A Novel Approach to Policy Development under Disruptive Circumstances using Situation Awareness and Scenario Planning in Higher Education

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Abstract—This paper focuses on policy development in a Higher Education context and provides a model for ensuring sustainable educational practice in TNE partnerships under disruptive situations. The focal point of policy initiation and development was the Covid-19 virus outbreak in China and the ensuing impact on program delivery and assessment. The development takes a novel approach by applying a combination of commercial scenario planning and crisis management techniques to create a coherent and prescriptive educational policy for staff operating in a Transnational Education (TNE) partnership based on the fly-in, fly-out (FIFO) faculty model. It demonstrates the application of these management tools and describes how, through careful analysis and planning, disruption to student learning, teaching and assessment can be minimized.

Keywords—policy development, scenario planning, crisis management, engineering education, Covid-19, transnational education

I. INTRODUCTION

While scenario planning and crisis management have been used and relied upon for many years in commercial enterprises [1] as aids to long term planning and crisis control, it is rarely used in Higher Education Institutions (HEIs) [2]. This paper considers ways in which a combination of scenario planning and crisis management techniques can be employed to develop and implement an operational level policy as part of a wider strategy for managing the learning, teaching, and assessment during the unfolding Covid-19 epidemic during the Spring semester of 2020, for a Transnational Education (TNE) joint program in electrical engineering based in Chengdu, Sichuan Province, China. It explores the effectiveness of the techniques from a management perspective and reflects on the success of the approach as perceived by the students, before suggesting how this approach could be applied as a regular methodology for developing operational policies in normal times.

While both partner institutions have policies covering learning, teaching, and assessment (LT&A), the focus of this paper is on the development of an operational policy intended to be used exclusively by the UK-based, FIFO staff who work directly on the TNE joint program, whether in delivery, assessment, or administrative roles. In particular, it looks at a structured approach to the development of policy within HEIs and how their strategies might be further developed by harnessing these tried and tested methodologies more commonly found in commercial environments.

II. BACKGROUND AND CONTEXT

The paper looks at the policy developed for a TNE joint venture, teaching electronic engineering in the University of Electronic Science and Technology of China (UESTC), Chengdu, China, with a student population approaching 1700 students, which has been running since 2013. The ethos behind founding a TNE operation in China was to establish links between a leading Chinese University [3] and the University of Glasgow, a UK Russell Group University, to develop greater collaboration and institutional visibility globally. The partnership combines the best of Chinese education pedagogy with that of the UK [4, 5] and has helped to foster collaborative research links. The 4 year BEng degree program, in which English is the sole medium of instruction, aligns closely with the standard non-TNE degree programs in the respective partner institutions.

The first anecdotal reports on the 'Corona' virus were received by the authors early in 2020 and confirmed by a medical

practitioner on the 9th of January [6] just 4 days after the World Health Organisation (WHO) [7,8] released a '*Disease Outbreak*' bulletin advising a '*Pneumonia of unknown cause*' had been detected in the Wuhan region. This early intelligence initiated a low-key monitoring operation to appraise senior management of any escalation that could impact TNE students studying some 1000km away from the outbreak epicenter. The monitoring method used was the accumulation of public sources of material that were then manually cross-correlated with information provided by Chinese colleagues and associates in situ who could provide immediate and unbiased updates.

should be improved based upon both student and staff feedback.

