Basic concept of ICT in education

Introduction

Digital technologies have become an integral part of the teaching and learning process in academic courses. The integration of digital technologies in teaching and learning is related to the awareness of changing nature of schooling. It also indicates to realize the necessity to properly prepare students for future work and lifelong learning in the information society of the internet age. Appropriate use of technology can promote the construction of new knowledge based on its link to students' previous knowledge and enhance individualization, personalization, modernization, customization, localization, teamwork, and collaborative learning too.

1.1 Instructional technology in the Nepalese context

Present day academic exchanges in schools and universities are characteristically technology based. In recent years, many efforts have been done to shift from conventional pedagogy and learning to technology based. In the context of Nepal too, Ministry of Education, Science and Technology (MoEST) has been focusing and investing heavily in;

- promoting technology-based school innovations for the sake of universalizing access on learning resources and producing digital learning resources and platforms.
- online learning, virtual learning, surfing e-learning portals/websites and downloading useful and relevant learning resources.
- communicating and collaborating through digital tools.

These have become high-sounding slogans of planners and practitioners. But, if serious and sincere efforts are not made, lofty targets become hard-to-reach. Therefore, if full potential of ICT in school education is expected, the following considerations should be focused on.

- Radical school curriculum change is needed in the internet age to focus on the concept of adaptive learning and academic resiliency of the students through interactive, communicative, project-oriented, search-oriented collaborative activities but with individual autonomy.
- School leadership and management must fully be committed to integrating ICT in language pedagogy, learning and assessment.
- Concerned stakeholders such as school, home and community can have new opportunities and avenues for partnership and collaboration for their children’s learning. Therefore, school-home-community links should be established through ICT tools. They can have dialogues through communication and collaboration tools such as phone, Zoom, Microsoft Teams, Skype, etc.
- Teacher training agencies should focus on ICT as one core area of teacher professional development. Teachers should be trained about how to use ICT tools as learning tools and tools for creating continuous professional development.
- Strong and sustainable physical infrastructure to utilize ICT effectively and efficiently in schools should be designed and developed.
- Teachers should shift the language pedagogies and methodologies to integrate ICT in regular language pedagogy.

Implication is concerned with the possible future effectiveness. It is like suggestion, but implicitly stated. The above-mentioned implication of ICT in language pedagogy is not comprehensive list. There can be others too. But what we can understand is it is the strong desire of the planners and the implementers that determines the effectiveness and efficiency of ICT in ELT. As we know that small fire can't give much heat and weak desire can't produce great results, strong desire with growth mindset is the starting point.

1.2 Technology skills and employability

If the role of education is to prepare students for modern life and the modern workplace we must think about what skills will be needed for those in the future. Our global societies are going through a period of rapid change often referred to as 'disruption'. Many of the traditional professions, services, and industries that we have lived with for decades are being rapidly transformed by technology. Examples of this transformation are the media industry, where social media services have replaced physical newspapers in many parts of the world and the music industry where digital streaming services have replaced cassette tapes and CD-ROMs.

For some years the global workplace has been changing.

- The development of faster internet internationally has enabled the 'outsourcing' of many customer services and support jobs from developed nations to the developing world. This has mainly been done by larger, established companies.
- Many new companies have also enabled more flexibility and a change in the way people are employed. Instead of having a single job with one employer it is becoming more common to be employed as a freelance doing many small jobs for a range of different employers. Many websites like Fiverr, Elance and UpWork have enabled digitally skilled workers from any part of the world to promote and sell their abilities to companies both small and large as well as individuals from anywhere in the world. This is commonly referred to as 'the gig economy'.
- The restrictions placed on people during the pandemic forced many to work from home. In many cases companies and employees have seen how effective this has been and many companies are now encouraging their employees to continue to work from home at least part for the time.

All these new developments in the world of work require that students have a good level of digital skill and the ability to learn and use new technologies to ensure that they can participate in this modern world of work.

The World Economic Forum is an international non-governmental organisation which was started in 1971. Their role is to look at the needs of businesses around the world and understand their future needs.

A recent report highlighted the impact that Artificial Intelligence (AI) will have in the workplace over the next decade.

They believe that AI will enable computers to carry out a wide range of tasks that at present are done by people. Medical, legal, financial services and many other professions where tasks are repetitive are likely to be impacted by the introduction of AI.

The report also highlighted the skills that people will need to ensure they are employable. These are:

1. Analytical thinking and innovation
2. Active learning and learning strategies
3. Complex problem solving
4. Critical thinking and analysis
5. Leadership and social influence
6. Technology use monitoring and control
7. Technology design and programming
8. Resilience, stress tolerance and flexibility
9. Reasoning, problem solving and ideation

Although only two of these refer directly to technology, most of these skills will need to be developed and used within a digital work environment.

To ensure our students can be employable members of our future workforce we must help them to develop the skills they will need to compete with others around the world.

1.3 Maslow and educational technology

Maslow's hierarchy of needs is an idea that was first published in a 1943 paper "A Theory of Human Motivation" in the journal Psychological Review. The author, Abraham Maslow, identified several areas that people need to fulfil to live satisfied and happy lives. These areas often appear in a pyramid type diagram, though this isn't how they Maslow originally described them.

This diagram is also a useful structure to help us think about how we use technology. Technology can be seen as a tool to help and support our students' personal development in the same way. We can think about the types of technology practices and tasks that we can use with our students to support them in their daily lives.

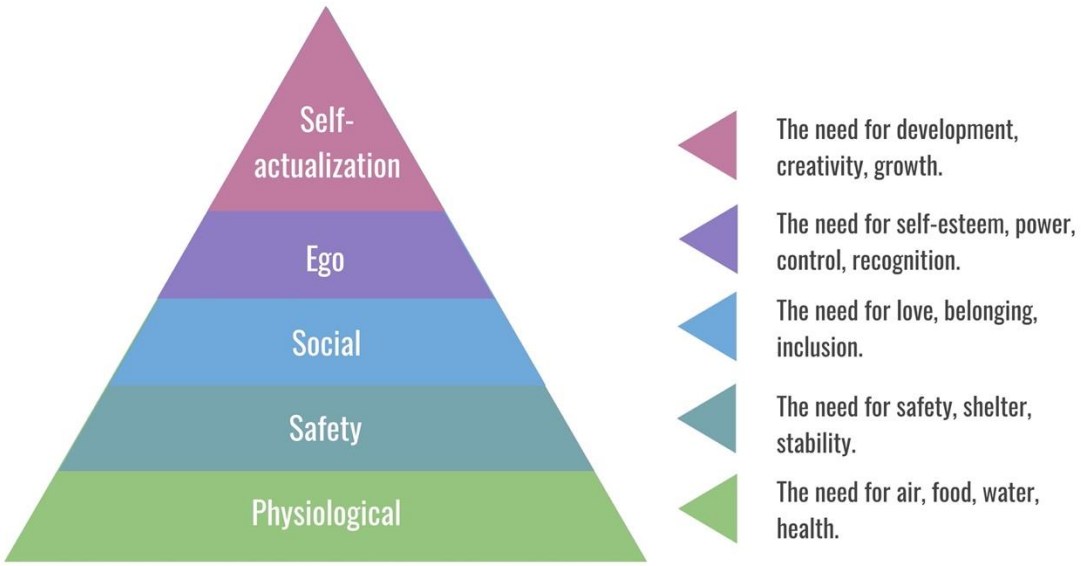

Fig 1. Maslow's hierarchy of needs

Here are some examples of uses for technology that might support our students and which we might need to teach them to satisfy each of the level.

- Physiological – We can teach students how to use spreadsheets to manage their finances, how to order food online, how to pay bills and do online banking, etc.
- Safety – We can teach students about safety and how to protect themselves online.
- Social – We can teach students how to use social networks to interact with others and develop safe friendships with people online.
- Ego - We can help students create a personal learning network and enable them to share knowledge with others. We can help them to develop their abilities to become more autonomous and critical learners.
- Self-actualisation - We can help students to understand how to create and share a range of creative artefacts that help them to realize their own ideas and share their views, their culture, and their understanding of the world.

In this way we can use Maslow's hierarchy of needs to develop our understanding of our aims and goals so that we use technology in a structured and informed way. This will help us to ensure that we are using technology to enable our students and help them improve their lives.

1.4 Understanding how ICT supports students' future goals

ICT can support our students' future goals in several ways. How this applies to individual students depends on their personal goals. Here are several areas where understanding of ICT and the ability to use it can have a major impact.

- Higher education – Any of our students wanting to successfully move into higher education will need to be able to use ICT for several tasks. They will need to be able to carry out research using digital resources, compile that research and deliver digital

learning assignments. They will need to create digital artifacts such as graphs and tables to include in their dissertations and thesis and they will need to be able to create these dissertations using digital tools. It's also likely that some part of their course will be delivered using a virtual learning platform using remote lectures and recorded videos of interactive learning activities.

- Continuous learning – Technology is rapidly increasing the rate of change in the workplace in most businesses. Employees are required to learn and relearn new business processes as well as how to use new technology. Most businesses now use online courses to develop their staff. Our students need the skills to learn and relearn new technologies to successfully compete for the jobs they need.
- Civil society – Many of the services that people need to use in their everyday lives are now accessed through technology. Students will need to understand how to use technology to have access to basic things like financial services, online shopping, access to medical services, access to development opportunities and many more.

Whatever goals our students have for their future, the ability to use technology will help them achieve those goals.

1.5 ICT in education practices in Nepal

Information and Communication Technology is known as ICT in short form. There have been many legal as well as practice level efforts to utilize ICT in school education. To be more specific, ICT has been lifeline of school pedagogy and learning. Almost all schools in Nepal have the internet connectivity, ICT labs and computer classes. The following points will help us understand about the legal and practice level efforts in using ICT in Nepal.

- Nepal has National Education policy, 2076. It has provisioned that all teachers should receive trainings on ICT in education and digital literacy. ICT infrastructure will be strengthened in schools.
- School Sector Development Plan (SSDP) focuses on developing digital materials and developing model schools as ICT hub
- Information and communication Technology Policy, 2072 focuses on digital literacy and envisions the internet access to all citizens and schools within 2020.
- Digital Nepal Framework, 2076 has prioritized eight sectors where digital tools will be utilized. Out of them, education sector is one important sector. Framework envisions enhanced teaching and learning using digital tools. It also aims in preparing tech-savvy human resources. The other significant aspects of framework are:
    - Investment in digital literacy education
    - Development of digital skills in human resources
    - Promotion and inspiration to talented and innovative spirit, and research and development
    - Bridging the skill-gap between industry and education by establishing Finishing Schools.

    - Establishing smart classrooms, online learning programs, laptop support programs, Education Information Management System (EIMS), biometric attendance, CCTV cameras, mobile learning in rural areas, etc.
- Student Learning Facilitation through Alternative Mode Guideline 2077 focuses on online and other different alternatives to continue learning process even in the physically disturbed environment like the situations created by COVID-19 pandemic.
- Teacher Professional Development through Distance Education System (SOP-2077) provides the provisions for continuous teacher professional development through online, face-to-face, and blended mode as the situation and need.

To address the above mentioned legal back up for teacher and students' continuous learning, CEHRD under the Ministry of Education, Science and Technology, has developed and delivered different kinds of digital learning materials from ECED to grade 12. CEHRD has one learning portal to expedite the learning process of teacher and students. Grade-specific and subject-specific digital materials are available on this portal. Teacher training activities are running through online, face-to-face, and blended modes. The audio visual section of CEHRD has been delivering virtual lessons for Grades 1 to 12. Thousands of schools have directly benefited from the production of virtual classes through YouTube, television channels and radio programmes as well. Now, CEHRD is planning to launch educational television for conducting fully education based programmes. This practice also indicates the recent and fresh departure in the conventional mode of teaching and training delivery.

1.6 Visioning future practice

Trying to guess what will happen in the future can be very difficult. Technology will have a role in shaping the future of education, but how big that role is depends on the willingness and ability to teachers and educational institutions to use it.

There are several technologies at present that are having an impact on education.

Artificial Intelligence (AI) - This can be defined as the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.

AI is having an impact within several areas of education:

- AI ‘chatbots’ are computer programs that are able to respond to either text based or verbal questions and provide information on request from students. These are now being used in many online courses to answer common questions from students and even to provide speaking practice for students. In some case students have found it difficult to distinguish the answers from the chatbot from those of their professor.

- Online course platforms that deliver learning also track and record large amounts of data about the students who use those services. Analysing data and looking for

patterns and learning points within the data can be very time consuming for people but using AI it can be much faster to sort through the data and learn from it.

Augmented Reality (AR) – This is a technology that enables internet-based images, information, and videos to be viewed in relation to the user's physical location. This is made possible by tracking the location of the user's mobile phone or device. It can also be made possible by using visual triggers that activate digital content.

This technology is being used in several ways in education:

- In some cases, it is being used in physical books to enhance the readers' experience. This can be by pointing their phone camera at an image or icon on the page which then starts a video or animation which users can watch.
- AR can also be used to add information to our physical environment so that we can get more information about it. An example is an app that can be used on the phone while walking through a city that can show us information about places of interest as we pass them, or which can help us interact with other people who have visited that place.
- AR is an exciting educational development because it can take learning out of the classroom and into the real world and make any journey students take outside of their house a learning experience.

Virtual Reality (VR) – This is a computer-based simulation of reality. VR is usually accessed by using a headset that is placed over the eyes. The user can then see a 3-dimensional space and move around and interact with the space. The space can be anything from a simulation of flying an airplane or riding a rollercoaster to a historical monument or even another planet.

This technology is being used in several ways in education:

- VR is already becoming a regular feature within education and is being used in medicine to allow medical students to carry out simulations of operations as well as training military and dealing with some mental and emotional illnesses.

- VR has huge potential for use within education as it can simulate learning experiences, such as visiting another country and allows students to learn through experience and interaction with artificial environments.

These three technologies are likely to have a growing influence and role in education as the devices needed to access them become cheaper and the connectivity that they need to work well becomes more widely available.

2. Operating system and hardware requirements

2.1 Operating systems

Every computer or mobile device needs to have an operating system. The operating system is what enables the user to install software, manage peripheral devices and interact with the device.

Most computer operating systems are either Microsoft Windows, Apple's macOS or Linux. The most popular phone and tablet operating systems are either Android or Apple iOS, though there are other much less popular ones like Microsoft Windows for phone, Blackberry and Samsung's Beda.

It is important to know what operating system is used on a device because not all apps or software can be used on any device and in most cases it's important that you only use software which has been developed for the specific operating system of the device.

