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Adopting Online Teaching and Learning Utilizing AI Technology Enhancements Throughout the COVID-19 Pandemic and Beyond

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Abstract: Since 2019 the Covid-19 Pandemic has had a significant impact on the daily lives of the populations of the world. Education was no exception, this was a sharp change to online teaching, which was the only available option to keep the education system working. At that time, the education sector was rapidly adapting and attempting to use a variety of online tools, such as Microsoft Teams, Blackboard Collaborate Ultra and Zoom to name a few. Therefore, using these tools for online teaching and learning required significant operational change, that had to happen at pace, as current teaching and learning was scheduled for Face-to-Face (F2F). In addition, greater use was made of Learning Content Management Systems (LCMSs) such as Moodle and Blackboard, which was an existing set of tools. Contemporaneously, these tools were adapting to the teaching and learning by adding additional features, based upon feedback for users. This paper examines some experiences of delivering higher education courses during the COVID-19 pandemic, where it examines the online teaching and learning tools Microsoft Teams and Blackboard Collaborate Ultra, and explores how AI can be used to enhance the process of teaching and learning online. Finally concludes with a summary of the main outcomes.

Keywords: Higher education, AI, MS-Teams, blackboard collaborate ultra, learning management system, LCMS, LMS, video conferencing, online teaching and learning

1. Introduction

In 2019 the world became aware of a respiratory viral infection called Coronavirus, which was identified and classified as COVID-19. This was formally identified in early January as a member of the SARS-CoV-2 group of viruses (Boni, 2020). As the infection proliferated across continents, it was classified as a pandemic by the World Health Organization on the 30th January 2020 (WHO, 2021). In the UK the government declared the infection as a public health emergency, and launched a number of measures to curtail and limit the proliferation of the virus. Commonly referred to as lockdown, all but essential work came to a halt and the public was advised to stay at home and only to venture out for essential supplies or in an emergency (GOV.UK, 2021).

These measures introduced to protect the public, left organizations attempting to devise a means of how to continue to conduct their business. This quickly meant a change to working practices and a move to online working. Therefore, many organizations implemented online working with video-conferencing tools such as Zoom and Microsoft Teams. The education sector was similarly impacted, with schools, colleges and universities investigating a rapid change to online delivery utilizing the same tools. The rapid change to the pedagogic approach concentrated on the use of small group activities and a number of formative assessments aimed at maintaining student engagement, motivation and studying in an online environment. The use of online platforms allows for timely lecturer feedback, however, the development of these activities and artifacts were time-consuming, although, they provided students to ability to reinforce their knowledge at their convenience (Wilson, 2020).

Additionally, consideration was given to the operational aspects of the courses, with some courses changing to a block mode of delivery, which allowed students to concentrate on one module at a time. Therefore, it can be seen that the use of these tools has proved critical in the online delivery of courses and the continued university operations. This paper examines some experiences of delivering higher education courses during the COVID-19 pandemic, where it examines the online teaching and learning tools Microsoft Teams and Blackboard Collaborate Ultra, and explores how AI can be used to enhance the process of teaching and learning online. Finally concludes with a summary of the main outcomes.

This paper is organized as follows: Section 2 discusses about online teaching and learning using Microsoft Teams; Section 3 discusses about online teaching and learning using Blackboard Collaborate Ultra; Section 4 presents some AI enhancements to aid online teaching and learning activities; Section 5 summaries the paper and presents some future work.

2. Online Teaching and Learning Using Microsoft Teams

In this section Microsoft Teams is considered as one of many online video conferencing platforms.

MS-TEAMS was announced as the primary replacement for Skype for Business in 2019, providing the primary client for communications in MS-365 and Office 365, and its development is outlined in the MS-365 roadmap (Microsoft, 2021c). In addition to the persistent chat and messaging capabilities, Teams includes a comprehensive meeting and calling facility, with built in, fully integrated voice and video. For many universities operating Microsoft 365, it was a natural step to investigate whether Teams could be utilized for online teaching and learning in the context of an impending global pandemic, where working and studying from home became the priority. Since the use of MS-TEAMS in this environment, it has been enhanced and improved by Microsoft, realizing its competitors had the advantage, and some HEIs opting to purchase both MS-TEAMS and ZOOM to account for all eventualities.

2.1 Microsoft Teams

The list of features below is not exhaustive, however, many of these features have been utilized by Higher Education Institutions (HEIs), in the UK. The pedagogical change meant a greater reliance on a constructivism pedagogical approach utilizing the features above with smaller group activities and formative assessment, to reinforce and enhance learning (Meyer, 2005).

2.2 Features of Microsoft Teams in Teaching and Learning

The following section describes how some of these features were used in the teaching and learning of the courses delivered at one university in the UK.