The approach adopted can be best summarised as a combination of classic crisis management techniques [12] with the environmental scanning methods regularly adopted by scenario planning and can be visualised in a new proposed operational model, referred to as a 'shark' diagram. The diagram reflects the breadth and complexity of information management from initial detection through the gestation of the pandemic until an effective and practical policy could be created and communicated. Figure 1 captures the 8 stages in
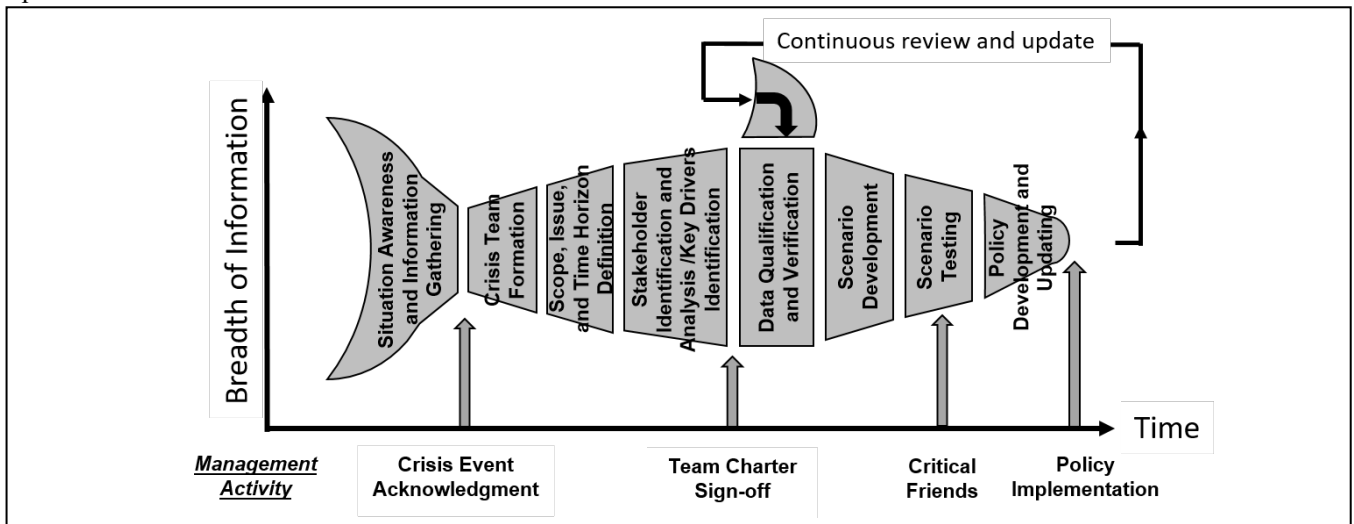

Fig. 1.   Shark diagram showing the breadth / complexity of information flow over complete life cycle of policy creation to business disruptions

During the monitoring activity, the students, still on campus in China, were completing the first semester and preparing to return home for the Chinese New Year holiday (24 – 30th January). As they would vacate the campus from the 18th January until the 24th March, this would allow program managers and course coordinators time to plan the resumption and method of teaching delivery in the second semester.

It became evident by the 15th January [9] that the situation was deteriorating rapidly across the whole of China and on the 22nd of January the UK Foreign and Commonwealth Office (FCO) issued advice to avoid travel to the Wuhan area, with the WHO issuing a Global Health Warning of a serious virus outbreak.

III.   METHODOLOGY

During the ongoing monitoring it became apparent that a more formal approach should be adopted by TNE management to manage the unfolding crisis. Crisis management techniques [10] are well known and tested in industry to deal with disruption and combined with scenario planning [11] would provide a suite of tools to analyse the evolving situation and inform the creation of a policy for FIFO staff involved in learning, teaching and assessment activities in the following semester. This paper presents the framework and methodology adopted to create the policy and how it was implemented; while considering impact upon the students' teaching and learning experiences culminating in the delivery of course assessments. The final part of the paper reflects on the effectiveness of the approach and which areas

the process that must be executed to manage a crisis, each of which is now described.

1)   Situation awareness and information gathering.
Stage 1 occurs before a tangible crisis has been identified. In the Covid-19 epidemic, this occurred in mid-January 2020. During this phase, relatively sparse, duplicated, and often conflicting information [13] appeared through a variety of communication channels and the greatest challenge was in managing the flow of this information and determining its reliability and accuracy. An effective tool in managing such information is a modified Jochari Window matrix [14] which is used to identify and classify known and unknown information from multiple sources. The technique provides a framework within which to cluster and classify information and is useful in articulating and prioritizing '*I wish we had…*' statements. The matrix cannot supply the information but helps direct an intensive investigation to uncover the required data.

Verifying the accuracy of each independent [1] source is a significant problem during the early stages of any crisis and is well-researched in operational management [15] where the need for decisions to be made based on incomplete information is commonplace. [16].

The outcome of the initial phase is an articulated description of the crisis with a qualitative summary for senior management on how the crisis might affect students; at this stage is not possible to quantify the severity of the problem.

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[1] Information sources should be checked for non-correlation to avoid the same source of information being 'double

counted'; it does not refer to the political independence of the sources such as government reports.

However, this situation report, similar to a high level market horizon scan in a business context [17], should provide sufficient management information to answer the question: *'Should a crisis team be formed?'*

2) Crisis team formation

Crisis management is a specialist area usually associated with emergency response teams within a manufacturing context or reputational damage in a marketing or publicity context [18]. While reputational damage crises are relatively common in the HE sector, their impact is usually contained. However, in the case of Covid-19 a much larger crisis was evolving, impacting all facets of learning, teaching, and assessment of the students engaged on the program.