2.2 The OS for teaching & learning

It's important to understand the operating system of any computer you or your students will be working with in the classroom. It's particularly important if students are allowed to bring their own devices to school to use during the lesson.

When choosing software of apps to use with your students it's important to know that they will work on whatever operating system the devices you have access to.

It can also be important for transferring files between devices, especially if this is being done using connecting cables. Some mobile devices are incompatible with different computer operating systems unless they have specific software installed to allow them to interact. The same can be true with some peripheral devices such as printers and webcams. You need to check to make sure the peripheral devices you have used are compatible with your computer's operating system. If they aren't you may not be able to use them.

2.3 Installing software

All teachers and students should be capable of installing software. Adding software to any device can extend its capabilities and add additional educational possibilities. Adding software to mobile devices such as phones is usually quite a simple process. Apps are downloaded and installed using a preinstalled piece of software that is part of the operating system. On Apple phones this is called The AppStore and on Android devices it is called The Google Play Store.

Downloading and installing software on computer can be more complex as you need to ensure that you are downloading software that is compatible with your operating system. Commonly if you are downloading software using the web browser the browser will detect which operating system you are using and select the correct version of the software for you.

Most software for the Windows operating system has the file extension .exe whereas most software for Apple computers has the file extension .dmg. Linux systems use a variety of file types but the most common is .Ext4.

It is important to select the correct file type for your operating system as the incorrect file is unlikely to install and function on the computer.

2.4 Open-source software

Open-source software is quite common in education. The term 'open-source' refers to the software code that makes the software function. Most software that is produced my commercial companies has 'closed' code. This means that nobody can access or change the code because it is the property of the company. Open-source software is non-commercial and usually free. The code is open for other developers to change and build on.

The idea behind open-source software is that it enables groups of developer to work together to produce software for free and to build on each other's work. Many powerful applications such as the Moodle LMS have been developed by the open-source community. There are open-source substitutes for many of the most popular commercial types of software. You can find a useful directory of open-source software at: https://opensourcesoftwaredirectory.com/

2.5 Understanding the mobile OS

Mobile phones and tablet devices also have an operating system. The two most common operating systems for mobile phones and tablets are Google's Android operating system and Apple's iOS. Apple's iOS is only used on Apple devices. Google's Android operating system is used on many different makes of mobile phone and tablet and is by far the most widely used mobile OS in the world. The key differences between the mobile OS and one that is installed on a computer are:

Software applications and updates are usually accessed through specific 'stores'. On Apple devices all software is downloaded from the Apple 'App Store'. On devices using Android software is installed through the Google 'Play Store'.

The internal memory of these devices is usually much small than a computer so they often have small 'SD' card disks that can be removed and replaced to extend the storage of the memory.

In the case of Apple devices these don't have the folder and file structure that the computer has. Each app has its own independent storage capacity.

2.6 Understanding file and folder management

Everything you create on a computer is a type of file, whether it's a video, audio, text, or image. Each file must have a unique name and it will also have a file extension at the end of the name. The extension tells you what type of file it is, and it tells the computer what type of

software will open the file. A Microsoft Word document will have the extension .doc or .docx for example. You can see a full list at: https://en.wikipedia.org/wiki/List_of_file_formats

The file name should help you identify the file. All files are stored inside folders. All folders must also have a name. The folders are usually stored on either the hard drive of the computer, a removable storage drive or on an online drive that you can access through your web-browser (this is usually referred to as 'the cloud'.)

Folders help you keep your files organised. You can name and rename folders so that you know what is inside the folder and to help you organise you can put other folders within a folder. If you want a folder for storing your lesson plans, you can have folders within the lesson plan folder that have the different level lessons inside. (See fig 2. Below)

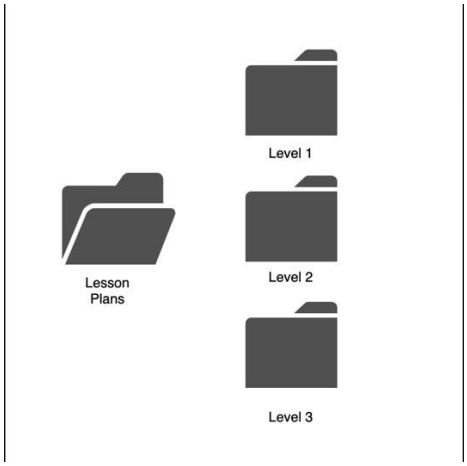

Fig 2. Folder structure

2.7 File naming conventions

A file naming convention is a specific way of naming files so that they can easily be found. Especially if you share files with other people, it is highly recommended that you agree to a file naming convention that you all follow. This will help your files to stay organised.

By default, files organise themselves in alphabetical order inside the folder, though files starting with a number in their name will come first in the list of files.

You should also try to keep file names quite short. Longer file names are harder to read. To make file names shorter use abbreviations for example change Unit 1 Lesson Plan 2 to U1-LP2. Also try to avoid spaces in file names. It is better to use a hyphen between words rather than a space.

2.8 Organising teaching materials

Organising your teaching materials can make them much easier to find when you need them and save you time. Having a logical way of organising them can also make it much easier to share them with other teachers. Many schools have shared folders where teachers who teach the same subject or level can share their materials together. With many teachers using the

same folder it's very important that everyone knows how the materials are organised within the folders and what the file naming conventions are. A good way to organise materials is to start with the subject, then level, then the semester or term, then the class and finally have a folder for each lesson that contains the lesson plan and any materials. It's also wise to keep a master copy of any shared materials. The master copy is useful because sometimes teachers make mistakes and overwrite a document or accidentally delete it. Choose one teacher to be the resource co-ordinator and they can keep a separate back up copy of all the shared materials so any lost or damaged files can be replaced.

2.9 Searching for and finding files

Finding files can take a lot of time if you don't have an organised folder structure and file naming convention. If you can't find the files you need, then using the computer's search tool can save you a lot of time. When you use the search tool to look for the files you can search in a number of ways. You can type in the file name if you know it, you can type in the titles, you can search for files that were published between specific dates, or you can search for file types (.docx, .pdf, etc).

When you search for a file, the computer will show you any files that match your search terms. The more specific you are with your search term the smaller the number of files it will show you. You can then browse the files to find the open you are looking for.

2.10 Introducing peripheral devices

A peripheral device is any device that can be connected to a computer to extend the things it can do. Some of the most used peripheral devices are:

- Keyboard
- Mouse
- Computer screen
- Printer
- Webcam
- Microphone
- Digital camera
- Projector
- Speakers
- Disk drive
- Scanner

2.11Accessing and using peripheral devices for learning

Peripheral devices are usually connected to a computer either using a cable or a 'Bluetooth' connection. Bluetooth connected devices don't use wires and can be very convenient because

your computer can be further away from the peripheral device. Most peripheral devices that connect by Bluetooth can also be shared and used by more than one computer.

Peripheral devices can be very useful for teaching and learning. Among the most useful are:

- Printer – A printer can enable you to produce high quality customised materials for your students to use in the classroom.
- Projector – With a projector you can show your students, websites, presentations, images, and videos in the classroom. If your computer has an internet connection, it can help you bring the world in your classroom.
- Microphone – With a microphone attached to your computer you can use it as a recording studio to record your students work or create audio visual materials for them.
- Speakers – With speakers you can play audio materials and music for your students and enable them to listen to as well as watch film and video.
- Webcam – A webcam can help you and your students to communicate with anyone anywhere in the world. This can enable you to bring guests into the classroom for your students to interview or to connect your class with other classes and other students around the world.

Although it isn't usually described as a peripheral device you can also connect a mobile smart phone to your computer and use the computer to store and share images and videos that you or your students collect.

3. The word processor 1

3.1 Word-processing

Word processing is one of the most frequently used and useful digital skills. Very few documents in education or in the workplace are handwritten in the modern world and so it can be considered one of the essential digital literacies for students and teachers.

There are a number of popular word processing software applications. For a long time MS Word has been the single most used word-processing application around the world, but in recent years Google Docs has become much more popular for a number of reasons:

- It's free
- It's very easy to use
- It works in the browser and stores documents online
- Documents created with Google Docs can be shared and edited by a number of people working on different computers at the same time.

Although Google Docs and MSWord are produced by different companies the arrangement of the interface and the icons and menus used on each are very similar so anyone who can learn to use one of these applications can easily learn the other.

3.2 Understanding menus

MSWord like most word-processing applications has several different menus that can be found in different places on the interface. Menus are ways of accessing the wide range of tools, functions, and actions that you can use to change and add elements to your document.

Menus work both horizontally and vertically. At the top of the interface MSWord has a horizontal menu bar.

Fig 3. Horizontal menu

When you click on the items on the menu bar a vertical menu bar opens with a range of functions.

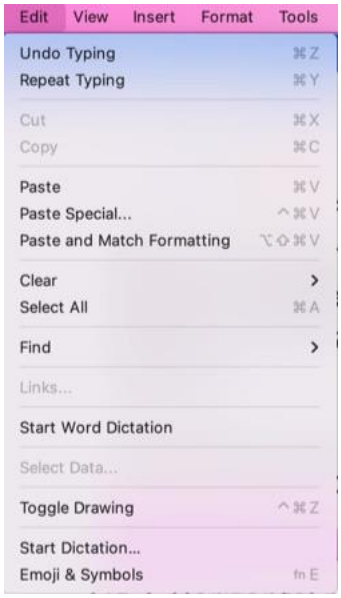

Fig 4. Vertical menu

In some cases, these vertical menus will also have sub-menus. You can find these by clicking on the arrow at the end of each item. You can see that both ‘Clear’ and ‘Find’ in the menu above have sub-menus.

Word also has graphic menus. You can explore these my clicking on the horizontal menu bar and you will see a group of tools that are connected to the top menu function, for example clicking on ‘Design’ will show you a menu of design tools. These make the more frequently used tools easy to access.

Fig 5. Graphic menu of design tools

Finally, there are context specific menus. These menus can be accessed by right-clicking on an element on the screen. This will show you a menu that has tools that are important for the thing you clicked on, for example clicking on an image in a word document will show you a menu of tools for editing the image.

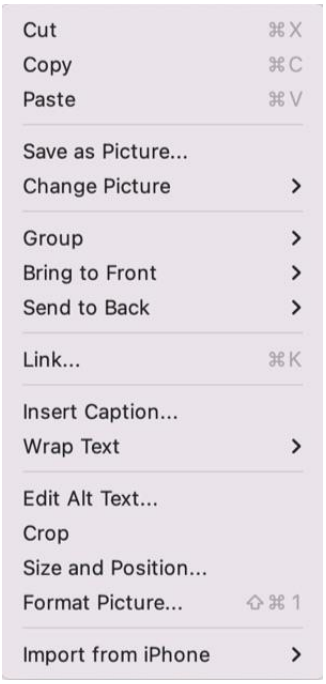

Fig 6. Right click context menu

The best way to learn more about these menus and what the various tools do, is to explore and play with them. Click on them to see what happens and how they change the text or appearance of the document. You can learn a lot by simply playing with the menus and discovering what they do.

3.3 Understanding icons

Software interfaces use many icons. The icons make it simpler and faster to understand the menus and tools available. Many of the icons used in the Word interface are also common to ones in both PowerPoint and Excel and similar to those used by other software companies. As you understand more of the icons and remember what they do you'll soon find it easier to learn other software applications because you'll see these same icons and be able to transfer your knowledge from one application to another.

Here are some examples of useful icons to remember.

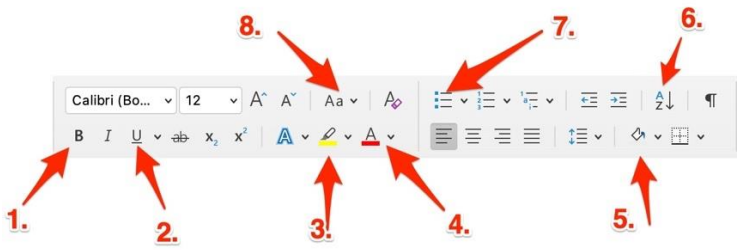

Fig 7. Toolbar icons

1. Make text **bold**
2. Underline text

3. Highlight text using a colour
4. Change the colour of the text
5. Add a background colour to a text box
6. Sort a list of items into alphabetical order
7. Add bullet points to lists
8. Change the 'case' of words from UPPERCASE to lowercase.

3.4 Formatting text

Formatting text is changing the appearance of the text. There are many things you can do to change the appearance of text. You can:

- Change the font style
- Change the size
- Change the colour
- Change the case
- Make the text bold
- Change where the text appears on the page so that it is centred or to the left or right of the page.
- Make the text into lists that are either numbered, lettered or have bullet points.

The important thing to remember is that any formatting changes you make should be done to make the text easier to read and understand. This is especially important for documents than students read on the screen. Reading on the screen can be more tiring and more demanding than reading from paper, but good formatting can make the text much easier for the students.

You can find more information about formatting your text to make it more accessible here: https://at3centerblog.com/2019/08/23/formatting-for-accessibility/

3.5 Why teach word-processing

There are many reasons for teaching students word-processing skills. Among the most important of these is that it is a very useful life and workplace skill. Most modern employers will expect their employees to be able to have word-processing skills to create a wide range of documents for the workplace, such as reports, memos, letters and emails and brochures.

Word-processing skills are also useful for our students' day-to-day lives. It's likely that they will at some point need to write letters of applications for jobs, create a CV or resume, or even create a to-do list.

Having word-processing skills can also help with students' more creative hobbies if they are interested in creative writing or they could simply use word-processing to store their thoughts, recipes, or future plans.

Word-processing is the modern day writing and can open a world of opportunity for students.

3.6 Printing a document

Although word-processing creates digital documents it is sometimes necessary to print these documents. To be able to print a document you need the following things:

- A printer that is connected to the computer you are using.
- The necessary software and drivers to enable the computer to communicate with the printer.

Modern printers are compatible with most computers, but you should check before connecting one if it is the first time the printer has been used with the computer.

It may be necessary to install 'drivers' for your computer to be able to communicate with the printer. To install the drivers you may need to connect to the internet and download these. Usually this is a simple and quick process that only needs doing once (the first time you use the printer with the computer).

Your printer may well also include some software which will help you during the printing process. This could include an application that allows you to choose either colour black and white printing as well as software to tell you whether there is sufficient ink in the printer and help you fit the documents to the size of the printed page.

Printing ink for printers is expensive and this isn't a cheap way of producing materials, so think carefully before printing a document. It may be possible to share the document digitally with your students. You should also print one copy as a master copy and then photocopy multiple copies for students as this will be more economical.