2.3 Teams and Channels

The use of Microsoft Teams was utilized in conjunction with the Learning Content Management System (LCMS), which in this case was Blackboard, however, at some universities, it might be Moodle, Canvas, BrightSpace, or some other LCMS.

Therefore, the LCMS is utilized to hold the content, videos, PowerPoints, reading material and formative and summative exercises. MS-TEAMS is used to establish a teams site for the main course and the modules, with channels for each type of delivery such as lectures and workshops. This allows communication with the whole student cohort under the course team site, and individual groups in the channels under the modules.

2.4 Conversations Within Teams and Channels

Utilizing the structure above, means that online lectures can be delivered to all the students in the module. For the smaller groups in the workshops and tutorials, channels are created with a subset of

the module cohort, in this way only members of the channels can join the online sessions, giving the students a class identity. During the session students can enter questions in the chat facility and they can be answered by the lecturer, either to the individual or the whole class.

In addition, students are able to signal that they have a question, and the lecturer is able to either answer immediately, or inform the student that they will take questions shortly. Finally, the whole session can be recorded for students to review the material and session interactions later. A number of students have found this facility invaluable, especially, if they cannot attend the original session.

2.5 The Chat Function

2.6 As stated earlier, the mechanism to communicate with the students is through messages in the chat function, where students can pose a question in the chat, and the lecturer can either reply immediately or answer later. Questions and comments posted in the chat are available to the cohort in that channel, which encourages students to chat with each other and discuss the topic whilst the session is progressing. Furthermore, the chat can be used to upload files and pictures to further aid student understanding.

2.7

2.8 Document Storage and SharePoint

All files uploaded in the chat or elsewhere on MS-TEAMS is saved to SharePoint folders for review later. Therefore, all files, videos and pictures are automatically uploaded to SharePoint and lecturers have the opportunity to edit the recorded lectures before they are made available to the student cohort.

2.9 Online Video and Screen Sharing

The screen sharing feature has proven to be very effective in the education field, as presentations or the screen can be shared. One of the main improvements in the MS-TEAMS software was the enhancement in the presentation feature allowing better control over the presentation. When using PowerPoint MS_TEAMS can allow everyone to control slides, or limit this to the presenter. In addition, there is a facility for other members of the channel or team to take control of the presentation. Moreover, the screen sharing allows the lecturer to demonstrate other software such as graphing or project management packages live to students in the online session.

2.10Online Meetings

Classes are scheduled through the student's timetable being organized into online meetings, which are video calls, as stated above. These meetings are linked to the students and staff that are members of the channel or team. Attendance at a class or meeting, is recorded in the attendance list and can be used in monitoring attendance. The attendance lists in addition to simply attendance, are capable of recording engagement throughout the session thus the lecturer can link engagement to the sub-topic under discussion at the time.

2.11 Limitations of Microsoft Teams in Teaching and Learning

2.12

There are a number of disadvantages of the use of teams, as given below (this list is not exhaustive, rather, it concentrates on the main disadvantages):

- Its success is dependent upon the students IT equipment they use in the home, which may be very different from that provided in classes in the university. This difference changes how students interact with the online classes and MS-TEAMS, as the software is resource heavy, which can mean that students may not be able to engage in video calls or meetings. Therefore, the advice given is to attend the meeting initially with video, but to switch to audio only, afterwards.

- This lack of suitable equipment means that for some students they followed the sessions on their mobile device, therefore, they could not fully engage with the interactive parts of the session, as the specific software was not available on a mobile device.
- The operating system of the devices is equally important, as Microsoft Teams is designed to work on Windows based PCs, therefore, for some devices to access the session, it would be through their browser, which can vary in both performance and operation.
- Students operating in audio only, it is difficult for the lecturer to ensure that the student is actually fully engaged with the session, especially as sessions are recorded and students can view the playback at a later date and time.
- For fully interactive content additional software is often used such as Kahoot, Padlet and Mentimeter, and many others, this functionality is unavailable within MS-TEAMS.

2.13 Curriculum and Operational Changes

The main variations were in the delivery rather than the subject matter; therefore, teachers were required to build content which was interactive and which maintained the motivation and engagement of the students. Student motivation and the psychology of factors influencing their motivation is complex, with research indicating that the types of materials and how the online environment is organized has an impact on outcomes (Pintrich, 2001). Therefore, teachers are required to consider carefully the type and organization of the material, assessment (both formative and summative) are arranged for their students online.

2.14

3. Online Teaching and Learning Using Blackboard Collaborate Ultra

3.1 Blackboard Collaborate Ultra

Blackboard Collaborate is a real-time video conferencing tool that allows the addition of files, share applications, and use a virtual whiteboard to interact (Blackboard.com, 2021a). Blackboard Collaborate provides simple and reliable virtual classroom tools and solutions to provide online teaching and web conferencing requirements (Blackboard.com, 2021b). Collaborate Ultra is browser-based tool and it does not require a separate launcher application, as previous instantiations required for example Collaborate Classic. The systems is a SaaS deployment and the Ultra experience uses WebRTC encoding for connection efficiency (Blackboard.com, 2021c). Collaborate Ultra is a relatively new tool whose feature set is evolving rapidly.