Crisis management is an operational rather than a strategic issue, therefore a crisis management team predominantly consists of operational managers assisted by subject experts or specialists as required. The organisational structure of the team should be flat with communication links between members designed in a star configuration [19] to minimize delay, filtering, or lag in the dissemination of knowledge. Team size should be limited as the communication load increases as membership increases. The team leader in a crisis management team must have delegated authority and executive power to implement proposals. In the specific situation described, this role was undertaken by the Vice-Dean at The University of Glasgow as the Chinese partner university (UESTC) had closed for spring break and all staff were in lockdown.

The initial briefing of the crisis management team focused on sharing the situation awareness information, ensuring a shared knowledge starting point. The team leader communicated the membership and overall remit of the crisis management team to all affected staff members.

3) Scope, issue and time horizon definition

With any project team formation, the first step is the definition of a charter covering the scope, issues to be addressed, and timescales for both implementation and intervention. The underlying objective in crisis management is the mitigation of the negative impacts resulting from the crisis but does not extend to identifying a permanent solution; this would be the focus of a follow-on team. The charter agreed for the crisis management team for Covid-19 can be summarised in the following 8 principles:

- Minimization of any impact on student learning and experience should be paramount

- Technological limitations on home-based students should be recognised

- The status quo (normal operation) should be modified as little as possible on the assumption that 'normality' would return eventually (potentially before the end of the semester)

- Any plan should be based on a worst-case scenario but there should be contingency for the event that the situation improved (plan for the worst, hope for the best)

- Wherever possible, the impact of problems should be limited to a single semester to minimize effect on the new academic year (2020-21)

- The most time critical / learning critical issues should be identified and addressed first (therefore, graduating students (Year 4) should be prioritised over year 1)

- A 'best fit' approach for the majority of students should be adopted; outliers should be addressed on an individual basis

- Assessment solutions should be robust, irrespective of mode of delivery.

The timescale for developing and putting the plan into operation was the start date of the 2nd semester; 24th March. The intervention would be sustained throughout the semester until the end of June 2020.

4) Stakeholder identification and analysis / Key driver identification

When addressing any crisis it is very easy for the crisis management team to become myopic; focusing only on immediate issues without considering the wider implications of any actions. A method of reducing the likelihood of this risk is to perform a formal stakeholder analysis [20]. This type of analysis is common in strategic planning but much less prevalent in crisis management.

Performing a stakeholder analysis in the early stages of crisis management enables a robust communication plan to be developed. Through this analysis, the team identified the stakeholders, their relative importance and how best to communicate with them. While the most obvious stakeholders during the crisis were the students and staff, the parents of the students and the two institutions themselves were also of significant importance. With this in mind, appropriate communication channels were chosen for each of the groups.

5) Data quantification and verification

At the point of deciding to form a crisis management team, the information supporting the decision is highly qualitative. This stage in the crisis management process draws directly from strategic planning and concentrates on quantifying the impact of the crisis and defining reliable metrics. It is imperative that clear targets are defined for the identified metrics, some of which may be in conflict, along with a weighting algorithm to be applied in the quantification process.

There are many alternatives on how this may be determined [21] however it should be based on building consensus within the team. Simple voting protocols are not recommended as they are divisive and reduce team effectiveness.

6) Scenario development

Scenario development principles have been utilised for many years in long term strategic planning and are equally valid when applied to disruptive events where outcomes may be unknown. The underlying principles require that the crisis team develop a number, usually three to four, of scenarios they believe to be equally plausible, but not necessarily equally probable. The probability is irrelevant as the underlying premise can be summarised as *'What if…'*.

Each scenario must be developed to a level of detail where everyone can appreciate and understand the significance of its starting point. In this particular context, the scenarios ranged from students being absent for only three to four weeks at the

beginning of the second semester to not returning at all until the following academic year in September.

7) Scenario Testing

Once identified, each scenario must be analysed and tested to estimate its impact. Whereas at the scenario development stage, the initial conditions and important variables for each scenario are defined, during this phase the team attempts to predict the impact of each scenario as it would play out over time. During this phase, the team will refer to the metrics and weighting algorithm from Phase 5 to evaluate the overall impact on the key stakeholders.

As in the previous phase, there is no consideration of the likelihood of each scenario; the assumption being that the scenario has happened and must be managed. During this phase, there is an opportunity for assumptions to be challenged to test the resilience of the assumptions being made. At the end of this phase, the team should have a clearly articulated set of three to four scenarios with an estimated impact for each.