3.7 Adding headers and footers

Adding headers and footers to documents has several benefits. The main benefits are that they can make the documents look more professional and they can make them easier to trace and navigate.

Headers (the parts at the top of the page) usually include titles and branding. This could include the name and log of your school, the author of the document as well as the title of the course.

Footers (the parts at the bottom of the page) are useful for including page numbers and number of pages, e.g., Page 1 of 5 as well as other important information like the file name of the document. Including file names can be very helpful for teachers who have a printed copy of the document and want to trace the digital master copy. You can also include contact details of the author in the footer in case another teacher needs to know who created the original document.

You can find and edit the header and footer by going to the 'Insert' menu.

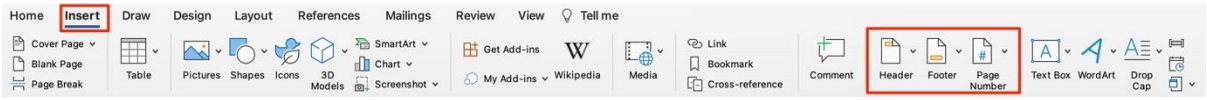

Fig 8. Header and Footer tools can be accessed through the Insert menu

3.8 Bullets to numbered lists

Adding numbered section and bullet points to lists in documents can make them much easier to read and to navigate.

Tools for formatting lists and document sections are usually found under the ‘Home’ menu.

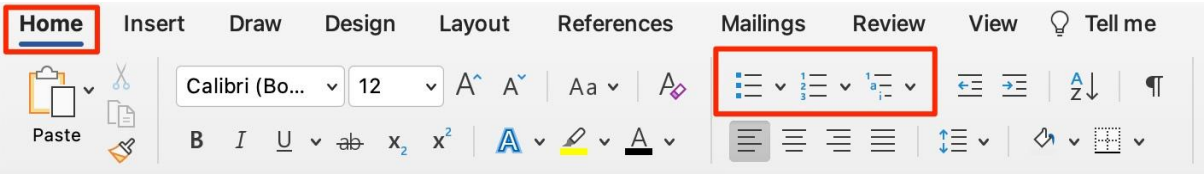

Fig 9. Tools for formatting lists

When creating longer documents such as reports, dissertations or journal articles that have multiple sections it is useful to use numbers for the titles of the sections and sub sections. This is a common formation:

1. Heading
    1.1 Subheading
    1.2 Subheading
    1.3 Subheading

2. Heading
    2.1 Subheading
    2.2 Subheading
    2.3 Subheading
3. Heading

This numbering system makes the longer document easier for the student to navigate as they can always see where they are in the document and how the sections relate to each other.

Bullet points are more commonly used within paragraphs to make short lists easier to read.

3.9 Finding and adding an image

There are several ways to find and add images to a document. The menus for these can be found under the ‘Insert’ menu on the sub-menu of ‘Pictures’.

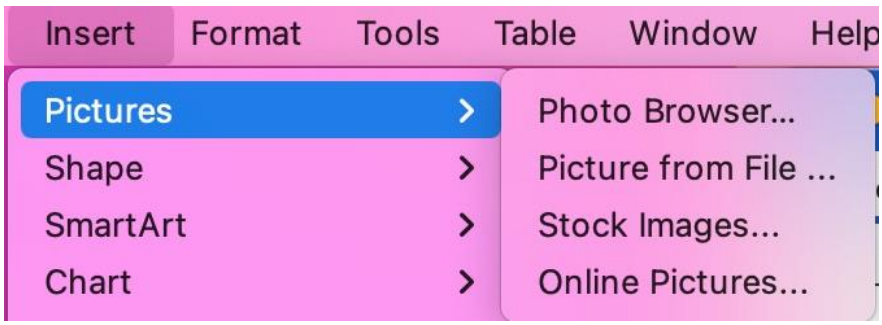

Fig 10. Insert pictures menu

In the example above you can see four options.

Photo Browser – This will enable you to access the images that are in your image editing and organising software on your computer.

Picture from File – This will enable you to access the images that are on your computer hard-drive in a folder.

Stock Images – This will enable you to access images that are part of the Word image bank.

Online Pictures – This will enable you to access images that have been put online under the 'Creative Commons' license. This license allows for the legal use of the images in projects that are not for commercial use.

These various methods offer you access to a huge number of images for your documents and can help to make them more attractive, but images also increase the file size of your documents. Increased file size means that the documents take up more space on your hard drive and are slower to share on the internet.

The other disadvantages of adding images to documents is that it can make them much more expensive to print, especially if you are using a colour printer.

3.10 Finding and adding charts and graphics

A wide variety of charts and graphs can be added to documents. The menu for these can be found under insert.

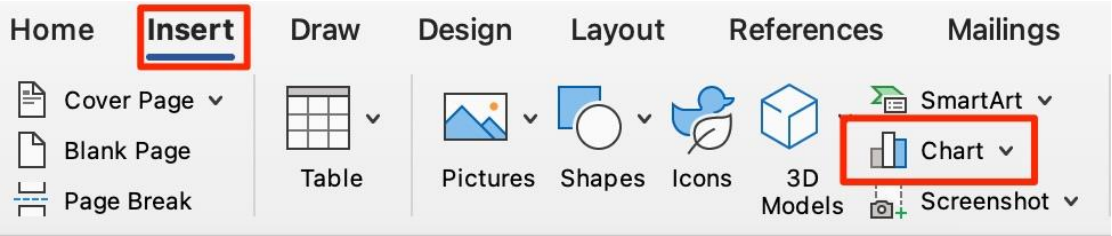

Fig 11. Charts and graphs can be added from the 'Insert' menu

When you click on the Chart icon you will see a sub menu with several different graph types.

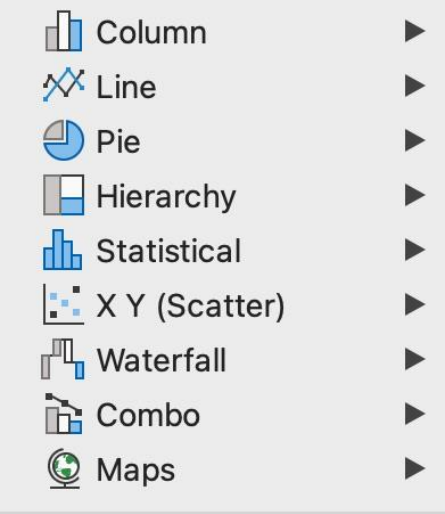

Fig 12. Shows several graph and chart types

Graphs and charts can be used to show statistical data and information. These are particularly useful for showing quantitative research results and for creating worksheets for students that involve understanding information and data.

Each chart type has several different forms and designs so you should be careful to choose one that suits the data you want to show and helps to make it clearer and easier to understand.

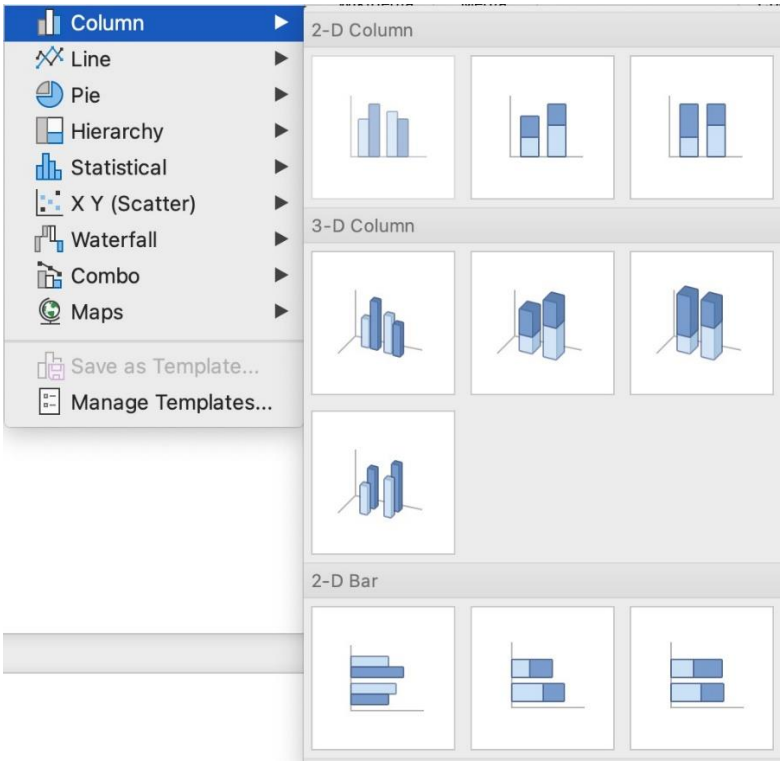

Fig 13. Shows several different chart styles

Once you have selected your chart type you should be able to input the data you want to display. Although the charts will display as a designed graphic the information is edited in the Excel spreadsheet software, so you'll need to have this installed.

3.11 Learning more about MSWord

MSWord is a powerful and multifunctional tool that can be extremely useful, but it can also be complex to fully understand. Getting help to understand the software though is quite easy. Word has an assistant built into the application. This is called ‘Tell me’ and you can access this from the top menu and type in a keyword related to what you want to know.

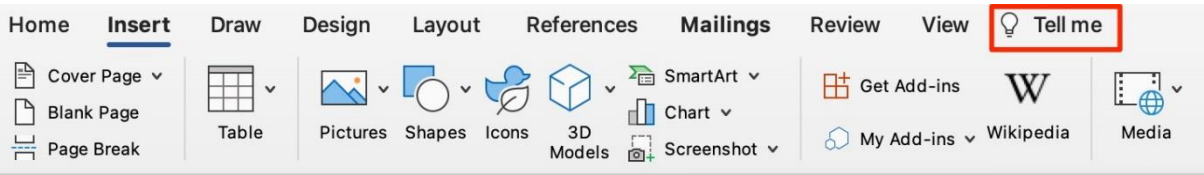

Fig 14. Click on ‘Tell me’ and type in key words for help

For more complex task it is better to go to YouTube where you can find video tutorials that will help you step by step. When you search for ‘How to…’ videos, be sure to check the date and make sure they are recent. The Word interface is constantly updated and so how you do things can change from year to year as new functionality is added.

3.12 Changing languages

There are several ways that Word can help with different languages. The most useful one for students is in the spelling and grammar checker. To change the language of the spell check and grammar check go to ‘Tools’ on the menu bar and ‘Language’ on the vertical menu.

This will allow you to select the language your document checking uses.

Fig 15. Selecting languages

Other useful language related tools are ‘Translate’. This is found under the ‘Tools’ menu and will enable you to translate a part of the whole of the document.

Fig 16. Translate a part of the whole document

This kind of machine translation is still far from perfect, but it can be a helpful tool to use when students trying to understand a foreign language text that is above their level.

3.13 Adding a hyperlink to a document

Hyperlinks can add an additional dimension to documents and particularly to worksheets for students. Hyperlinks enable you to create links to references and online resources and materials. Linking to online materials can help to make your worksheets more engaging and authentic for students, add to the range of content you can use (video, audio, web. 2.0 tools, social networks, images, podcasts, etc.) and add to the kinds of tasks you can give students to do.

If you are using hyperlinks these will only work on the digital version of a worksheet. For paper-based versions you will need to show the entire.

A simple way to add a hyperlink is to copy a URL from the address bar of your web-browser and then paste it into your Word document and add a space. This will automatically create a hyperlink to the website and students just need to click on the link to open it in the web browser.

Here is an example: https://www.britishcouncil.org/

A more professional way of doing the same thing is to type some text instructions and add a link to a word in your document.

Here is an example: The British Council Website

To make this kind of link, type the text first, then select the words you want to link and go to ‘Link’ on the ‘Insert’ menu. This will open a new window. The link words you select are in the field at the top and you should add the hyperlink/URL to the second field.

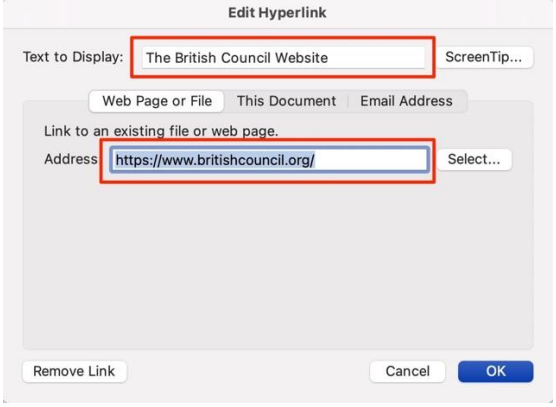

Fig 17. Adding hyperlinks

You can also add a hyperlink to an image or icon in your document. To do this, select the image and follow the same process as with the text. The students can click on the image to open the link.

Here is an example: 🔗

3.14 The benefits of links

Hyperlinks can add much more variety to your worksheets and can enable you to create a simple form of blended learning. This enables you to create digital worksheets that students can use at home to either prepare for the lesson or do follow up research on the theme of the lesson.

This technique is commonly used in 'Flipped Learning'. This is a type of learning that encourages students to prepare and learn about some of the main content of the lesson before they come to class. Then in the classroom there is more time for practical activities to deepen their knowledge and skills.

These types of learning often involve using video to help students prepare for the lesson, but there are many other forms of web-based content we can link to. Here are a few examples of links to content where you can find out more about blended learning.

- What is blended learning? https://youtu.be/-bwhR1ZKGRE
- Blended learning in higher educations: https://teachinginhighered.com/podcast-category/blended-learning/

3.15 Designing worksheets

When you design a worksheet for your students there are a few things you should consider.

- Think about the design of your worksheet and how you can make it clear but attractive.

- Try to use no more than two different fonts. You should have one font for titles and a different one for text.
- Make sure you include a rubric/instruction so that students know what to do with the worksheet.
- Try to keep rubric/instructions short.
- Number the activities on your worksheet if there are more than one.
- Make a master copy of your worksheet that you keep in an independent folder.

Is the worksheet going to be printed or used digitally on a computer or device?

If the worksheet is going to be printed:

- make sure any links to online materials show the complete URL of the materials.
- try to fit the entire worksheet on one page. This will save printing costs and paper.
- leave space for students to make notes and write answers.

If the worksheet is going to be used on a digital device:

- you can include colour images and icons.
- you can include a small space for students to type and this will expand as they type.
- You can include hyperlinks

Remember to give your worksheet a clear file name so that you can find it again the next time you need to use it and so that you can share it with other teachers.

