Many years ago, when starting formal education, pupils were often taught using the ‘chalk and talk’ method. In some educational institutions these methods are still in use today, particularly in third world countries. However, more and more we see the introduction of new technology and the use of a new type of ‘blackboard’ in the Smart Media Board [1].

At London South Bank University (LSBU), the decision has been taken to introduce this technology throughout the entire university as funds permit. Now, having recently been fortunate enough to have had a Smart Media Board installed in three of the main teaching rooms of the Maths Support Centre, this paper will elaborate on some of the features and benefits of using this new technology, both from the point of view as a teacher and also as seen by the students receiving tuition through the use of the new technology.

Smart Boards are a revolution in the way in which lecturers teach, as whole lessons or an entire curriculum can be planned, prepared and shared electronically with other teachers before a student even sets foot on campus. The boards have at their heart a few simple components, often found around the average home, plus a very clever display screen. The heart of the system is a computer, just like the one most people have at home or work but this one is connected to a special projection screen. Between the screen and the computer all the vital communication takes place to bring lessons alive and make learning fun as students at LSBU have been heard to say.
The Smart Board screen is similar in many ways to a touch screen, where you can touch the screen and this in turn will control the linked computer. It is just like a writing tablet that can be sourced for your computer. The smart screen can also be a writing tablet, only on a much bigger scale, and again anything written on the screen can be stored for later use or sent to a connected printer for a printout. Through the use of a projector, these boards can also display any information you wish to show from the attached computer. The computer attached to the Smart Media does not need to be a standalone machine and in the case of LSBU it is part of the entire network, meaning that it can access any data or information from the network and display it on the screen. During lessons it is possible to pause or freeze frame at any point so as to empathize a particular point or allow students to copy information from the lesson. Whilst the picture is paused, it is also possible to write on the board to highlight any salient point in the lesson being shown. This is particularly helpful when students tackle harder to grasp concepts and discussions can be undertaken to help ensure a fuller comprehension by all in the class. Students have been quoted as saying “what a great way to learn” as it allows them to see maths in action whilst allowing the tutor to highlight the methodology used by pausing at the pertinent frame. With the use of the optional Airliner Wireless Slate, it is possible to control the action and writing on the board from a distance. The use of this slate allows the student to participate in the lesson without the need to go to the board. This interaction could be further enhanced through the use of Wireless Routers and students using their own laptops, should an institution want to expend the large sums necessary to install the additional equipment. At this stage, LSBU Maths Support Centre does not require this additional equipment but it is possible for future expansion of the service.

Whilst the Smart Media screen can control the computer through its touch screen ability, it can also be used as a standard whiteboard; for example, should a teacher wish to just write on the board, unlike previous projector screens, the Smart Media can adapt. Through the use of Dry Write Pens that are different to Whiteboard Markers, it is possible to write on the board and use it as you would a normal whiteboard. The pens supplied with the Smart Media Board are totally dry with no ink at all and are housed in their own tray at the base of the board. The selection of a pen from the tray determines the colour of the marking on the board and by placing incorrect coloured pens in the tray it is possible to confuse the teacher but not the board. The location of the empty slot in the tray determines the colour of the marking and taking more than one pen at a time results in only the first colour chosen being shown. It is possible to write on the boards by selecting a pen and then using your finger to draw but this should be actively discouraged as the natural oils in the skin can affect the surface of the board. With the controls for the eraser also located on the screen it is possible to adjust the size quickly and easily to rub out large parts or more delicate sections of the picture, graph, text or table.

The machines used at LSBU Maths Support have already been preloaded with specialist backgrounds such as graph paper. It is possible to load any type of preprogrammed wallpapers into the computer for use in specialist lessons, the only limit being the lecturer’s own. Similarly, Power Point presentations could be loaded and set to run on a continuous cycle for presentations at conferences or repetitive lectures; again, the only limit being deciding what you want to do with the equipment. The screens can also be used for the presentation of slides, once again eliminating the need for an extra projection screen in a classroom.

