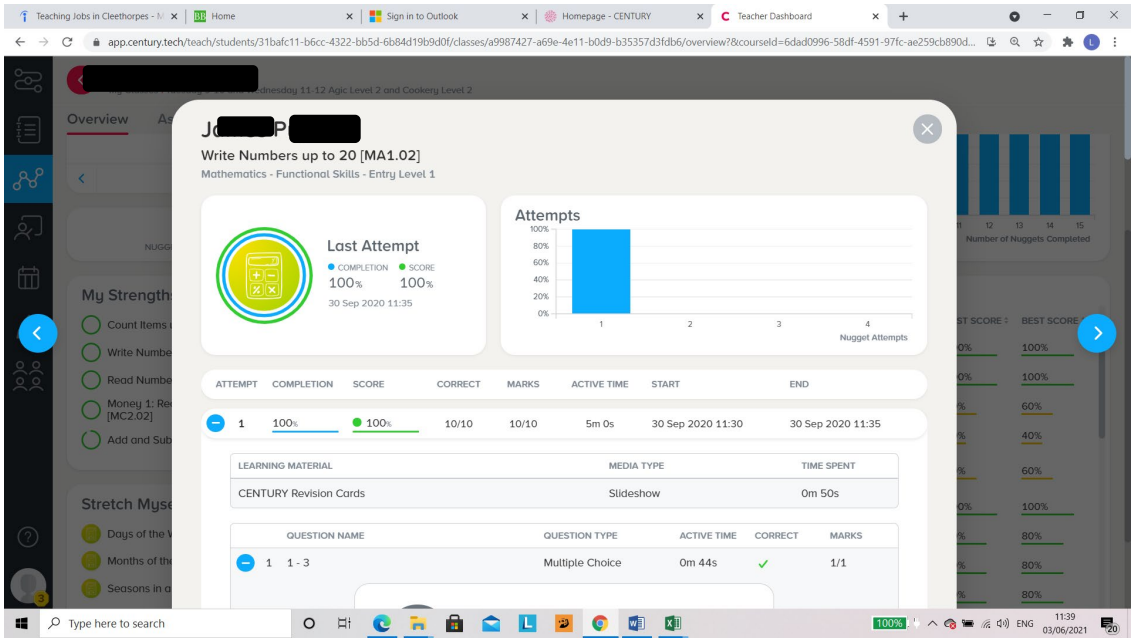


Century's artificial intelligence then set out an individualised pathway for JP. It identified his strengths, areas for improvement and stretch and challenge pathways.



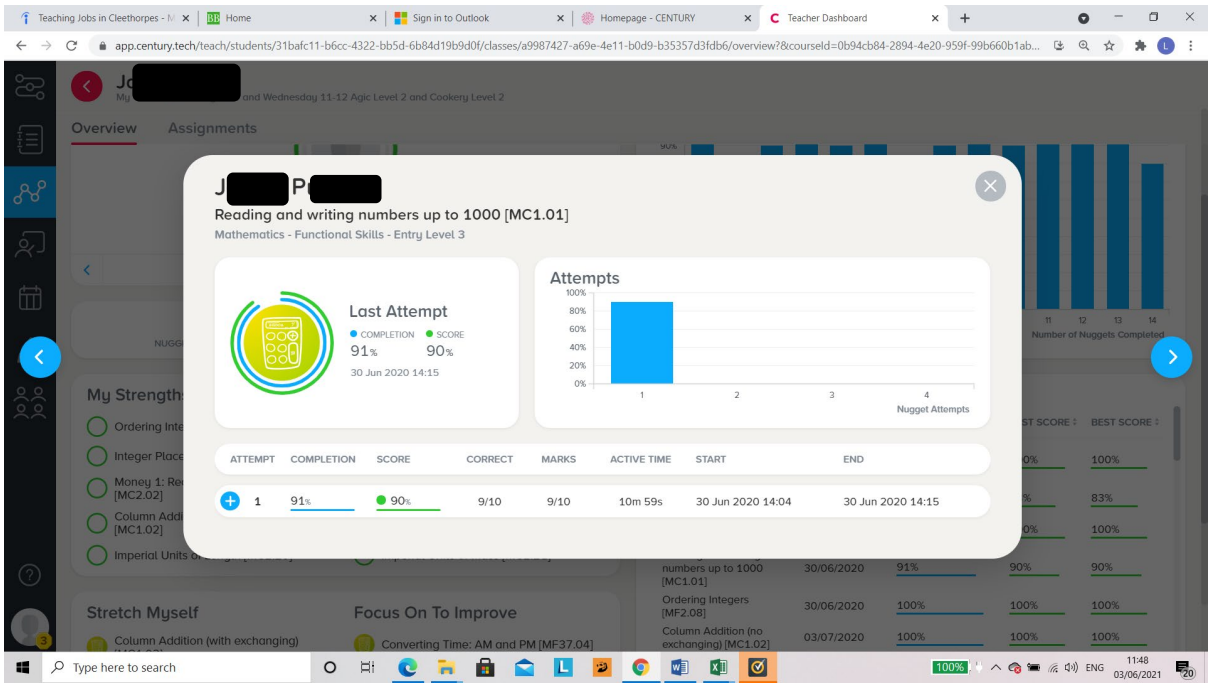
With each successfully completed nugget, the pathway adapts and changes, scaffolding questions to increase knowledge and understanding.