4. Spreadsheets

4.1 Creating a spreadsheet

There are a number of software applications for creating spreadsheets. The most popular of these is Microsoft's Excel. Other popular ones include Google Sheets which is an online application that enables you to create and store spreadsheets using your web-browser, Apple's Numbers, which is only for use on Apple computers and devices and Apache by Open Office which is a free open source application that can be used by anyone.

Spreadsheets are most used when you need to record different groups of data and organise and reorganise the data. Spreadsheets are most commonly used for financial data such as accounts, budgets and pricing and cost information. They do have a range of other uses for teachers such as tracking records, such as attendance and test scores, parents' names and email addresses, and records of work submitted.

Spreadsheets are also very powerful tools for making calculations and creating graphs of information. You can use them with your students to collect information from research and create graphs to show relationship between the different types of information.

4.2 Ordering data

There are several ways that spreadsheets can help you to order and sort data once it has been added to columns in your spreadsheet. The most common of these is by ordering data either alphabetically or numerically.

Data in spreadsheets can only be ordered within a column and this is usually done by clicking on the column that contains the information and then clicking on the data menu.

When data in a column is reordered all the data that is in the vertical rows will also be reordered at the same time. This is important to remember, so when you are entering data into a spreadsheet you should make sure that related data is put into a row. An example of this would be putting students' names in column A and test scores in column B.

When you change the order of the names of the students their test scores will also be moved and stay in the same row. When you order the test scores numerically in column B then the names of the students will also be moved so that they stay next to their score.

4.3 Adding fast sequences

When creating spreadsheets with sequences of numbers or letters you can easily speed up this process by starting the sequence and selecting the cells containing the sequence. Once you have done this you drag the square at the corner of the sequence down or across the spread sheet and the sequence will automatically continue until you release the cursor.

This is a useful timesaving tip that works with numbers, letters, dates and even months and days of the week.

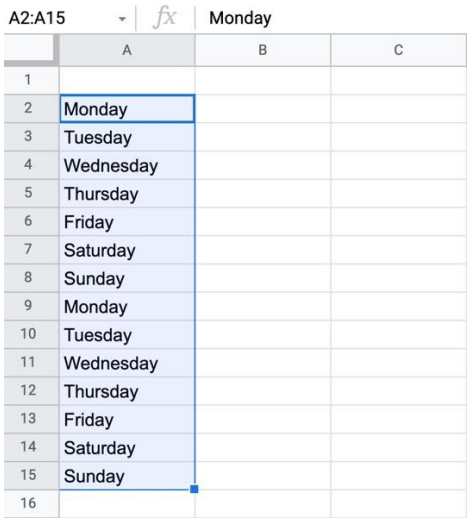

Fig 18. Sequencing days

4.4 Row, column, and cell referencing

Each cell within a spreadsheet has a unique reference. This is a combination of a number and a letter. The number always refers to the vertical position of the cell and the letter refers to its horizontal position. These numbers and letters correspond to the numbers down the side of the spreadsheet and the letters along the top of the columns.

By clicking on a cell, you can identify its unique reference as it will appear in the top left corner of the spreadsheet.

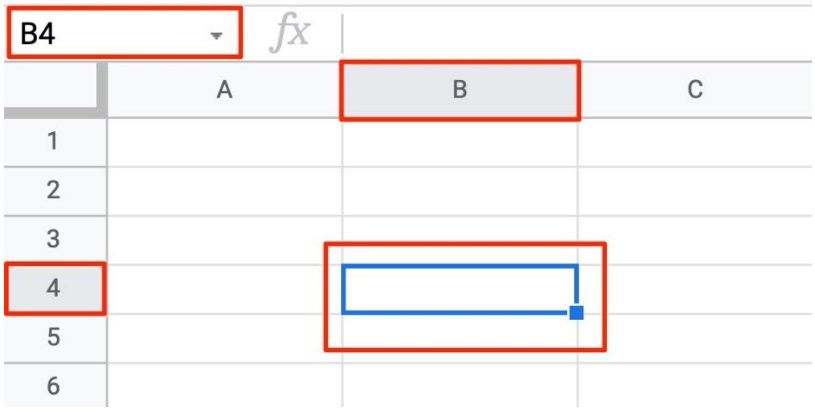

Fig 19. Cell referencing

Knowing the reference of a particular cell can be important when you want to add functions or enable the spreadsheet to do calculations for you.

4.5 Cell formatting and colouring

Colouring and formatting cells can make the spreadsheet much easier and more attractive to read. To add colour to a cell or cells, select them and then click on the paint pot icon and

select the colour you want. This will change the colour of the background of the cell. Any text or data within the cell will remain the same colour.

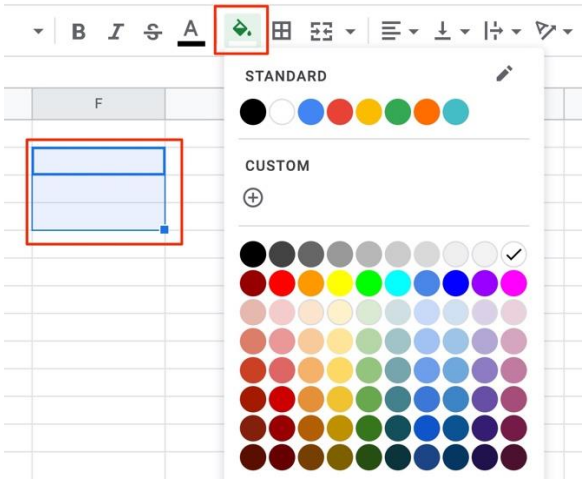

Fig 20. Cell colour tool

4.6 Using spreadsheet functions

Functions can be very useful and can help save time by doing a range of calculations. Functions can be very complex and are capable of huge range of different types of complex and long calculations. There are however several very useful and easy to use functions.

These functions can be accessed by clicking on the ‘functions’ icon on the toolbar

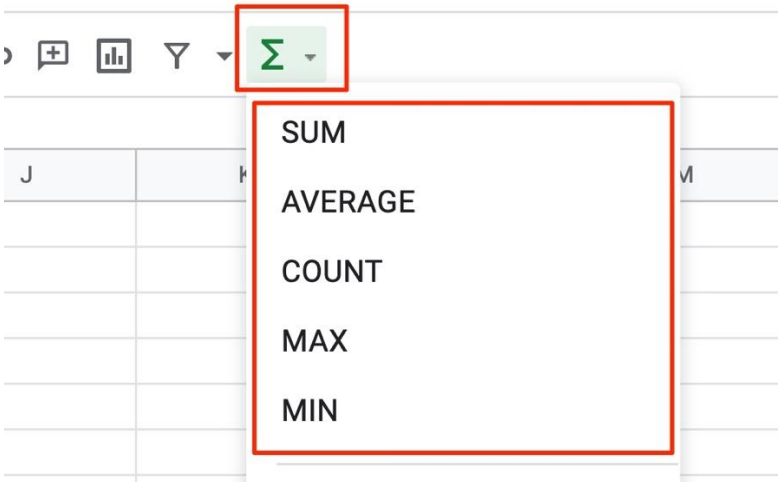

Fig 21. Functions menu

Functions are used by selecting a column. The function can then be applied to all the information in the column, so using the common functions shown in the image above you can:

SUM – Add all the numbers in the column together to find the total.

AVERAGE – Find the average of all the number in the column.

COUNT – Find out how many numbers are there in the column.

MAX – Find the highest number in the column.

MIN – Find the lowest number in the column.

These functions can be very useful when exploring student test results, or calculating attendance information, especially when you have many students.

4.7 Using spreadsheet templates

Most spreadsheet programs such as Excel, Google Sheets and Apple Numbers, have a selection of templates available that cover some of the most common uses for spreadsheets. Users can also create and save their own templates.

Templates can be a great way of saving time. Finding a template that has been designed to do the task you need can save you having to create it yourself. Searching online can help you find a wide range of additional spreadsheet templates. There are a lot of spreadsheets designed by other teachers for various subjects and topics, so before creating your own be sure to search online. You may also find some new ideas for how to use spreadsheets with you students.

4.8 Creating a spreadsheet activity

When you create a spreadsheet activity for your students you need to be aware of several things.

Think about whether you want the students to work alone or collaboratively. If the students need to work collaboratively it will be better to use Google Sheets, though they will need an internet connection to do this.

Make a master copy of your spreadsheet activity and use a copy to give to students. This will ensure they don’t write over your activity, and you’ll be able to use it again.

Make sure you include the instruction on the activity, so students are aware of what they need to do.

Try your activity with a colleague before you give it to the students to do. Your colleague may be able to give you some useful feedback and tell you where the activity is unclear.

Think about what students are learning about from doing the activity. Ideally, they should improve both their knowledge of using spreadsheets as well as their topic knowledge.

4.9 Teacher tools from spreadsheets

Spreadsheets may seem like quite simple tools for exploring data, but online spreadsheets can also act as a database to support powerful web applications. There are many useful tools for

teachers that have been built on spreadsheets and teachers can adapt and build their own tools based on some of these.
You can see a wide range of teacher tools at the site below:

- Flippity: https://flippity.net/

As well as building tools for teachers, can also be used to build websites and mobile apps.
These are useful skills for students to learn and can make good educational projects for students.

- Webflow: https://webflow.com is a useful free tool for creating websites as part of projects.
- Glide: https://www.glideapps.com/ is a free tool that can be used to create apps for the mobile phone based on simple spreadsheets.

5. Presentations

5.1 Best practices for creating presentations

Presentation software such as MS PowerPoint, Apple's Keynote and Google Slides are among the most used by teachers. Presentations are a useful tool for creating teaching materials that can be projected onto a screen for the whole class to see. Presentations can be dynamic with transitions and animations; they can be colourful, and they can be very visual. They can also be very boring when produced badly. The term 'death by PowerPoint' is often used to describe very long and uncreative presentations with large numbers of slides containing text.

To avoid 'death by PowerPoint' it is wise for teachers to understand a few basic principles of best practice in designing engaging presentations that are easy for students to follow.

- Use powerful images – Images can communicate a lot of information and can help students remember so try to use images instead of text. It's also easy for students to look at an image while they listen. Reading text and listening is much more difficult.
- Avoid reading from slides – If you need to add text to slides then avoid reading it. Give the students time to read and then comments on the text.
- Bullet points – Rather than using lots of text use bullet points of the key ideas and then when you talk add more details.
- Make sure text is big enough to read – The students need to be able to see the text clearly from the back of the room, so make sure your text is big enough.
- Use contrasting colours – Make sure your text colour isn't similar to your background colour. Contrasting colours make the text easier to read.
- Use only two fonts – Don't be tempted to use lots of different fonts. You should have one font for titles and a second font for the text.
- Graphs for data – If you need to talk about a lot of data then try to use a graph rather than having lots of numbers in text or bullet points.

Remember the purpose of your presentation slides is to help people understand your talk.

5.2 Understanding the interface

The interface presentation software is designed in a similar way to other software applications. The toolbars and menus are on the top and on the left side you can see the slides from the presentation.

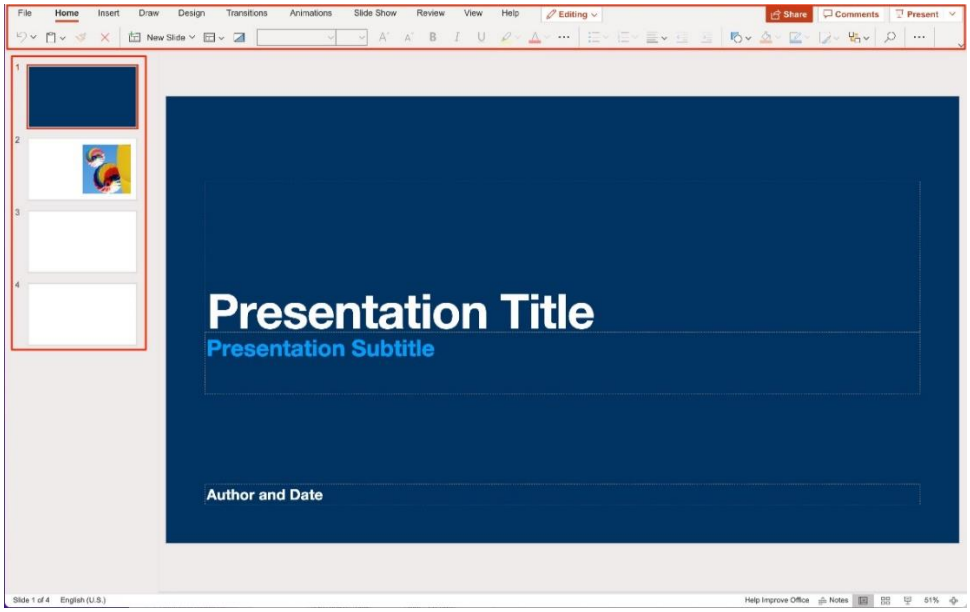

Fig 22. PowerPoint interface

Clicking on the menus along the top opens new tool bars.

Fig 23. Draw menu

To edit the text on the slides you can click on the text field.

When you are ready to view your presentation, you can click on the 'Slide Show' and this will give you several options for viewing the presentation.

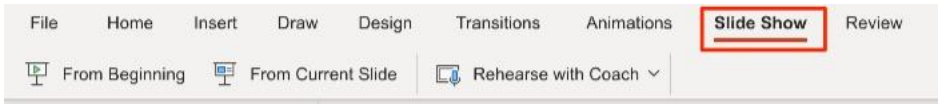

Fig 24. Slide Show menu

5.3 Planning a presentation

- When planning a presentation start by making notes about what you want the students to know by the end of the presentation. These are your learning points.
- Next, think about the order that you want students to learn these points and what is the best way to teach the information. Think about whether an image, a graph or some bullet points would work best.
- Think about how to introduce your presentation in a way that will get your students' attention.
- Think about a conclusion that will include an action point for the students. An action point is something they should do or think about in response to the presentation.
- Now plan what you will say for each of stage of the presentation.

- Once you have your overall structure (introduction – main learning points – conclusion) and you know what you will say you can start to plan the slides for your presentation.
- Make the structure of the presentation and think about what images you could include on each slide to help students understand your message.
- Make sure you have a title for each slide.
- Think about how you can break your main points down into short bullet points.
- Choose fonts and a colour scheme for your presentation.

5.4 Creating a presentation

When you create a new presentation, you are usually offered a number of templates to choose from. Starting from a template is recommended. Templates have been designed around best practice, so they will have fonts at an appropriate size and the colour contrast should be correct.

The template offers you a number of different slide designs to add your content to. To add a new slide to the presentation, click on the 'New Slide' icon on the 'Home' menu.

