COVID 19 – TECHNOLOGY SUPPORT COMMITTEE

Working Paper

Abstract

How can Universities prepare for the transition to virtual instruction?

March 26th 2020

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Introduction

In response to the COVID-19 pandemic, the Government of Pakistan has taken the decision to close educational institutions until 5th April 2020. As per the Higher Education Commission's COVID-19 Policy published on 13th March 2020, Universities have been instructed make preparations to minimize the disruption to the teaching schedule in the event the closure will be extended post April 5th. All universities have agreed to start preparing their systems to be able to offer effective online teaching as a substitute for regular classes. The objective is to ensure that teaching continues wherever possible, and that the impact of the necessary disruption on the students' learning is minimized.

A second objective is to protect the quality of teaching from being compromised. Faculty members, university administration, and the HEC will coordinate efforts to ensure that students have full and timely access, through virtual and electronic means, to all course information, reading materials, library resources, audiovisual material, power point presentations (if any), assignments, lab demonstrations (where relevant), classroom interaction with faculty as well as students, exam and testing schedules, and normal opportunities for off-class interaction with faculty members.

The HEC has established a Technology Support Committee to assist universities in establishing efficient online delivery mechanisms to achieve the above objectives. The members of this committee are:

- Mr. Asif Shahid Khan, HEC
- Dr. Naeem Tariq, VU
- Mr. Rizwan Rashid, HEC
- Dr. Saeed Ghani, IBA Karachi
- Dr. Ziaul Qayyum, AIOU

This working paper aims to assist the senior leadership of Universities in easing the transition to virtual instruction by providing minimum technology requirements and recommendations on the choice of digital platforms for the University.

Due to the wide variation in the capabilities of Universities to deliver courses online for the remainder of the semester, a one-size-fits-all solution is not feasible, and a number of options have been considered. The long-term sustainability (i.e. recurring financial & HR costs) of the recommended solutions and the ability to implement in a short time-frame (i.e. setup and readily available training) have been taken into consideration in the development of these guidelines.

Finally, what is important is not only that the LMS is installed, but that it is operationalized, i.e., that students can navigate their course requirements through the system, the faculty members have placed all relevant course materials online, future assignments and exams are conducted through the system, and more. A separate guidance document will be issued on these operationalization issues.

Minimum features required for Virtual Instruction

- **A functional Learning Management System (LMS) supports the following:**
    - Content Management System – capability to upload different types of content, e.g. documents, presentations, links to other sources, video lectures, etc.
    - Collaboration Tools – e.g. online discussion boards, chat, etc.
    - Testing and Assessments – basic capability of conducting and grading quizzes online and allow submission of assignments electronically
    - Mobile Learning – not all students have desktop / laptop computers at home, it is critical that the LMS supports mobile devices either through a native app or mobile browser (e.g. Chrome)
    - Offline access – capability to download course materials
- **A functional Video Conferencing (VC) solution supports the following:**
    - Class sizes of up to 100 students
    - Recording of live lectures made available for offline access
    - Mute feature – the presenter should have the ability to mute a particular participant and all participants as/when needed
    - Whiteboard – a digital canvas where the presenter can add content in real-time
    - Ability to play presentations/slides that would be broadcasted to meeting participants
    - Support for mobile devices
- **Building capacity of faculty members and relevant staff for online delivery: See** Annexure G – Resources for Best Practices / Guidelines**.**

Why is Video Conferencing needed?

Learning Management Systems are typically used in conjunction with in-person instruction. In order to deliver quality virtual instruction, faculty must create highly interactive content to make sure that students are engaged and learning outcomes are achieved. Without proper training, it is difficult to expect that existing faculty will be able to change their teaching methods and quickly adopt the best practices / models that work well in an asynchronous environment (i.e. learning through online channels without real-time interaction).

Students are in a similar situation; they are unfamiliar with a purely asynchronous form of learning. In the long run, both faculty and students can and will adapt; however, it is unlikely that this transition will take place in the short term.