8) Policy development and updating

The last phase of the process is to compare the predicted findings from each scenario with the most recent situation report. The team may then decide to discard or modify the weightings attributed to one or more of the scenarios, or less attractively, to include a previously unconsidered scenario for analysis. Using the information from valid scenarios, a policy document is prepared for staff and students. This may be a suite of separate documents but must be self-consistent to avoid potential conflict. When preparing policy or policy modifications for use in a crisis, there must be clarity of intent and unambiguous in implementation and may be highly prescriptive. The new policy must be approved by the relevant stakeholders and communicated effectively to its intended audience. In the Covid-19 example, the team leader held a briefing session with all affected staff, and student counsellors based in China contacted every student to explain the significance and purpose of the revised policy.

After completion of the revised policy, the crisis management team remain in place to continually monitor the situation for any change that could result in further policy modification. It is also good practice for the team to check the revised policy for efficacy or unintended consequences.

IV. POLICIES AND IMPLEMENTATION FOR LEARNING AND TEANCHING

The most immediate challenge for the new semester was the preparation and adaptation of coursework and the corresponding teaching and learning material originally designed for conventional face-to-face delivery to make it suitable for an online delivery model. Nineteen courses were affected, most of which were in technical subjects. However, all Year 1 students also take a large (40 credit) English for Academic Purposes (EAP) course as part of the ongoing language development within the program. Student cohort sizes ranged from almost 500 in Year 1 to just under 300 in Year 4, with a total student population of approximately 1700 students. Of the 19 technical courses, ten were delivered by staff at the partner institution in China in a synchronous format while the remaining nine courses were delivered asynchronously by staff based at the UK university. Fortunately, all Year 4 modules had been delivered and assessed in Semester 1 and so final year students were only working on their Final Year Projects (FYPs). This mitigated the impact on graduating students arising from changes to the learning and teaching schedule.

Whether to offer synchronous or asynchronous delivery was a topic of significant debate within the learning and teaching management team in the UK. While synchronous delivery would potentially enable greater contact between students and lecturers in a live lecture hall setting, it was accepted that much of the desired interactivity and immediacy would be lost in an online setting. In addition to this pedagogical challenge, there was significant concern regarding the reliability of the network connection between the UK and China to permit online course delivery for up to 500 students, each accessing learning from their individual homes across China rather than on campus. Furthermore, the 8-hour time difference between the UK and China allowed only a small overlapping window for delivery, which gave rise to significant scheduling difficulties. It was inevitable that such timetabling constraints and time zone issues would necessitate either staff or students being involved in 'end-of-day' teaching, not conducive to a good learning or teaching experience. For these reasons it was decided that the most reliable and flexible approach would be to offer pre-recorded lecture material via the VLE (Virtual Learning Environment), in this case Moodle, with a follow up live session in the following week. This synchronous event would be delivered twice to ensure all students had the opportunity to participate, even where there were technical problems.

A. Policies for Learning and Teaching

Based on the above decisions, the Learning and Teaching policy detailed below was communicated to all staff at the UK university.

- Lectures should be delivered by embedding voice-over PowerPoint presentations.

- Each lecture should consist of 4-5 short (~10 minutes presentation plus audio) clips. This recommended size and length was based on network channel capacity issues, and pedagogical factors related to student attention span.

- Where lecturers would normally demonstrate worked examples in real time on the board during lectures, additional slides /material would need to be prepared in advance to replace this interactive mode of delivery.

- Two academic hours (one 90-minute) tutorial session would be held in the week following lecture delivery. This would allow students to interact and raise questions with teaching staff in a real time online forum environment. The use of the Zoom platform in a webinar style was recommended. A recording of this webinar would then be uploaded to the VLE to allow student revision and to accommodate those students unable to access the live session.

- Tutorial session slots were to be scheduled in the evening teaching sessions (Beijing time) to accommodate the differing time zones.

- The preferred VLE was Moodle. Administrative colleagues at UESTC would offer support with the portability of teaching materials onto the alternative VLE 'Blackboard' as a backup.

- Course leaders would have to evaluate the technical and pedagogical success of their academic delivery and report issues immediately to the Programme Director and the Vice Dean.

- UESTC student counsellors were to provide all announcements and updates to students via the Chinese 'QQ' mobile messaging service.

In courses involving student group work, provision was made to deal with specific learning and teaching requirements. Detailed discussion of this is outside the scope of this paper but as an exemplar, the Year 3 Team Design Project was facilitated by teaching staff through the use of Zoom, and individual group meetings used Chinese online services, such as 'Wechat' or QQ messaging, successfully.