Fig 25. New Slide menu

To change the design of the slide, click on the small arrow next to the icon. You will then see a range of different slide designs that you can choose.

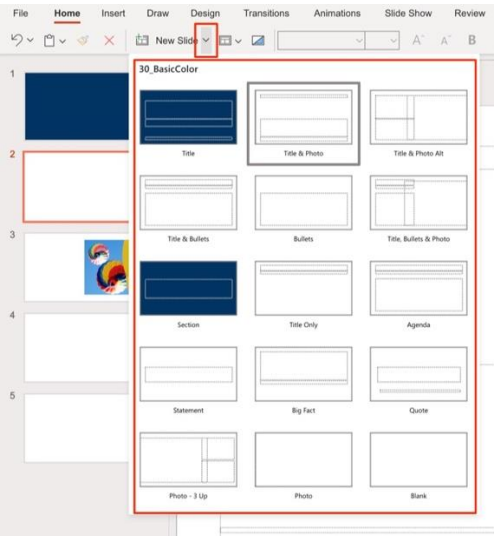

Fig 26. Slide design menu

5.5 Adding images, charts, and hyperlinks

You can add a wide range of media to your presentations as well as hyperlinks to internet-based resources.

To add an image to your presentation go to the ‘Insert’ menu and click on pictures. You can then locate the picture either on your device or you can find one on the internet.

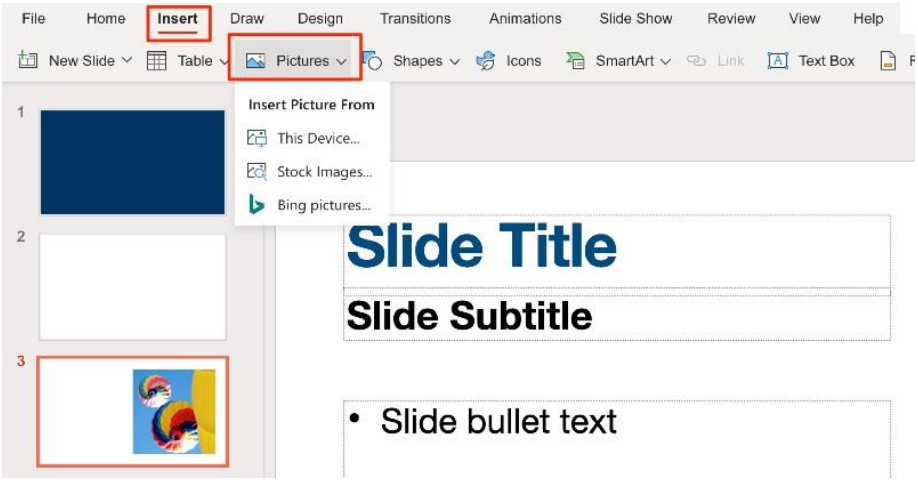

Fig 27. Adding pictures

To add charts and graphs to your presentation, click on the ‘SmartArt’ icon. This will show you a range of different chart and graph types.

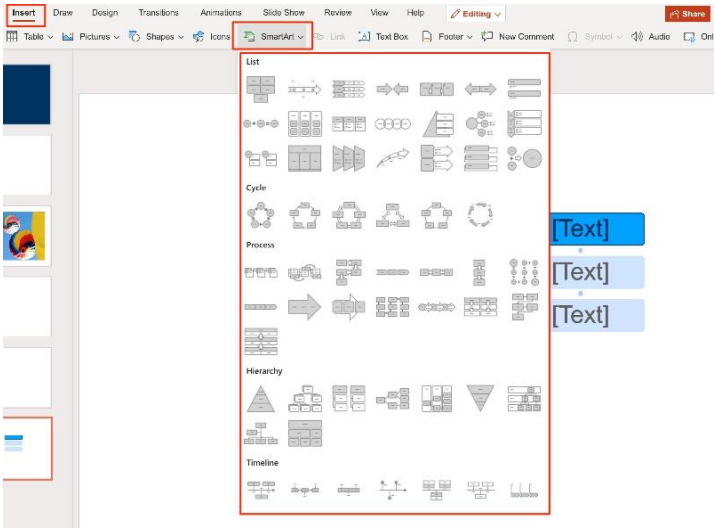

Fig 28. Adding graphs

Click on the one you want to add. You can then edit the data that appears on the chart.

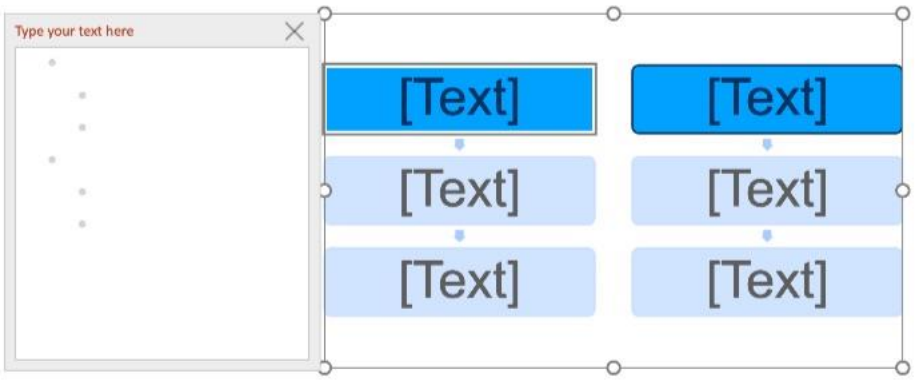

Fig 29. Configuring graphs

To add a hyperlink to your presentation you need to select a word or phrase within the text. Then click on the 'Link' icon. Add the web address of the page you want to link to. Then click on 'Insert'. When you show the presentation, you click on the text to go directly to the page.

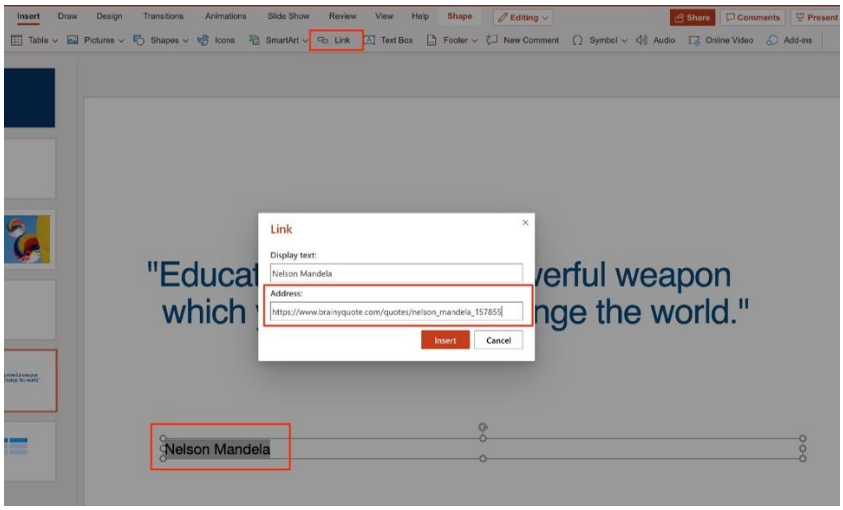

Fig 30. Adding hyperlinks

Adding links, images and charts to presentations can make them more engaging and can make the information easier to understand.

5.6 Adding animations and transitions

Adding animations and transitions to slides can make your presentation seem more dynamic. You should use these carefully though. Too much movement on the screen can be confusing for your audience.

Animations and transitions are similar but there are differences.

- Transition are movements from one slide to the next.
- Animations are movements within the slide.

Animations can be used with objects on the screen such as text or with images. Animations allow you to control how the text appears on the slide and how it disappears. Animations are activated by clicking on the screen. The most common use of animations is to control bullet points. Animating a list of bullet points can make each one appears as you speak rather than having the complete list visible. This can help your audience follow your talk.

To add animations to your slides first select the object on the screen that you want to animate. Click on the 'Animations' menu and then select the animation you want to add.

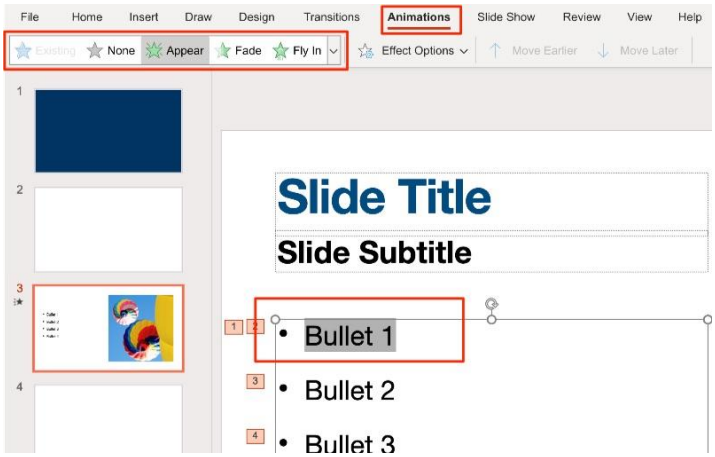

Fig 31. Animating slide objects

To add transitions to slides, select the slide you want to add the transition and then select the 'Transitions' menu. You can then select the type of transition you want and choose the speed of the transition.

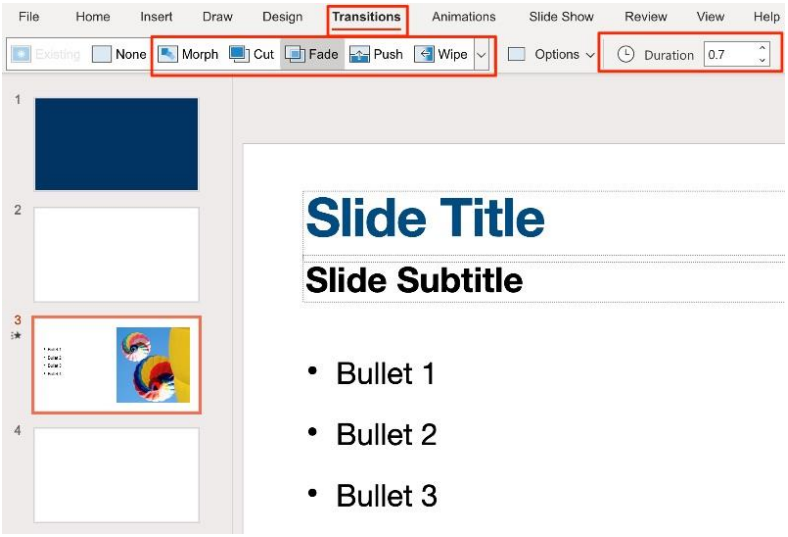

Fig 32. Adding transitions to slides

If you decide to add transitions to your slides use the same transition with each slide. Using lots of different transitions can become confusing for your audience.

5.7 Criteria for evaluating web resources

The internet is a rich source of authentic content that can be used for learning. We must be careful though to select material that is both suitable for our students and for our learning goals.

When deciding if the material is suitable for our students we should consider:

Level – Is the language and content level appropriate for our students? If it's too easy or too difficult it can be demotivating for students.

Accessibility – Will all of the students be able to access the material? If the materials require fast internet connection, a specific type of phone or app that students need to download then some students without the correct equipment may be unable to access the material.

Appropriacy – Is the material age and culture appropriate? A lot of web-based materials include advertising that could be offensive to students and disturbing for younger students.

Motivation – Will students find it interesting? Web-based materials are only motivating for students if they find it interesting. For the materials to be interesting they need to see a connection between the content and their own lives.

Credibility – Is the source of the content credible and reliable? Web-based content can now be created by almost anyone and can look just as good as professionally produced materials. We need to check to see who created the materials to make sure they are honest and credible.

Safety – Is the content safe? We need to make sure that content we use with students isn't a threat to their safety. We need to check that it is delivered through a secure server (the address starts with 'https' and not 'http') and that the site isn't attempting to capture personal information from the students.

After we decide that the content is suitable for our students, we need to think about whether the content can help us achieve our learning goals. Here are some things we should consider:

Task design – Can you design tasks that are suitable for us to guide students through the materials?

Time – How much time will it require? We need to decide whether the materials can be exploited within a suitable amount of time.

Syllabus fit – Does the material fit within the syllabus you are teaching? We should avoid using materials only. The materials we use need to fit within our overall syllabus.

5.8 Evaluating web-based teaching resources

In some ways evaluating web-based teaching resources is easier than evaluating authentic web-based content. When we look at web-based teaching resources they have already been evaluated and designed by a teacher or instructional designer. It is still possible that the resources aren't suitable for our students, so we still need to consider some of the same issues around suitability, but things like time and task design will already be done.
We do still need to think about syllabus fit though and make sure we aren't using the materials just because they are available.

Other things to check before using web-based teaching materials are:

- Currency – Are the materials up to date? Some materials may have been made a long time ago and some of the content may no longer be true.
- Maintenance – Has the materials been maintained? When web-based teaching materials include links to other sources or materials such as websites or videos we need to check that the links are still live and the materials still exist.
- Task design – Have the tasks been well designed? It is best to try to do the tasks in the materials yourself before giving them to students. This will help you to understand the design of the materials and whether they have been well designed. You should make sure that all the tasks will be possible for your students.
- Answer keys – Check that the answer keys are correct. Publishing materials online can be very fast, but the checks placed on digital materials are often less thorough than those made on paper-based materials. Make sure you go check the answer key before you use the materials and that all answers are correct.

6. Email & internet

6.1 Top search tips

Many students and teachers believe that searching for information online is simple. They go to a search engine like Google and type in what they want to search for. They will then see the first page of many pages of results. Most people only look at the first page which is usually a combination of paid advertising links and the most popular pages. Searching in this way doesn't necessarily get us the best results. It is much better to understand some basic search tips to ensure we get better results. Here are some of the most useful information.

1. Use the tabs – When you see your search results you should also see a range of 'tabs' that have different types of media. Clicking on the tabs can help you see a wider range of results.