In order to limit the disruption to both faculty and students, it is recommended that synchronous learning (i.e. online or distance education that happens in real time) be used to complement the material available on the LMS. This requirement makes an interactive video conferencing solution necessary. The live lectures can be recorded and will help the faculty create content that can be used for future courses and offline access for those students that are absent at the time of delivery.

Are Universities ready for this?

Last year, the HEC conducted a survey to assess the digital maturity of both public and private sector universities. Based on this survey and relevant to virtual instruction capabilities, Universities fall into the following categories:

- **Universities without LMS** – ~70 public sector universities have indicated that they do not currently have an LMS
- **Universities with LMS (Video Conferencing not included) –** ~40 public sector universities have indicated that they have an LMS. As the survey conducted did not ask for data on video conferencing integration, we are assuming that all these universities will require video conference capability
- **Universities with LMS (Video Conferencing included) –** A few universities including Virtual University and IBA Karachi have an LMS and are using third-party video conferencing solutions (e.g. Zoom, WebEx, Adobe Connect, etc.)

Recommendations

After evaluating the various options available, the following table summarizes the recommendations of the committee:

University Size	Services Needed	Universities without LMS	Universities with LMS (VC not included)	Universities with LMS (VC included)
Small (<5K students)	**LMS**	MS Teams	Existing LMS	Existing LMS
	Video Con	MS Teams	MS Teams	Existing VC
Medium (5K to 10K students)	**LMS**	Moodle	Existing LMS	Existing LMS
	Video Con	MS Teams	MS Teams	Existing VC
Large (>10K students)	**LMS**	VULMS	Existing LMS	Existing LMS
	Video Con	Adobe Connect	MS Teams	Existing VC

[Note: Refer to Annexure A – Technology Solutions for description of each platform + estimated recurring monthly costs]

Universities with Existing Systems

For Universities that have existing systems (LMS and/or VC), it is critical that they are prepared for the increase in traffic when all students shift to their online platform. To handle the expected increase in concurrent users, the University's IT staff will need to ensure that:

- The hardware infrastructure is sized appropriately
- There is adequate bandwidth available and extra capacity can be added as / when needed
- Business Continuity / Disaster Recovery plans are in place (includes regular backups)

For the above, it is important to highlight that only limited support from the HEC will be available as the nature of changes required depends heavily on the architecture of the system deployed by the University.

Evaluating Alternatives & Third Party Solutions

There are many 3rd party solutions available in the market and in use by other Universities. A few examples are: Blackboard, Canvas, Sakai and indigenously developed platforms. At times like this, Universities will be approached by many vendors claiming to have a solution that will fit their needs. It is strongly suggested that Universities ensure that the vendor has a track record of deploying their solution at scale and is in use by at least 5 Universities (VC level endorsements/testimonials of the vendor platform should be sought).

Next Steps

1) **Technology Implementation**
   a. It is recommended all Universities initiate the setup of Microsoft Teams **immediately** – see Annexure E – Getting started with MS TEAMS.
   b. Universities leadership should review the recommendations with their head of IT and determine which option they will choose for virtual instruction. If any further clarification/discussion is required from the Technical Support Committee, you may contact covid19-tsc@hec.gov.pk .
   c. Universities must provide the information requested in Annexure D – Basic information needed from each University clearly indicating their choice of platform(s).
   d. For large universities (>10K students), the VULMS team will contact your focal person to begin the implementation – see Annexure F – VULMS Division of Responsibility for details on division of responsibility.
   e. For the Moodle installation process, please have your focal person contact moodle@hec.gov.pk.
   f. While Microsoft Teams is the recommended option for video conferencing due to an existing licensing agreement, Universities do have the option to use alternate solutions (e.g. Zoom, WebEx, BigBlueButton etc.), however, they must do so at their own cost.

2) **Governance**
   a. Universities need to identify students and faculty that may not have access to broadband at home and those who do not have devices (smartphones, tablets, desktop / laptop computers) that can be used to access online learning platforms.
   b. Universities need to setup a helpdesk to answer student and faculty questions and address any issues encountered in the launching of the online learning program.
   c. Universities need to circulate the best practices / guidelines to all faculty – see Annexure G – Resources for Best Practices / Guidelines.
   d. Universities' Quality Enhancement Cells (QECs) will need to develop internal monitoring mechanisms to ensure the faculty is updating content on the LMS and delivering lectures regularly.
   e. Universities should identify staff with experience in virtual instruction who can assist other staff members in adopting the technology solutions used by the University.