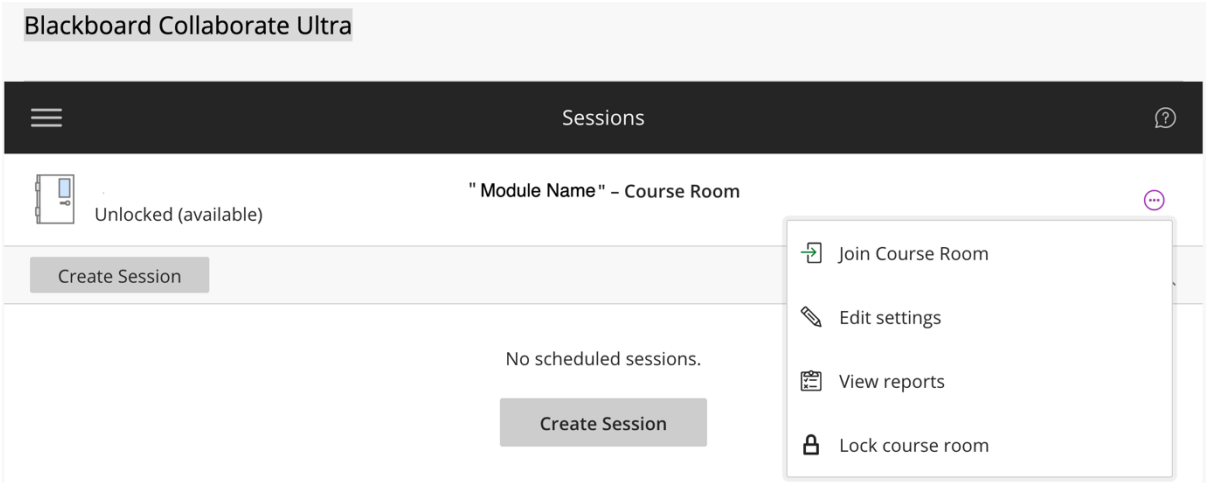

Figure 1. Blackboard Collaborate Ultra Accessing Screen

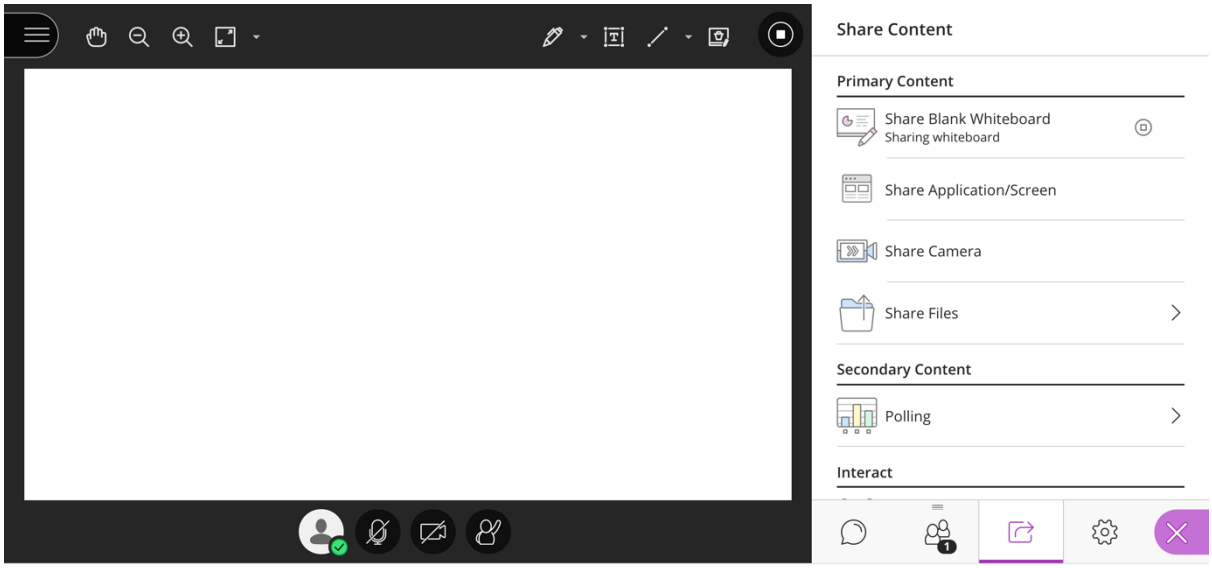

Figure 2. Blackboard Collaborate Ultra Teaching and Learning Screen

3.2 Features of Blackboard Collaborate Ultra in Teaching and Learning (Blackboard.com, 2021b) (Blackboard.com, 2021c) (Codlearningtech, 2021):

3.3 User-Friendliness

It delivers one seamless and consistent learning environment to students, without a separate login, providing a user-friendly user interface (UI), which makes accessing and navigating the virtual environment simple and efficient. It facilitates most of the required teaching and learning activities such as lecturing, tutoring, mentoring, and team projects.