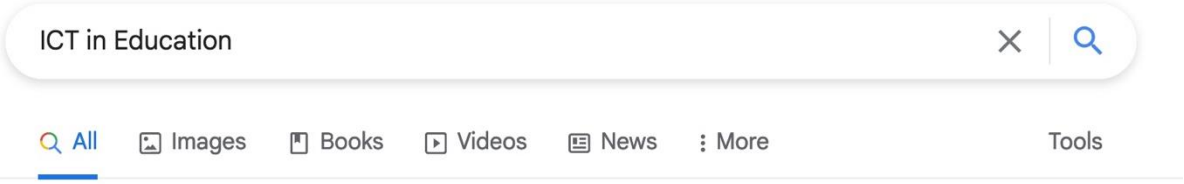

Fig 33. Search tabs

2. Use quotes – If you put quotes around groups of words the results will only include pages with the complete phrase.

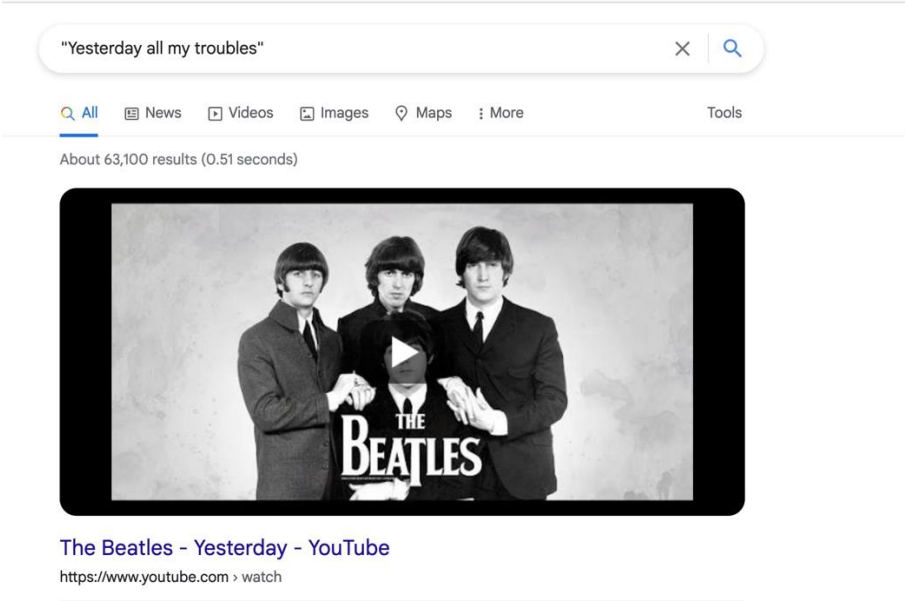

Fig 34. Searching for phrases

3. Use a hyphen to exclude words- You can use hyphens to exclude words, so if you are looking for information about a type of insect called a beetle, you can type beetle-car and this will exclude results about the type of car called a beetle.
4. Use a colon to search specific sites – You can search for information on a specific site by using your search topic followed by a colon and then the address of the site. So, to look for scholarship information on the British Council website you would type – scholarships site:britishcouncil.org
5. Find sites that are similar to other sites – You may want to search for a site that is similar to one you already know. To do this you type related followed by a colon and then the address of the site you already know. So to find a site similar to the British Council site you type related:britishcouncil.org.

6.2 Internet treasure hunts and other search activities

In the early days of the internet before websites became interactive and before the development of web-based tools for user content creation, treasure hunts were a very popular among educators. Teachers used internet treasure hunts as tools to encourage students to develop search skills and to help them find interesting online content.

The internet treasure hunt is still a very useful activity type to use with students, especially when we want them to develop an understanding of how to collect information from a range of different sources.

Treasure hunts can be developed by selecting a specific group of web pages you want your students to explore and giving them links to those sites. This is better for younger learners when you want to restrict the range of content they may encounter.

With more mature learners you can give the students specific information you want them to find out and allow them to find and record their own sources of information. This is better for developing 'real world' digital literacies, but your students need the skills to understand search results and choose the websites they visit carefully.

Another popular type of web-based activity that developed in the late 1990s was the 'Web Quest'. This is a more structured form of internet treasure hunt that encourages students to work with the information they find and complete longer assignments.

Web Quests commonly have a four-part structure:

- Introduction – This stage is normally used to introduce the overall theme of the WebQuest. It involves giving background information on the topic.
- Task – This stage of the WebQuest explains clearly and precisely what the learners will have to do as they work their way through the WebQuest.
- Process – This stage of a WebQuest guides the learners through a set of activities and research tasks, using a set of predefined resources.
- Evaluation – This stage can involve learners in self-evaluation, comparing and contrasting what they have produced with other learners and giving feedback on what they feel they learned.

6.3 Creating an email account

Email has been in use for more than 50 years now and many younger students and teachers tend to use faster platforms with shorter messages such as text messaging, voice and video messages. It is a mistake to disregard email though it is still very important for study, work and day-to-day purposes when longer and more formal communication is necessary. It is a far more reliable and traceable form of communication than text messages, which can easily get lost or overlooked.

All teachers and students should be encouraged to have an email address and to understand how to use email effectively and how to write within the email message genre.

Some of the important aspects to make students aware of are:

- Subject lines – These are important as having a clear and relevant subject line that tells the reader what information the message contains can make emails easier to search through and more likely to be read.
- Titles – Users of email should have a title that clearly identifies them.
- Greetings – Most email use is more formal than text message use and so it's still a common practice to start with a greeting.
- Signature – Emails should end with a 'signature' that clearly defines the sender and their professional role. Many email users also include things like links to their online profiles or telephone numbers in their email signature.
- Message – Email messages should be written in proper sentences and paragraphs and writers should be careful to clearly reference other messages when writing emails. Don't assume that other parts in the thread of communication have been read and understood.

6.4 Creating email titles

Every email account holder must have a name or title in order for other users to send them a message. When we create an email account, we choose the first part of our email title. This is the part before the @ symbol. The part after the @ is usually provided by the company that supplies the email service such as @gmail.com, @hotmail.com etc.

As a teacher it's important to choose something that looks professional. If possible, the best option is your first name followed by your last name with a dot (.) in between, e.g. firstname.lastname@gmail.com . Every email title must be unique, so there are times when your name may already be taken. In this case you may need to create some form of variation on your name.

The most important thing to remember is that the email address you use as a teacher needs to look professional as it may appear on any publications or conference presentations you give as well as any official correspondence you have.

6.5 Understanding cloud computing

Cloud computing is a concept that began in 2006 when large tech companies like Google and yahoo started to develop services and software that was accessed through the web browser and remained on the internet rather than being downloaded to the user's computer. Before this time most software, files and documents remained on the user's computer hard drive. Companies like Google made cloud computing popular by offering web-based services such as Gmail and Google Apps along with storage space for free. Many people now store most of their documents 'in the cloud' meaning the documents are stored online rather than on their computer hard drive.

6.6 Benefits of cloud computing

There are many benefits to cloud-based computing.

- It saves space on the computer hard drive which means that computers can be smaller and less expensive to produce.
- Information and apps that are stored in the cloud can be accessed from any computer and any device, so documents and images you create on your phone and store in the cloud can be accessed from your computer.
- Email services that are cloud based can also be accessed from any device.
- Because the software is accessed online this means that it is updated by the company and there is less risk of viruses from the software update process.
- Cloud based services also make online collaboration much easier. Applications like Google Documents can be accessed by two or more people in different locations and at different times and both people can update and make changes to the same document without producing multiple copies. This makes collaborating online much simpler and more efficient.

6.7 Social media platforms

There are a large number of social media platforms available online these days and many if not all of them have some form of educational activity going on within them.

The most popular ones are:

- Facebook – Facebook was first launched in 2004, but it has changed and continues to change a lot each year. It started as a platform for university students in the US to keep up to date on relationships but has now become a global platform for sharing news, images, videos, finding jobs, buying, and selling personal objects and learning new skills. One of the big advantages with using Facebook is that so many teachers and students already have an account on the platform.
- LinkedIn – LinkedIn is like a professional version of Facebook. It started in 2002 as a platform to allow people to share their CV/resume and look for jobs. Since then, it has

become a professional news portal with special interest groups, a blogging platform and a great place to develop professional connections and build networks.

- Twitter – Twitter was launched in 2006 and was originally described as a 'micro-blogging' platform. This meant that users could only use a maximum of 140 characters in each message they sent. This made communication quick and concise. Many educators were attracted to the platform and used it to circulate links to articles and teaching materials. Most educators use hashtags to share their materials. Hashtags are keywords preceded by the hash symbol. These hashtags make it easier to search for and locate information.
- Instagram – Instagram was launched in 2010 as an image editing app for the mobile phone, but it has become one of the most popular image and video sharing platforms on the internet. It seems like an unlikely platform for education, but there are a huge number of teachers creating learning content for the platform. Most of the educational content on the platform is short video clips. These are a form of 'micro learning' that students an easily access and consume.

Some of the less popular ones in terms of educational activity are:

- Pinterest – Pinterest was launched in 2010 and was designed as a place for online shoppers to store images of things they wanted to buy. Pinterest has also become popular among educators where they commonly share infographics (graphics containing information) and other visual teaching aids.
- TikTok – TikTok was launched in 2016 and was designed to be used to share short entertainment videos of between 15 seconds and 3 minutes. The platform has become extremely popular with teens and younger students and many teachers have started designing short video learning content for the platform. There are many teachers who only work through the platform and generate an income through their online lessons.

6.8 Social media for professional development

Social media offers huge opportunities for self-guided professional development. There are many groups of teachers who are very active on social media and who have created their own blogs, podcasts, Facebook Groups and Twitter accounts to share information and to support the global educational community.

For teachers who are new to using social media for professional development it is easy to start with the platforms that you already use and look for groups there. Facebook has many groups that have been created by teachers. To find groups join just search through the groups using your special interest as a key word. You are likely to find a lot of different groups so you will need to choose carefully which ones you decide to join.

Some things to check before joining a group:

- When was the last time someone posted to the group? – If there have been no recent posts the group may have died, or the moderator may no longer be active and so no new posts are being added.

- How many people are in the group? – Active groups usually have a large number of members as only a small percentage of social media users are active contributors to the groups. In some cases, you might find small groups that are very active, but this is unusual.
- What is being posted? – Have a look at the types of information the members of the group are sharing and see if there is anything that's interesting and useful for you. Look at the comments too and find out if people are actively discussing issues that interest you. Sometimes groups just have lots of people posting advertisements for their latest blog post or book.
- What are the rules? – Most useful groups have rules for participants that guide how they can use the group and what they can contribute. If there are no rules, then it's less likely to be a useful and constructive group to be part of.

Once you have joined groups go back to them regularly and monitor the activity on the groups for a while before you start to participate. Try to understand the way other teachers interact within the group. You could start by posting an introduction about yourself to the group and explaining why you have joined and what you hope to achieve by joining the group.

6.9 Pros and cons of social media in education

There are many pros and cons to using social media in education and you should think about these before deciding whether to start using social media with your students. You should be especially careful if your students are younger learners.

Here are some of the pros.

Using social media with students can:

- Add a new dimension to their learning and take it outside the classroom.
- Help students to contact other people who are interested in the same things.
- Help to develop students' cultural and intercultural knowledge.
- Help to develop students' abilities to collaborate and communicate online.
- Add an element of motivation and autonomy to the students' learning.
- Help to make them more aware of safety and the need to protect themselves and each other online.

Here are some of the cons.

Using social media with students can:

- Put students at risk.
- Be distracting if it isn't used with a specific goal in mind.
- Be very time consuming.
- Overload students with too much information.
- Make students feel uncomfortable.

Before getting students engaged in social media projects you should make sure they want to use social media and find out what existing experience they have with using social media.

You should also make sure your school and the parents of the students know what you are doing and that you have their approval.

6.10 Setting up a social media group for students

Using social media with students can have some huge benefits for them. Groups are one of the most useful aspects of social media as these tend to be more democratic (everyone who is a member can post and participate in the group) and they can be topic specific, so you can set up a group about something that your students are interested in.

Here are some things you should think about when creating a group for your students:

- Purpose – What do you want your students to achieve by using the group? Students need to have a purpose in order for them to participate in the group.
- Platform – Which platform should you use? Try to choose one that your students already use and are familiar with.
- Privacy – Will the group be public or private? Having a public group can give your students the opportunity to interact with a much wider variety of people, but you will also need to make sure that they interact with these people in a safe way.
- Safety – What safety measures can you take to ensure your students aren't put at risk? You need to make sure your students are safe and make them aware of any threats that might exist in social networks, how to identify them and who to tell if they feel uncomfortable.
- Moderation – Who and what will be moderated? Most social media interest groups succeed or fail because of the moderator(s). The moderator needs to be aware of what is happening in the group, and they need to prompt discussion and interaction. Moderators also need to be aware of any threats or any misbehaviour that may happen within the group and be prepared to act. Moderators usually create the rules for the group and make sure that members follow the rules. If your students are responsible enough some of them could become the moderators of the group.

7. Multimedia

7.1 What is multimedia?

Multimedia is a combination of several different types of media including text, images, audio, graphs, video, animation and increasingly three-dimensional objects.

Different combinations of these media can be used in the design of materials for our students. We should be careful though when designing materials that we don't try to combine too many different types of media as this can result in 'cognitive overload'. This is when the students receive too much information for their minds to cope with and understand it.

We should think carefully about how we use different types of media together so that the combinations reinforce the learning content.

An example of a strong combination would be using audio and text together. If students can listen while they read a text this can reinforce elements of the written text. The voice gives additional information using tone and intonation which isn't present in the text.

An example of a poor combination would be using video and images together. If students have to watch a video at the same time as looking at a group of graphs or pictures, then their visual attention will be split, and the activity will be less effective.

7.2 Benefits of multimedia

When used with a good understanding of instructional design, combining different types of media can be very effective.

Well-designed instructional materials for our students can increase the level of student engagement, aid motivation and understanding, and lead to higher levels of information retention.

Using a wider range of media than just text or spoken voice can also help appeal to a wider range of students learning preferences.

Different types of content are also better suited to different types of media. Statistical data is much easier to understand when presented in a graph or chart than in long form text. Instructions for how to do something are much easier to understand when video and images are used.

So, to get the most impact from using multimedia we need to consider these questions:

- What type(s) of media are best suited to the type of content and learning goals we want to achieve?
- How can the media we are using be most easily accessed by the learners?
- What combinations of media will work best together with this content?
- How can we balance our use of different types of media to keep students engaged?

7.3 Finding and downloading images

There are a wide range of sources of images that can be downloaded from the internet. These can be used in multimedia and materials design both by teachers and students.

Teachers often believe that they can use any image they can find online. This is not true. All images you find online are owned by someone. Whether you can use them or not depends on the copyright.

When using images that you download online you should be careful to check who owns the image and whether the owner of the image permits reuse.

There are several useful sources of images that are free to use for educational purposes and ones which are royalty free and can also be used for commercial projects.

Here are some places where you can find and download images to be used for commercial and non-commercial educational purposes.