3) **Communication**
   a. Universities should establish channels for communication with faculty and students.
   b. Use of social media platforms (e.g. Facebook & Twitter) are recommended.
   c. WhatsApp groups should be created at the department level for Faculty.
   d. Through these channels, the faculty and students should be kept informed of the Universities' strategies, plans, and timelines for virtual instruction.

Annexure A – Technology Solutions

Microsoft Teams (MSTeams) for Education

Overview: Microsoft Teams is a digital hub that brings conversations, meetings, files, and apps together in one place. MSTeams provides a lightweight LMS that has the very basic features needed for virtual instruction. It also includes the necessary video conferencing capabilities necessary to deliver live lectures.

Licensing: MSTeams is included in the PERN subscription. PERN subscribers already have access to the Teams platform. Before using Teams, please check to ensure that you are subscribed to PERN with the appropriate number of faculty and students.

Infrastructure Requirements: None for Universities with valid PERN subscriptions. Please check your PERN agreement for details. For Universities not on PERN, the HEC will cover student licenses for the next 6 months; however the University must cover the licensing for faculty (~2 USD / month).

Moodle

Overview: Moodle is an open source LMS which has over 50,000 registered sites in over 200 countries. It has all the basic features that are needed for virtual instruction. It does not have the video conferencing capabilities necessary for live lectures. However, integration with MSTeams will be provided to enable live lectures on Moodle.

Licensing: This program is free software; you redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation.

Infrastructure Requirements: The hardware needs for Moodle depends on size of the university. A typical University of 5,000 students, will require a minimum of 8 cpus, 24GB RAM and 1TB of hard disk to get started with Moodle. For the next 6 months, the HEC will provide the infrastructure needed costs (public sector universities only). After this time, Universities should budget the infrastructure costs as listed in Annexure B – LMS Features & Cost Estimates.

Virtual University LMS

Overview: The Virtual University LMS is a custom built LMS that has been in use by Virtual University since 2002. The VULMS has been leveraged to deliver such nationwide initiatives as digiskills.pk. It is a complete LMS system and includes video conferencing (via Adobe Connect) features necessary for live lectures. It has been tested on the ground at an existing Pakistani university, and VU has considerable experience in managing it effectively.

Licensing: Virtual University has offered to provide their LMS free of cost for the first 6 months, after which the costs will be ??/month. Adobe Connect licensing are estimated to be USD 500 / month?. HEC will cover the costs for the next 6 months (public sector universities only).

Infrastructure Requirements: The hardware needs for VU depends on size of the university. A typical University of 10,000 students, will require a minimum of 12 cpus, 32GB RAM and 1.5TB of hard disk to get started with HELP. For the next 6 months, the HEC will provide the infrastructure needed (public sector universities only). After this time, Universities should budget the infrastructure costs as listed in Annexure B – LMS Features & Cost Estimates.

Annexure B – LMS Features & Cost Estimates

LMS Features	MS Teams	Moodle	VU-LMS
Course Management	✔	✔	✔
Forums	✔	✔	✔
Quiz Tool w/ Grading	✔	✔	✔
Assignment Submission w/ Time Limit	✔	✔	✔
Integration w/ Plagiarism Software	✔	✔	✔
Active Directory Integration	✔	✔	✔
Online Help Documentation	✔	✔	✔
Mobile Support	✔	✔	✔
Offline Access to Course Materials	✔	✔	✔
Community Online Support Forums	✔	✔	✖
Messaging	✔	✔	✖
Live Chat	✔	✔	✖
Catalogue Management	✖	✔	✔
Gradebook	✖	✔	✔
Teacher Evaluations	✖	✔	✔
Attendance Sheet	✖	✔	✔
Admin Reports	✖	✔	✔
Course Reports	✖	✔	✔
Self Enrolment	✖	✔	✔
Gamification	✖	✔	✔
Easy to Integrate with existing systems	✖	✔	✖
Customizable	✖	✔	✖
Costs			
Annual Subscription	**$0**	**$0**	**$24,000**
Annual IT Support (HR)	**$0**	**$12,000**	**$0**
Annual Infrastructure			
Less than 5000 Students	**$0**	**$5,000**	**$5,000**
Between 5000 to 10000 Students	**$0**	**$7,500**	**$7,500**
Between 10000 to 20000 Students	**$0**	**$15,000**	**$15,000**
More than 20000 students	**$0**	**$25,000**	**$25,000**