By the use of this new technology, whole lessons can be mapped out and programmed either onto a disc or memory stick. This use of a memory stick allows a maths tutor to use specialised programs to show the mathematical symbols used in displaying problems. From a student’s perspective, this allows for a uniform recognition of symbols as drawn by machine rather than interpretation of symbols drawn by hand. Smart Media can supply handwriting recognition software for use with their boards and although not deemed necessary at LSBU Support it may be a consideration for other users of this media. This software program will recognise the writer’s style and show the hand-written text as type face on the board. The method of being able to pre-load lessons onto portable media also allows the dwindling numbers of maths specialist teachers the ability to reuse the lesson for the next class or share it with other colleagues; there is no longer a need to rewrite it on a standard board or to rely on a much photocopied class handout. In this age of calls for lower carbon emissions, being able to reduce the number of photocopies not only saves time and paper, it also saves the teacher’s time in having to re-prepare every lesson. Further technology already exists to share lessons around the world; through the use of Smart Media, as a computer file it can then be emailed anywhere at the click of a mouse and so therefore best practice methodology can be shared.
With the use of this new technology, it would be possible for specialist groups, like mathematics, statistics and operational research (MSOR) related Centre for Excellence in Teaching and Learning (CETLs), to set up partnerships around the UK or indeed around the world, to share knowledge and best practice techniques with maths specialists everywhere. Given the growing reliance of global meetings through the use of web cameras or video conferencing, it would be possible using a combination of both web camera and the Smart Media Board to teach a class of maths students made up of people from around the globe without the need to all be in the same place. This is a statistic of ‘maths going green’ and saving energy whilst improving the mathematical skills of the world. The computers used by these Smart Media Boards are capable of doing more than one task at a time and so through this latest teaching tool it becomes even more possible and probable that these teaching techniques will develop quickly, especially given the falling number of maths specialist teachers.

The computers used at LSBU come equipped with two USB power ports on the front panel of the machine. These ports allow the teacher to connect any device with a USB connector directly into the computer and thus use it on the Smart Media Board. The cost of electronic storage devices is falling all the time and more professionals are turning to them to store data and have a portable device with which to store and carry information. Others may have their own or institution issued laptop computers and these can also be connected either through the use of the USB port or, in the case of the LSBU machine, through the supplemental cabling supplied with the control unit. Finally, as previously mentioned, there is always the possibility to have the computer networked, as is the case at LSBU, so that information can be shared or obtained with any number of other users on the network.

The range of possibilities does not end with just a computer and all the many connotations that can bring to the advancement of pedagogy in mathematics. At LSBU the system being used in the Support Centre has been upgraded to include a video player that plays both magnetic tape and DVD format videos. This allows teachers to use existing commercial media from outside sources or other media sourced from specialised organisations, such as the Matehtutor, which can be purchased or viewed on-line from the mathcentre website [2]. There is an ever-widening range of excellent video and DVD products available to enhance the learning experience of students and by using the Smart Media Board these can be brought directly into the classroom.

With the addition of the optional DVD/video player came the need, in the case of the LSBU unit, to install a separate amplifier unit. This unit allows the signal from both the computer and the other player to be sent to external speakers mounted on the wall of the classroom. The soundboards traditionally found in computers do not have the necessary power to do this job, hence the need for the amplifier. Whilst having the amplifier installed, you can also consider adding a radio tuner into the overall unit, should it be deemed that in the future radio broadcasts might want to be played to students.

The entire Smart Media Board system installed in the Maths Support Centre at LSBU is housed in a very functional heavy steel cabinet. The cabinet is a practical housing, allowing all controls to be accessed by users of the system; the controls are easily reached through a cut-out section in the front of the cabinet. However, for security purposes, the entire cabinet is secured to the floor.

The projectors used in the units at LSBU are two different types. The first type contains a large mirror that projects the image onto the Smartboard from a very acute angle. This type of projector works very well in the particular room in which it is located as the ceiling there is very high and allows the unit to lower the image sharply onto the screen. The second type of projector used is one found more commonly in most educational institutions and, due to the way it projects, requires a greater distance from it to the board. Given the lower ceilings in the other classrooms this projector is used. These units do not hang as low as the mirror projector and therefore it is unlikely to cause any overhanging obstruction hazard in the classroom.

The cost of installing this system depends on the type of package required. For example, you can get started by spending as little as £800 if you already have a suitable projector and technicians to install the board. However, for a comprehensive package which includes installation of a SMART Board interactive whiteboard, projector and audio system the cost is around £3000. The Network Infrastructure Solutions website [3] will give you ball park figures of relevant costs, and they do offer an educational discount. The Wireless Tablet can be purchased for around £250.

The LSBU Maths Support Centre team have not had their new equipment very long but already students have commented on the new and innovative way of teaching. If you would like to see the boards in action or have any questions, please feel free to contact the authors.

References