- https://pixabay.com/
- https://unsplash.com/
- https://www.pexels.com/
- https://www.imagesource.com/royalty-free/
- https://burst.shopify.com/
- https://www.freeimages.com/

7.4 Adding images to PowerPoint

Many skilled presenters choose to add images to their presentations. This is not just for decoration, but images can play an important role in making the presentation easier to understand.

Many audiences complain that presenters use too many slides with text information on them. Reading text from presentation slides can be difficult for several reasons including text size, line spacing, colour contrast between text and background.

More importantly though if the audience is reading text from the screen, they will find it harder to listen to the speaker.

Adding images to the screen that help to illustrate the points you want to make with your presentation can help the audience to follow the presentation and reduce the problems of reading from screen. Many of the best speakers use little or no text on the presentation slides and rely on the images and titles to guide the listener and help hold their attention.

7.5 Phones in the classroom

The presence of mobile phones in the classroom has been one of the most controversial issues in education of recent years. Many teachers object to letting their students bring their mobile phones into the classroom and many schools around the world support them.

Other teachers find that having the phones in the classroom can help them to extend the range of content they can make available to the students while they are teaching. They also believe that by using the phones in the classroom they can help to develop students' digital illiteracies and autonomous learning skills.

The main objections to mobile phones in the classroom are:

- Distraction – students become distracted by the phones and don't pay attention to the lessons.
- Disruption – they cause disruption because students start to do other things on their phones rather than following the lesson.

- Inequity – not all students have mobile phones so the ones that bring them have an advantage.
- Privacy – students have been found to take pictures and make videos of other students and the teacher during the lesson and post them online.
- Cost – students either have to pay for the data on their mobile phone or the school has to provide adequate Wi-Fi to support large numbers of devices.
- Training – teachers lack the training to help students make use of the devices as learning tools.
- Safety – using the phones within the classroom makes the teacher responsible for the students' safety online and ensuring that students don't use the devices to bully and harass each other.

The main reasons teachers want students to have access to mobile phones in the classroom are:

- Digital literacy skills – the phones can be valuable learning tools and enable teacher to start developing students' digital literacies in the classroom.
- Autonomous learning – having the phones in the classroom enables teachers to encourage more autonomous types of learning by encouraging students to do online research tasks and use various models of blended learning.
- Access to materials – access to the internet enables greater access to a much wider range of free and commercial learning content that teachers can use with their students.
- Task enhancement – teachers can develop more varied tasks for students to do that include making videos and recording audios when their students have access to mobile phones.
- Soft skills – students need to be taught what is acceptable and unacceptable use of these devices in a range of contexts and how they can set up their phones to avoid phone addiction.

7.6 Using smart phones in class

As you have seen in 7.5, there are many reasons for using phones in the classroom, but for this to be a successful practice there are a number of things you should consider:

- Accessibility - Any apps, materials, or resources that students access for learning should be accessible across platforms. This means that you need to know what types of phones or devices your students use and be sure that your materials are compatible with those devices.
- Connectivity – Any kind of internet access using a mobile phone requires a connection. When students are accessing the internet through the schools WIFI the costs of access will not be carried by the students. If your school doesn't have WIFI access for students, then you need to be careful that the amount of data students need to access the materials isn't too high as this will cost them or their parents' money.

Where possible try to use apps that don't require a connection and make sure students install any new apps before the lesson to save time and money.

- Classroom management – Think about whether every student needs to have a device to do the activity. In some cases, it may be better for students to work in pairs or even groups with one phone per group.
- Safety – You must make sure that any materials or apps you are using are safe and appropriate for your students. We will go into more detail about this in chapter 10 Cyber ethics and security.

7.7 Using a smart phone to consolidate learning

Smart phones are very useful tools for consolidating learning. They are particularly useful because they can capture digital video, audio, and images that the students can create. This makes them suitable for demonstrating and recording learning outcomes.

Recorded outcomes could include video or audio recordings of student presentations, recordings of debates and speeches, images of work created, videos of role plays, recorded feedback on work and many others.

These records of learning outcomes can be stored either on the user's phone on cloud-based storage and regularly reviewed by students. Students can also select some of their best work to include in a digital portfolio.

7.8 Editing a video

Video editing is a complex and expensive process that only trained professionals could do, but video editing has become increasingly cheap and simple with the development of web-based and mobile apps.

The ability to create and edit video is one of the many digital skills that will be extremely useful for students in the world of work so video editing and creation can be considered a 21st century digital skill.

There are many tools and apps that students and teachers can use to edit video either on a mobile device or laptop computer.

7.9 Exploring editing tools

Most modern computers and mobile devices are supplied with basic editing software. Al though this software may be basic it is usually capable of doing things like trimming video to remove unwanted sections, joining clips together to make a single product, adding transitions (when the video moves from one scene or clip to another) and adding text for titles at the beginning and end.

There are many other video tools available, and they can do a number of other editing tasks and in some cases make quite complex video editing tasks quite easy.

Some useful functions that you can explore are:

- Adding subtitles/transcription – This enables you to add either a translation or transcription of the spoken text from the video.
- Adding audio – This enables you to add a voice over the top of a video to narrate what is happening in the video.
- Adding text – This enables you to add texts or titles at different places within the video.
- Adding images – This enables you to add additional images to the video.
- Changing the speed – This enables you to speed up or slow down the video.
- Muting the audio – This enables you to convert the video to silent video so that students focus on the visual aspects.
- Creating slide shows – This enables you to create a video from a collection of still images and then add a soundtrack or narration.

7.10 Introduction to the SAMR model

The SAMR Model is a framework that was created by Dr. Ruben Puentedura as a way of describing attempt to integrate technology into education.

The letters “SAMR” stand for Substitution, Augmentation, Modification, and Redefinition and these are the four possible levels of tech integration.

The first and simplest stage is substitution. At this stage technology is used a direct substitute for pen and paper type activities. There is no real change in what the student does, just in the tools they use to do the task. There can still be benefits to using technology at this level. It may well save time, be easier to organise or make additional learning resources available.

The second level is augmentation. At the augmentation level something is added. The changes are more than convenient. The technology makes possible something that would not be possible through traditional methods. This could be through additional interaction with content, or it could be that the technology makes it easier for students to do part of the work more autonomously.

The third level is modification. At this level technology is used to design interactive and dynamic tasks that go beyond the limitations of a traditional classroom. This could be through peer-to-peer virtual collaboration or more hands on collaborative production of digital media such as a podcast or video.

The final level is redefinition. At this level technology is used to make entirely new learning opportunities possible. This is the highest level if technology use and could include things like connecting your students with other students from around the world, having students publish their work online where it can be viewed by peers, recording students as they deliver a presentation or practice, then using the recordings to encourage student reflection.

7.11 Applying SAMR

The aim of the SAMR model isn't to prescribe one level or another it is a descriptive model to help teachers understand how technology can be used. This can help teachers define their own goal when using technology.

The first step to using SAMR is to analyse and describe your existing student activities to look for ways you can use technology more effectively and perhaps move them up another level.

SAMR can be used when thinking of new activities or looking at how new technologies can be exploited.

The obvious assumption is that teachers will generally want to aim for the redefinition level of use, but this isn't always appropriate. Using a technology at the substitution level may well still be useful.

7.12 Creating audio

Creating good quality digital audio has never been easier or cheaper. You can now create and edit audio on most smartphones, laptops, or tablet devices, as long as they have a microphone or somewhere to plug in a microphone.

To record good quality audio one of the main things you need is a quiet room. Trying to record when there is too much background noise will result in poor quality audio. When getting students to do audio recording activities it's better to ask them to do these at home where they can find a quiet space. Recording in the physical classroom when there is a lot of activity isn't recommended.

7.13 Introduction to project-based learning

Project-based learning is often confused with any form of learning that involves creating a project or doing work over a period of time. This is not the case. Project-based learning (PBL) is generally used to describe a very specific approach to learning that encourages, develops students' autonomy, and develops a range of important learning skills.

Project-based learning usually includes seven design elements.

- A Problem or Question - The project should be based around a meaningful problem to be solved or a question to answer by the students. Where possible the students should be involved in selecting or identifying the problem.
- Sustained Inquiry – Project-based learning usually takes place over several lessons and students are involved in researching and evaluating information.
- Authenticity - The project usually involves real-world context, tasks, and tools. The problem is also a real problem that students should see as being relevant to their lives.
- Student Voice & Choice - Students should make some decisions about the project, including how they work and what they create to show the solution to their problem.

- Reflection - Students should be encouraged to reflect on the learning, the effectiveness of their research and project activities and the quality of their work.
- Critique & Revision - Students should give and receive feedback from the teacher and their peers and then apply the feedback to improve their process and products.
- Public Product - Students should finish by creating a final product which the share publicly and by explaining or presenting it to people beyond the classroom.

7.14 Technology and PBL

Technology can be used within this PBL framework as a tool to enable the collaboration and presentation process and as the product of the learning. Using technology within the PBL framework is a useful way to develop the kinds of digital literacies that students will need to use in the real world of work.

Teachers can use a wide range of technologies within the PBL framework, such as;

- sharing documents for collaborative work
- planning and time management tools such as to-do lists and digital calendars
- using digital media production tools such as audio and video editing software and presentation software
- using social media platforms or virtual learning environments to collaborate with others, for team meetings and for sharing information.

7.14 Applying a PBL approach

The first time you use PBL approach can be difficult for both teachers and students. It requires quite a big change in approach which puts more responsibility onto students and takes some control from the teacher.

When you first try this approach with your students it’s wise to explain to them why you are trying the new approach and what they should expect to gain from it.

Try to involve them in your process as a learner too and try to get feedback from them on how they think things are developing and their attitudes to the new approach. Don’t expect everything to be wonderful the first time you do PBL. Be prepared to learn and improve.

8. Note keeping

8.1 Note taking tools

There are a number of digital note taking tools that are in common use in the classroom. Among the most popular of these are:

- Evernote: https://evernote.com/
- One Note: https://www.microsoft.com/en-gb/microsoft-365/onenote/digital-note-taking-app
- Roam: https://roamresearch.com/
- Google Keep: https://keep.google.com/
- Simplenote: https://simplenote.com/

If you decide to use a note taking tool with your students, then it is best to recommend the same one for all students, as collaboration and sharing is much easier between students using the same application.

8.2 Evaluating note taking tools

There are several criteria you should keep in mind when selecting a note taking tool for yourself or your students.

Accessibility - Can it be used by all your students on the devices that they have? Make sure you choose a cross platform compatible device that works on different operating systems.

Cost – Some note taking applications start to charge once you have reached a data limit. Make sure you check that any free applications you use give students enough storage, so they don't have to pay.

Ease of use – It can be tempting to choose applications that have lots of different functions, but that can make it difficult to train students to use the application. It's much better to choose something that is simple and easy to use.

8.3 Pros & cons of digital note taking

There are several advantages of digital note taking tools over paper-based note taking:

- They can capture video, audio, and images into the notes from the internet.
- Notes can be shared and worked on collaboratively with other students.
- They can be synchronized and accessed from any device.
- Notes are easy to organize and reorganize
- They can't be lost or damaged
- They can easily be reviewed and improved.

Among the disadvantages of digital note taking are very few and some have yet to be confirmed through thorough research.

Students who take digital notes have a strong tendency to copy paste from online sources rather than create their own notes.

Some research suggests that taking notes using a digital device reduces the rate of information retention and that students who make notes by hand retain more information. This research is still controversial as other research suggests there is little of no difference in the level of information retention.

8.4 Structuring digital notes

Although digital note taking tools can make taking notes from online sources very fast and efficient the notes can sometimes become long and disorganized.

Copy pasting text from online sources into digital note taking tools is so simple that some students copy lots of very long chunks of text without really considering why and what the key issues are.

Students also tend to take digital notes and forget to include the source of the quote.

To ensure that students take meaningful and useful note you can provide them with a suitable structure.

Remind them that their notes should include the following things about the course of the information:

- The title
- The author's name
- The name of the publication/publisher
- The URL where they found the information
- The information they want to remember
- Their own comments on the information
- The date of publication and the date they found the information

It can be useful to create a note template for students to train them to include these elements when they take notes.

8.5 Sharing notes

Being able to share notes and collaborate on note taking and research assignments is one of the big advantages of digital note taking tools.

There are several ways you can approach this with students:

- Put students into small pairs or groups to work collaboratively using a shared note tool so that all students have the same document and the same notes.
- Ask each student to work on their own notes and then share and compare them with a peer to see what they can add to their own notes.

- Ask pairs of students to work together making note and then share with other pairs to give feedback on each other's notes and try to add to them.

Some important factors you should think about before doing collaborative note taking and sharing are:

- Make sure the students know how to share their notes.
- Make sure they understand that they will be able to see the notes that their peers are writing.
- Think about whether you need to assess the notes and whether you will evaluate each student's individual input or whether you will evaluate them collectively.
- Think about the way you pair or group students and whether you want strong students working with other strong students or weak students working with stronger students.

8.6 Creating a note taking lesson

Some teachers assume that students know how to take notes. This is not always true. Most students take very poor-quality notes, and they find them difficult to understand when they want to review their lessons.

Teaching students how to take, use and review notes can help them become more effective and autonomous learners.

Note taking lessons should cover these skills:

- How to structure digital notes
- How to organise notes
- How to share notes with other students for peer review
- How to use a digital calendar to ensure you review notes regularly
- How to add digital media to notes

9. ICT based projects

9.1 Project work

In previous chapters we have looked at Project-based Learning and have seen that it is a specific approach to teaching and learning that is different from doing a project. This doesn't mean that you should not do projects. Creating ICT projects for yourself, your peers and your students are still highly recommended.

The main definition of a project is that it is completed over a longer period of time. Projects usually involve research, reflection and an outcome or output.

There are different types of ICT related projects you can do:

- Projects to research and find out how best to use new software or applications.
- Action research projects that address a problem you or your students are having in your classroom and look at what you can do about the problem.
- Projects to integrate technology into the day-to-day teaching in your school.

These are just a few examples. The main thing about doing projects is that they give you a longer period of time to think about a specific issue or opportunity.

9.2 Designing project work

When designing project work, you should:

- Start with a specific goal in mind. This could be a problem you want to solve or something you want to learn about or achieve.
- Give yourself a specific deadline by which you need to complete the project. Having a deadline with give you something to work towards.
- Think about what resources you need to do the project.
- Think about who should be involved.
- Think about how you will show the outcome of the learning from your project.
- Break your project down into stages and tasks that you need to do in each stage of the project.
- Plan the order that you will need to do each of the tasks.
- Estimate how much time you will need for each task so that you make sure all the tasks can be completed within your deadline.