Note:
- **All costs are estimates, actual costs may vary.**
- **Microsoft Teams licenses are included in the PERN subscription.**

Annexure C – Video Conferencing Solutions

Features	MS Teams	Adobe Connect	Zoom	Webex	BigBlueButton
Max number of participants	250	200	500	100	100
Time limit	None	None	None	None	None
Mute All Feature	✓	✓	✓	✓	✓
Create Named Room	✗	✓	✓	✓	✓
Whiteboard	✓	✓	✓	✓	✓
Sharing of Desktop	✓	✓	✓	✓	✓
Breakout Rooms	✗	✓	✓	✓	✗
Support for Mobile	✓	✓	✓	✓	✓
Recording	✓	✓	✓	✓	✓
Seamless Integration of recording with LMS	✗	✗	✗	✗	✓
Costs (monthly / room)	$0	$20	$20	$20	-
Note: BigBlueButton is an opensource solution that can be self-hosted and requires no commercial bandwidth when all clients are on the local network (e.g. Universities internal network or PERN)					

Annexure D – Basic information needed from each University

- University Name
- University Type [Public/Private]
- Focal Person Name
- Focal Person Email
- Focal Person Work Phone
- Focal Person Mobile Phone
- Type of Assistance Required [LMS, VC, MSTEAMS]
- Number of Faculty teaching courses in the current semester
- Number of Students enrolled in the current semester
- Number of Courses offered in the current semester
- Size of IT Team that can assist with training / setup of users for online platform
- Current Bandwidth available (Mb/s) to University
- Does the University subscribe to PERN services?
- Does the University offer email to faculty?
- Does the University offer email to students?
- Do you have a Student Information System?
- Current Learning Management System of University
- Number of courses currently using the LMS
- Does your LMS support synchronous instruction via web/video conferencing?
- Does your LMS support online assessments?
- Estimated number of students that have access to broadband internet at home?
- Estimated number of faculty that have access to broadband internet at home?
- Estimated number of students with a smartphone, tablet, desktop computer, or laptop?
- Any additional information you would like provide / Questions

Please submit your data using the following form:

https://forms.gle/QNd3f5pRZ7SyNYeT8

Annexure E – Getting started with MS TEAMS

1.   Contact Wahid Gul (wgul@hec.gov.pk) for the setup of user accounts

2.   Guide on how to set up classrooms and assignments using Microsoft Teams

        a.   How to create a new classroom using Microsoft Teams: Watch video*

        b.   How to give assignments to students using Microsoft teams: Watch video*

        c.   How to setup classrooms using School Data Sync: Watch video

3.   How to use Microsoft Teams to host classrooms online

        a.   How to use Share option to deliver the training content: View Link

        b.   How to use Whiteboard to make the training interactive: View link

        c.   How to record the meeting for replay and for your knowledge base: View link

4.   Set up Microsoft Teams Live Events for large seminars

        a.   How to plan and schedule a live event: Watch Video

        b.   How to attend a live event: Watch Video

        c.   How to moderate a Q&A: Watch Video

Annexure F – VULMS Division of Responsibility

Role of HEC:

1. Provision of Infrastructure, which includes:
    a. Virtual Servers with Windows Operating System (licensed)
    b. Database Server with Microsoft SQL Server (licensed)
    c. Network/Internet Bandwidth
    d. SMTP service
    e. Firewall protection
    f. 24/7 Technical Support
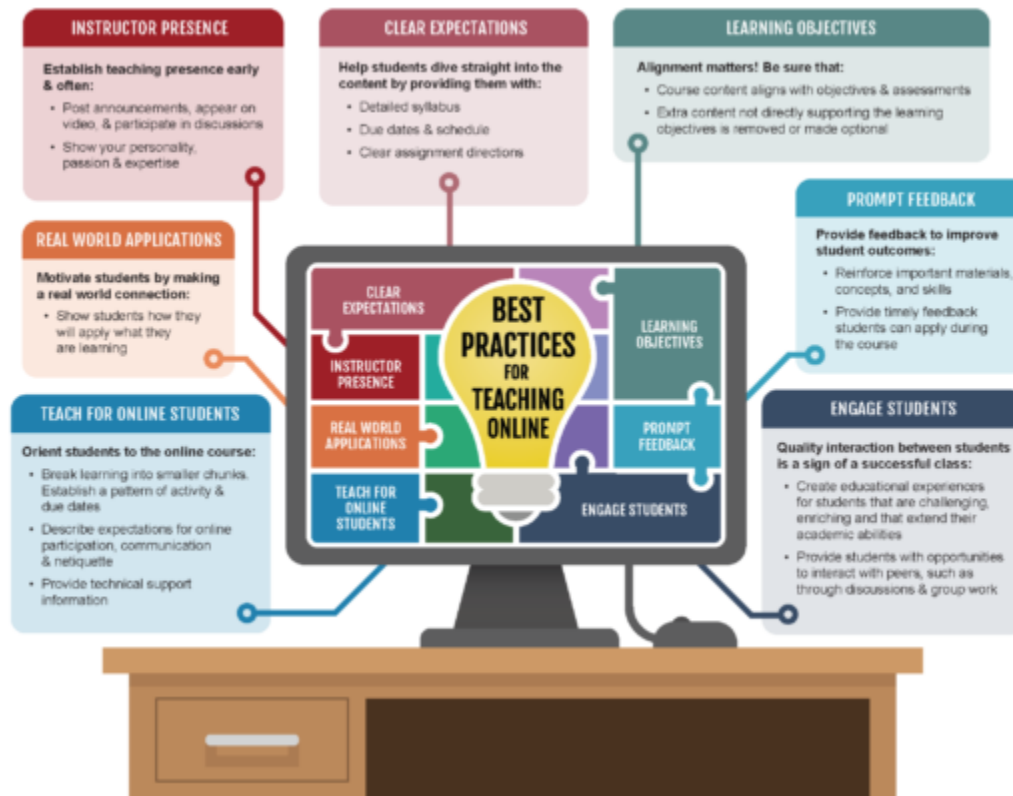   g. Additional Hardware Infrastructure for additional Universities (more than 7 or so)

Role of VU:

2. The following activities will be handled by VU.
    a. Setting up of Learning Management System (with interface for quiz, assignements, discussion boards)
    b. Preparation of User Guide
    c. Technical Support & troubleshooting regarding LMS

Role of Other University:

3. Each university will be performing following activities over the provided LMS.
    a. Users and Role Management
    b. Creation of courses and preparation of e-Contents (They can pull out content from VU OpenCourseWare (OCW.vu.edu.pk) or other free online resources)
    c. Creation of Students Accounts and circulation of credentials to the students
    d. Preparation of Assignments and their Grading by their own Academic staff
    e. Preparation of Online Quizzes and their contents by their own Academic staff
    f. Q&A on LMS Discussion Boards by their own Academic staff
    g. Online student support regarding subject related queries

Annexure G – Resources for Best Practices / Guidelines

[Source: https://teachonline.asu.edu/2018/09/best-practices-for-teaching-online/]

Further reading:

- How to be a better online teacher? (https://www.chronicle.com/interactives/advice-online-teaching)
- Columbia - Resources for Online Teaching & Learning (https://www.tc.columbia.edu/office-of-digital-learning/what-we-do/inner-pages/resources-for-online-teaching--learning/)
- Harvard – Teaching Online Resources (https://hbsp.harvard.edu/teaching-online-resources/)
- Harvard – Best Practices: Online Pedagogy (https://teachremotely.harvard.edu/best-practices)
- Stanford – Best Practices (https://teachanywhere.stanford.edu/best-practices)