JP was given tasks on writing numbers as he was good with reading numbers. The scaffolding identified his start point at writing numbers up to 20. JP worked through the tasks and scored 100% on his first attempt.



JP continued to follow the pathway identified for him by Century. He worked on it at home as well as in college.

At the end of Entry Level 1 he had completed the same topic at Entry Level 3 (due to no Entry Level 2 being available) This increase in difficulty did not stop JP.



JP's score at Entry Level 1 was 60%, after he had worked his way through Entry Level 1, his score on the same topic at Entry Level 3 increased to 90%.

His ability went from being able to read, write and compare numbers up to 20 to being able to read, write and compare numbers up to 1,000. A significant increase. Century has worked extremely well for JP as it has stretched and challenged him as well as increased his confidence in mathematics. He enjoyed the videos and the questions being displayed one at a time. He would have liked it if the questions could

be read aloud as this would decrease his need to have someone with him when he was working, which would further uncrease his independence.

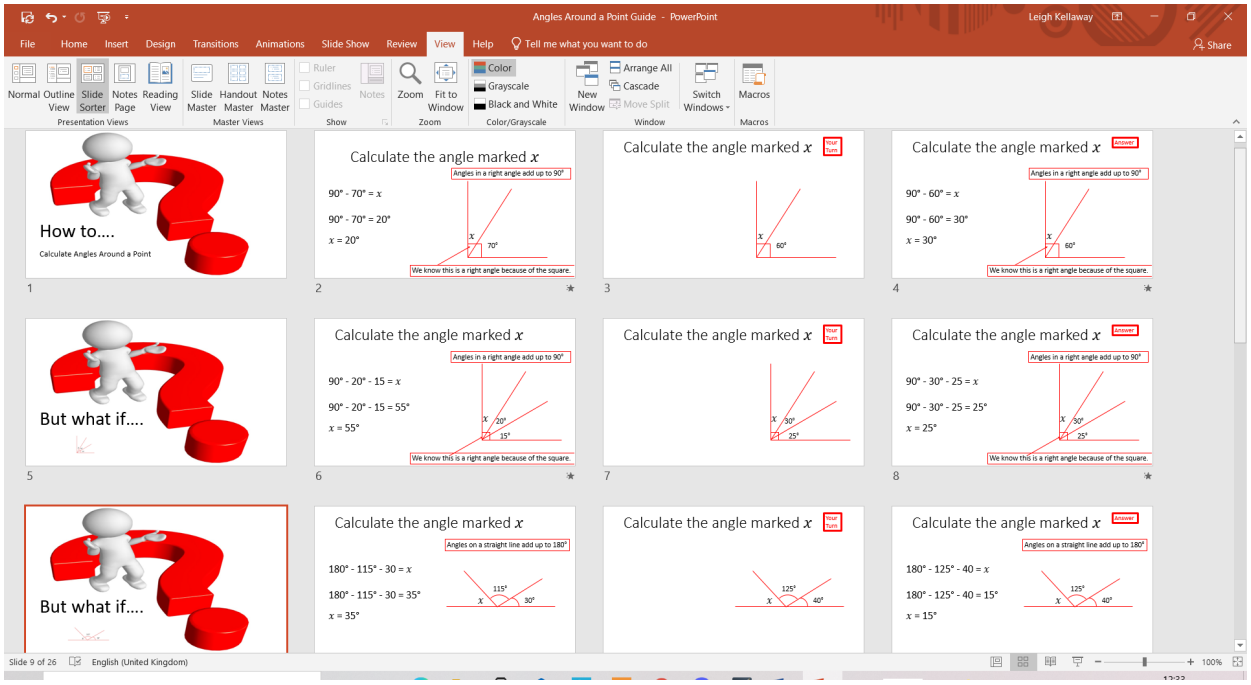
Appendix 17 – Industry Related Maths Example