3.4 Usability

It provides several accessibility features include full-screen reader support of all key workflows, whiteboard activities, and uploaded files. Additionally, most global keyboard shortcuts for common activities are supported. Users can open a Collaborate Ultra session from the Blackboard app and Blackboard Instructor, if a link is provided within a course. Users are directed to a web browser to join the session. The presenter can permit others to share their screens if they need clarification or to discuss further ideas.

3.5 Breakout Groups

There are group breakout features, which are very helpful in conducting different group-based activities, and allocating students into smaller groups for discussions or to work collaboratively. Moderators can select student groupings or allow Collaborate to randomly group students them. Furthermore, they can allow attendees to switch to another group and join a particular breakout group themselves to assist in the facilitation of collaboration. Additionally, files can be shared with one or more groups and there is a timer facility to limit and track the session.

3.6 Polling

The polling feature is effective in engaging attendees and asking opinions or questions from attendees during teaching and learning activities. Moderators can poll attendees using either multiple choice or yes/no questions to see how well attendees understood what the presenter presented or use reflective questions to help attendees retain what the presenter presented. On closing of the poll, results they can be shared with the attendees or downloaded for future use.

3.7 Live Closed Captioning

It provides a live closed captioning feature, where attendees can type in real time during a session and other attendees being able to see it. This provides an accessible learning experience for special educational need students, as well as for students whose native language is different from the moderator. These captions are saved along with the recording of the session. If the session had more than one caption track, only the first available one is captured.

3.8 Classroom Chat

It has a classroom chat feature that offers a messaging platform for students to share images, text, audio, and video. An important part of a classroom dynamic is the non-verbal communication such as emojis, and Collaborate Ultra supports diversified emojis and Unicode 8 characters. By default, moderators are notified when someone posts a new chat message. Moderator can limit who participants chat privately with. Moderators can choose to allow participants to only chat privately with moderators. If a session is being recorded, chat messages in the everyone channel are being recorded as well.

3.9 Customized Recording

It facilitates the recording of sessions which makes it possible for students who could not attend live to access them later, for students to use them to study, or for the lecturer to record messages to send to students. Recordings can be made available for download, and they capture not only the video and audio aspects but also the chat box. One of the newer features in recordings is that they can be made either public or private. If set to private, only the lecturer and the students enrolled on the course will be able to access them, keeping them safe and secure. As mentioned above, it is possible to add captions to recordings to improve their accessibility for all students.

3.10 Performance and Engagement Analysis

It drives better data-driven decision making by gaining a complete view of student performance and engagement.

3.11 Limitations of Blackboard Collaborate Ultra in Teaching and Learning

- It provides a file sharing facility; however, it currently supports only PowerPoint and PDF files which makes it difficult to share other types of files during teaching and learning activities if required.
- It provides a white board for writing and drawing; however, its functionality and usability are limited at the moment, which is slightly inconvenient for effective teaching and learning activities.
- The font and windows are much smaller and the user is not able to increase the size of the windows to make it easier to read/navigate.
- It is difficult to manage and monitor the chat with a large number of users.
- The audio-video synchronization is sometimes inconsistent.
- Some browsers require access to the microphone to play audio, even in situation where there is no speech. To hear others in the session, give the browser permission to access the microphone.

4. Enhancing Online Teaching and Learning Using AI Technologies

One of the issues affecting the learning and teaching is student engagement, as it is easy for students to turn off their microphone and camera, indeed, some may not possess these devices. Therefore, how can engagement and learning be measured. MS-TEAMS, makes use of PowerBI to assist in providing data analytics on student sessions (Microsoft, 2021b). The results from the analytics can be compiled into a

predictive algorithm, giving information on activities and delivery methods that are likely to maintain motivation and engagement. Once detected, the AI system could recommend different types of intervention methods and techniques.

5. Conclusions

The paper has presented an overview of how HEIs have adapted and responded teaching and learning in the context of the COVID-19 pandemic. Taking standard software for video conferencing and working with Microsoft and Zoom to improve the facilities that are offered on these platforms. A review of MS-TEAMS and Blackboard Collaborative with some examples of they are being used in teaching and learning in HEIs in the UK. For many HEIs the use of these online platforms has hastened the introduction of a blended learning approach, which they intend to continue after the pandemic has subsided.

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