9.3 Drafting and outlining project works

Before starting on your project, it's good to draft a project outline. You can then show the outline to others and get their input and feedback before you start.

You should also try to build a project timeline that specifies the different part of your project, how long the tasks will take and the order that you will do them in along with any

dependencies. (Dependencies are task that need other tasks to be completed before they can be done.)

Here is an example timeline:

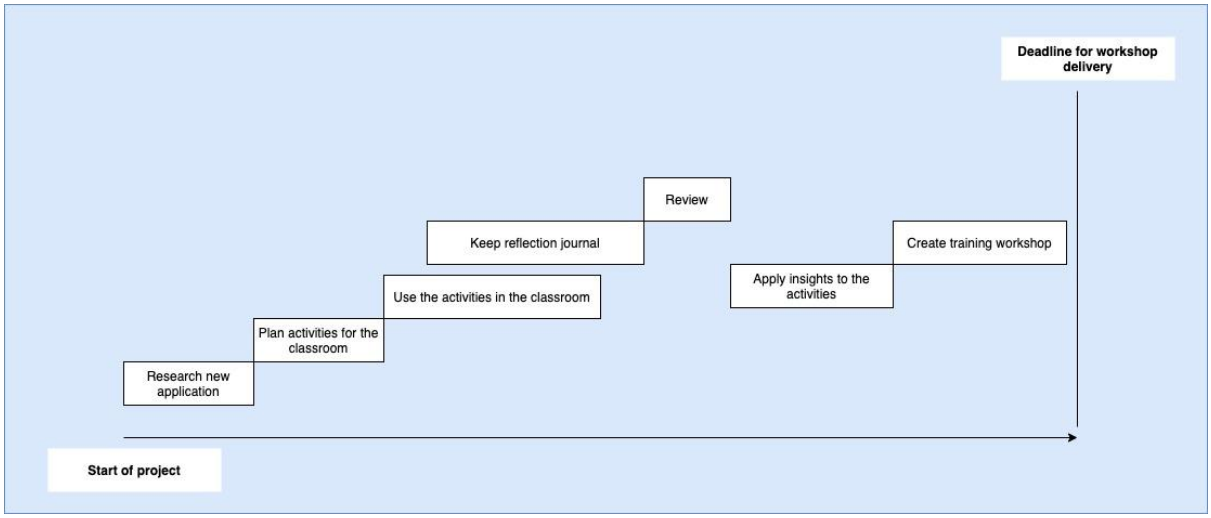

Fig 35. Project timeline

The timeline is based around a research project into how to apply a new application in the classroom. At the end of the project the teacher plans to give a workshop for other teachers to share what they have learned about the new application.

The teacher has broken down the activity into tasks. The first is to research the application and find out how to use it. The second task is to start planning some classroom activities using the application. The third task is to start using the activities in the classroom. While using the activities in the classroom the teacher will also keep a reflection journal to track what they are learning. Once the teacher has finished using the activities, they will review their learning journal to see what they have learned and then apply these insights to making changes to the activities. Finally, they will create a training workshop to share their insights and learning activities with other teachers.

This is just one example of what a project timeline may look like, but it is a useful one to show the planning concept

9.4 Working on projects

Working on projects demands a level of organisation and discipline. Projects can take a long time to finish, but you should be careful not to leave all the work to the last days. Be sure to organise your time and think through all the things you need to do. Creating a project timeline like the one above and adding timings and dates to each of the tasks will help you to keep on schedule.

Be sure to keep a learning journal that you can use to write down your reflections and learning points while you work on the project. This can be very valuable and can help to make sure you don’t forget what you have learned from the project.

Working on projects alone can be useful but working together with a team can be much more rewarding as you'll be able to get opinions from a wider range of people with different perspectives. Working as part of a team will also enable you to use different technology tools to collaborate so you can learn from the process of working with others as well as from sharing ideas with others.

To keep your project organised and on time you can use a Kanban board.

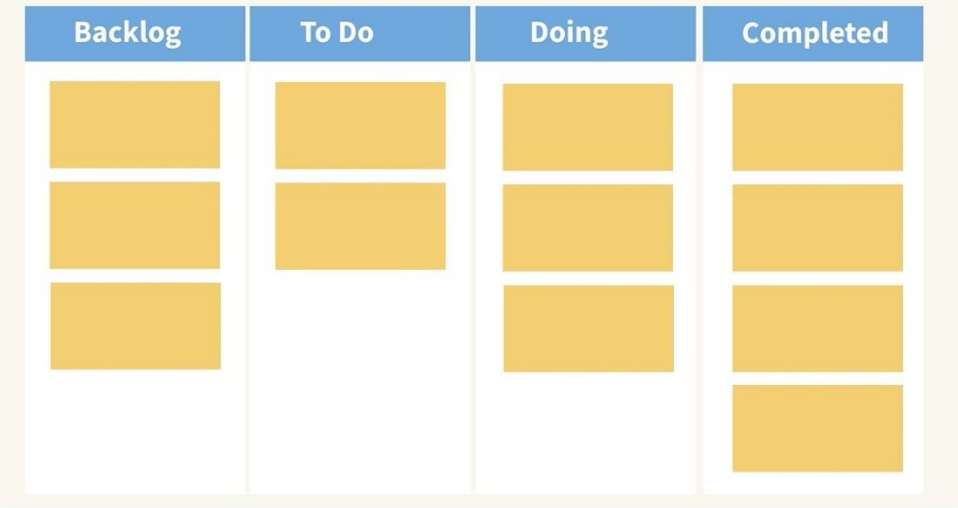

Fig 36. Kanban board

Kanban boards are frequently used by project teams to track and review progress. There are four columns in a Kanban board. First, write all the things you need to do onto separate sticky notes. Then put all the notes in the first column called 'back log'. Look through all your tasks and choose the ones that are most urgent and place them in the second column called 'To-do'. As you start on these tasks move them into the third column 'Doing'. Then once you have finished the task, move it into the last column 'Completed'. Work through your tasks gradually moving them from left to right across your board. This will help you to see the progress you are making and keep track of your workload. You can create a digital Kanban board using https://trello.com/ and add all the people from your team to the board. Then you can assign different task to members of the team, and you will be able to see how each person is progressing.

9.5 Tools for reviewing projects

The first thing to remember about reviewing projects is that the review doesn't have to only come at the end of the project. You can review a project at any stage and see how things are progressing. This can be useful and can help to get a project back on track.
If you only review projects at the end, you miss the opportunity to fix failing projects.

At the end of a project, we need to be aware of why we are reviewing it. These are some key objectives to think about when reviewing a project.

- Did the project fully solve the problem that it was designed to address?
- Can we go further with the project, and deliver even bigger benefits?
- What lessons did we learn that we can apply to future projects?

There are several tools you can use to review your projects.
We have already mentioned learning journals. These can be paper-based or digital, but keeping a learning journal and using it to record your insights and reflections as the project progresses can be very helpful. At the end of the project, you can read through your journal and see how your understanding of the project has changed and developed.

Gap analysis can be used to measure the difference between the project goals and what the project delivered. To do this you:

- Review the original project outline and evaluate how closely the project results match the original objectives.
- Review the expected project outputs (including documentation) and make sure that these have been completed.
- If there are gaps, think about how will these be closed?

To determine the satisfaction of students and peers on the project, you can use these questions:

- Were the students' needs met?
- How has the project impacted the students?
- If there were any problems, how should this be addressed?

To identify lessons learned you can use these questions:

- What went wrong, why did these things go wrong, and how could these problems be avoided next time?
- What went well, and needs to be learned from?

Finally, it is good to consolidate learning points from the project by writing a report of the findings and recommendations. You should try to include:

- What have you learned from this review?
- Do you need further action to get the benefits you want?
- What lessons have you learned that need to be carried forward to future projects?
- Does this project naturally lead on to future projects?
- How can you build on the success and benefits already achieved?

10. Cyber ethics and security

10.1 Cyber ethics and security

Cyber ethics refers to students' behaviour when they are using internet resources and the way this impacts them, their peers and society.

Cyber security refers to the way an individual or organisation protects itself from cyber-attacks that could cause harm or result in the theft of information.

With increasing numbers of students accessing the internet more often and at younger ages, cyber ethics and security has become an important issue.

Students are accessing the internet both at home and at school through a variety of devices and often in context which are not controlled by either parents or teachers, so many teachers believe that we need to help them understand the threats and responsibilities involved and as we have already seen, this has become an important part of developing their digital literacy skills.

10.2 Digital threats

As teachers it is our responsibility to make sure that our students are safe online as well as in the classroom. There are several threats which we and perhaps our students should be aware of. These are some of the most common:

1. Cyberbullying – This is a form of harassment that usually comes from other students. Bullying is common in schools and cyberbullying is similar. One of the biggest problems with cyberbullying is that unlike physical bullying from peers, when the student goes home, they can still be harassed, so there is no safe place for victims to escape to. Most cyberbullying takes place through social networks and through text messages and most of the victims know the person who is bullying them.
2. Cyber Predators – These are people who often use a false identity to be friend students and try to develop a relationship with them. This could be for a number of reasons, but usually with the aim of leading to a physical meeting. This can be particularly dangerous for students.
3. Posting Private Information – Often students don't realise that much of what they share online is in public view and anyone can see it. Students may share personal identifiable information such as physical address, telephone numbers, images or even family vacation plans. This information can be seen and used by criminals.
4. Phishing – This is the use of email messages to encourage people to click on links. These links are often malicious and can enable criminals to access passwords, or information about the students' social media contacts or to take control of their social media accounts. These can be very difficult for students to spot, as they often appear to be from friends that they know.
5. Scams – These are usually offers or messages about winning prizes. They can be used to get details about bank accounts, passwords, or other private information that the

criminals say they need to deliver prizes. Scams aimed at students often involve access to computer games and software.

6. Malware – These are types of computer programs and software that can use your computer without you being aware of it. These programs can steal private information such as bank account details or use your computer to send messages and spread viruses to other computers without detection. This kind of software often hides within free software programs such as games that can be downloaded from the internet.
7. Digital footprint – Once something has been posted on the internet it is very difficult to remove. You may be able to delete a message or an image from your social media account, but by the time you do this it may have been copied and spread by multiple other internet users making it almost impossible to trace and remove. If students post inappropriate images, jokes or messages those messages will stay online for years and may at some time be used to embarrass them or even worse. People have lost jobs and been refused entry to colleges and universities due to messages they posted years earlier. Students need to understand that something they may think is funny now may cause them harm later in their lives.
8. Inappropriate content – The internet was designed to be a space that is free of censorship where anyone can express their views and indulge their preferences whatever they may be. Whereas this may be a good thing in terms of personal freedom and expression, it can be a dangerous for younger students. It's very easy for unsupervised students to accidentally find something that they might find disturbing, offensive or at the least very worrying. We need to be sure as teachers that we are taking responsibility for the content that our students are exposed to so that this doesn't happen.

10.3 Protecting students

As you can see from 10.2, there are many reasons why we should be careful when using the internet, especially with younger students.

Most teachers' opinions on how to do this are split between two options.

1. Block and restrict the use of internet and digital devices in schools
2. Train students how to use internet resources with an awareness of the potential problems and dangers.

Option one above can seem like the safer option for students, but it restricts our ability to develop our students' key digital literacies and robs students of the opportunity to access what is the largest educational resources in the history of the world. It also means that our students get no formal training in how to protect themselves from online dangers that they are likely to encounter when using the internet at home.

Option two involves teachers and schools in taking responsibility for training students to manage their own and each other's digital safety and helping them to understand the dangers.

One of the most effective ways to do this is to create a code of practice for all teachers, students, and parents so that they understand the threats and dangers, know what they should

do to protect themselves and understand the consequences of breaking the code of practice and endangering or threatening other students.

10.4 Students and plagiarism

Many teachers consider plagiarism to be one of the biggest problems to emerge from increased digital learning. Technology makes it very simple to copy text from any digital document and paste it into another. Students tend to be very outcome focused are often totally unaware that there is anything wrong with this. They believe they have accurately completed a task and don't see the importance of using their own words.

To stop plagiarism students first need to understand what plagiarism is and why it is wrong. They also need to understand the consequences for plagiarising the work of others and they need to know that plagiarism will be discovered.

10.5 Understanding plagiarism

To understand plagiarism, we need to teach students about the most common types and how to avoid them.

These are some of the most common forms of plagiarism

1. Mosaic or patchwork plagiarism

This is when a student copies text from another writer and then changes words and phrases and uses synonyms to make the work seem like their own. They then mix this with their own ideas and writing.

2. Paraphrasing plagiarism

This is similar to the above type of plagiarism, but the students use their own words to express ideas they have taken from another writer with mixing in their own ideas.

3. Complete plagiarism

This is when an assignment or research paper is completely copied from another source.

4. Self-plagiarism

This is when students reuse work that they have previously submitted instead of producing completely new work.

5. Accidental plagiarism

This is when a student takes ideas from other sources and doesn't cite the original source or cites it incorrectly.

6. Direct or verbatim plagiarism

This is when students copy paste large chunks of text from a range of other sources and then say it is their own work.

All these forms of plagiarism can be avoided if students are taught how to correctly cite sources and how to use information; they have taken from other sources correctly. They should also be made aware of the acceptable percentage of text taken from other sources.

The consequences of deliberately plagiarising the work others can be serious and far reaching. Students should understand that plagiarism is intellectual theft and that especially at university level consequences may include:

- failure on an assignment
- grade reduction
- course failure
- suspension and even dismissal

10.6 Tools for detecting plagiarism

There are several tools you can use to detect plagiarism in your students' work. Telling students about these tools may help to make them aware of the dangers and the likelihood of being caught when they plagiarise the work of others.

One of the most effective plagiarism checkers and the one most used by universities is Turnitin https://www.turnitin.com/ . This is a commercial product and is usually paid for by the university.

There are a range of free and freemium ones available online that can be used by individual teachers and students.

- https://www.plagramme.com/ (free)
- https://www.quetext.com/ (free)
- https://www.scribbr.com/plagiarism-checker/
- https://unicheck.com/
- https://plagiarismdetector.net/ (free)
- https://www.duplichecker.com/
- http://plagiarisma.net/

Most of these tools work by allowing teachers or students to upload assignments. The tool then searches through a database and a variety of online sources to find similarities with the uploaded text. The results show which sections of the text match or are similar to other sources. These are usually highlighted in the text along with a percentage score showing how similar the part of the text is to the original source.