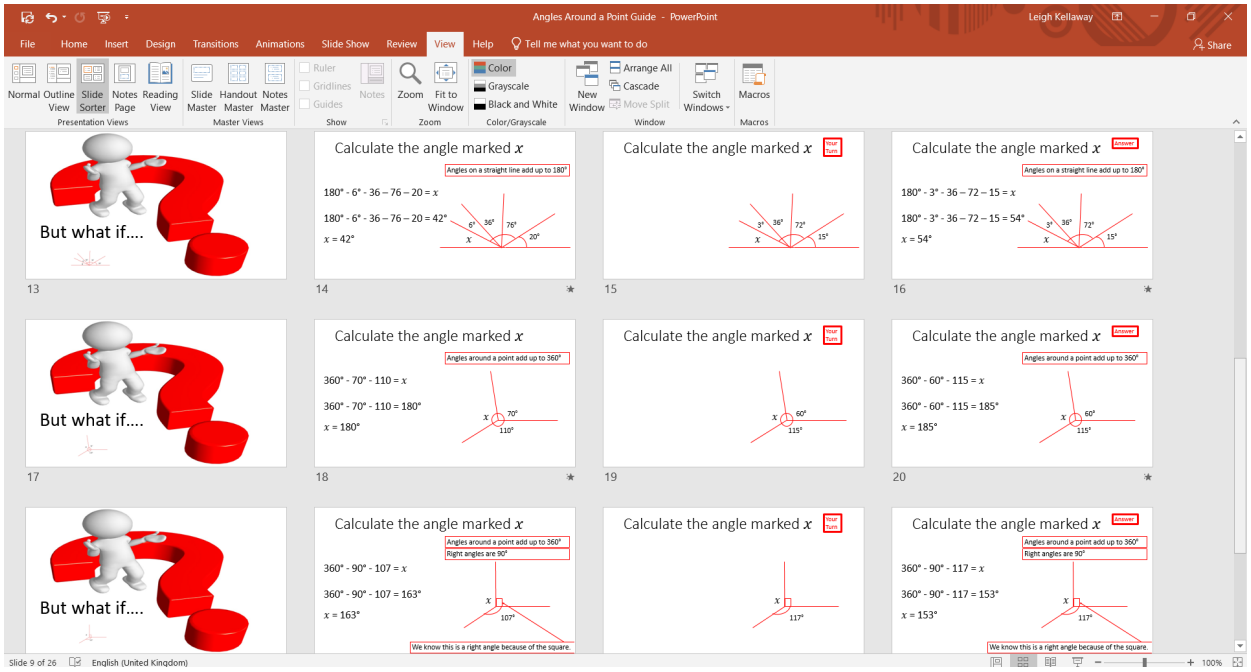
In Horticulture courses the area of vegetable beds or the volume of paint required for painting wooden decking for seating areas gardens which has become a popular alternative to a patio. This was a benefit to both learner and tutors.

The tutors let me know their scheme of learning and topics to be introduced in advance and I was able to alter worksheets accordingly. This continued through lockdown. The main course tutor and I blend lessons so that functional skills and main course become one subject. An example of this is in Horse care. Learners had to calculate the weight of feed to give a working horse by calculating 2.5% of its body weight. The main course tutor led the session but when the calculations were needed I led the lesson.

Appendix 18 – How to Guide Example

The how to guides were created as a PowerPoint with knowledge organisers at the end of the slides. This was done so students who had limited access to lessons due to having siblings, being young carers or having intermittent broadband could access the lesson any time of the day/evening. The guide walked them through worked examples and practice questions which was preceded and followed by start and end point assessments delivered on Microsoft Forms.





Angles Around a Point Knowledge Organiser 1

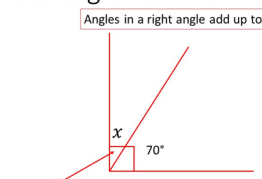
Calculate the angle marked x

Angles in a right angle add up to 90°

$90° - 70° = x$

$90° - 70° = 20°$

$x = 20°$



We know this is a right angle because of the square.

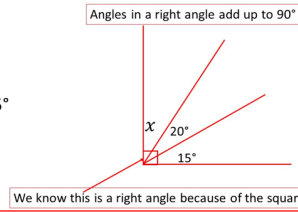
Calculate the angle marked x

Angles in a right angle add up to 90°

$90° - 20° - 15 = x$

$90° - 20° - 15 = 55°$

$x = 55°$



We know this is a right angle because of the square.

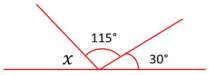
Calculate the angle marked x

Angles on a straight line add up to 180°

$180° - 115° - 30 = x$

$180° - 115° - 30 = 35°$

$x = 35°$



Angles Around a Point Knowledge Organiser 2

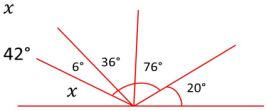
Calculate the angle marked x

Angles on a straight line add up to 180°

$180° - 6° - 36 - 76 - 20 = x$

$180° - 6° - 36 - 76 - 20 = 42°$

$x = 42°$



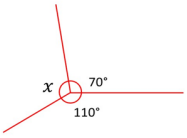
Calculate the angle marked x

Angles around a point add up to 360°

$360° - 70° - 110 = x$

$360° - 70° - 110 = 180°$

$x = 180°$



Calculate the angle marked x

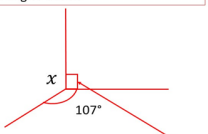
Angles around a point add up to 360°

Right angles are 90°

$360° - 90° - 107 = x$

$360° - 90° - 107 = 163°$

$x = 163°$



We know this is a right angle because of the square.

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