B. Learning and Teaching policy implementation

UK-based staff teaching on technical courses delivered their courses asynchronously, using pre-recorded lectures and on-line laboratories. Due to time constraints, teaching staff based their material on existing lectures used in previous years in a face to face setting, adapting this for online delivery. Modifications to the format and content were carried out to meet the needs of the new delivery mode. Most of this demanded that the content be broken into smaller 'chunks' of ~10 minutes and included video clips and short tasks to encourage student participation and engagement. The result was the rapid transition towards a blended delivery model.

For courses involving laboratories, it was not possible to deliver the lab component in the conventional format. Staff therefore considered the learning objectives of the sessions and converted these into one of two formats. Design centric laboratories were converted from hardware to simulation style tasks and students submitted their completed work on the VLE. In the case of experimental labs, lecturers created a set of experimental results, allowing students to participate in the lab experimental analysis using the pre-supplied dataset. Both approaches ensured the same level of cognitive development as face to face delivery had provided.

This overall strategy was adopted to ensure that all students would be able to access learning over highly variable internet connections in a timely manner and be able to study at their own pace. However, it was recognised that this approach would not deliver the interactivity and immediacy preferred by the students.

In contrast, much of the English course was delivered synchronously (using the Zoom platform) to much smaller groups of 20 students by teachers working and living in the same time zone. The existing class size was maintained to allow for the necessary skills and task-based language teaching and learning to be delivered. When working with these small groups, technological issues were significantly reduced, enabling much more effective remote face to face sessions to be delivered.

V. POLICIES AND IMPLEMENTATION FOR FINAL YEAR PROJECTS

During the pandemic, as all face to face communication options became unavailable, supervision practice demanded a shift to a remote model. However, there are additional requirements and challenges related to remote supervision practice for students whose projects are based on hardware components and/or laboratory facilities. For instance, in the case of science and engineering students, the projects usually require access to lab equipment and campus facilities that have become inaccessible due to the disruptive circumstances. In addition, project assessment presents further challenges as these would, in normal circumstances, include a live student presentation of the project.

Therefore, there are two main fronts on which policies need to be made to support the supervision process, i) appropriate recommendations and guidelines for supporting students using remote supervision, and ii) performing risk assessment and mitigation of the challenging environmental conditions.

A. Policies for FYPs

A policy was prepared which took account of the disruptive circumstances and covered the above mentioned aspects. The salient points of the policy document were:

- The Project Coordinator was to ensure that projects of moderate to high risk impact were reviewed.

- Suitable actions to mitigate the impact on the student's performance were to be devised by supervisors and communicated to the students within two weeks.

- Programme Directors were to be informed of the solutions proposed for all cases with moderate and high risk impact.

- Teaching offices in both institutions would be jointly responsible for ensuring that all FYP documentation was updated and shared. Students would be notified of all modifications in a timely manner.

- A 2-week extension for final project reports was to be granted for all students.

- Reports were to be submitted to the VLE and marked electronically.

- Oral presentations and demonstrations would take place online, with the most appropriate technology option identified during the remote lecturing phase.

B. FYPs policy implementations

Following the development of the policy for project supervision and assessment, all staff were asked to review their own projects in terms of completion, due to the Covid-19 outbreak and inaccessibility of lab spaces. Supervisors modified and updated the titles and scope of their projects where required, with the resulting changes communicated to the students. Any changes required to a given project was formally recorded and signed by both student and supervisor. In addition to this project scope update, an additional two weeks was added to the submission deadline for all students.

The supervisors and students kept in contact through remote communication means such as Microsoft Teams, Microsoft OneNote, Zoom, or Skype. Some social media platforms such as WhatsApp and WeChat were also used for informal communication. The students were required to keep a detailed log of their meetings, including date and time, communication mode and discussion points. The logbook formed part of their submission.

The project reports were submitted electronically through Moodle, while Microsoft Forms was used to collect marker

grades and feedback. Oral presentations were conducted live online via Zoom, with presentation grades collected through Microsoft Forms.

Before the final assessed presentation event, a test session was run to help identify potential issues which could impact on assessment. While most of these tests went smoothly, some students had minor problems with camera connectivity issues and video / audio quality. Additional guidance and support was provided in such cases to resolve the issues in advance of the final assessment.

Almost 300 oral presentations were conducted in 15 parallel sessions over three days. In each presentation session, the student presented their work to their two assessors. Before the presentation start, the students confirmed their identity through the camera feed and by displaying their student identity cards. A 10-minute Q&A session followed the 15-minute student presentation. All online presentation assessments ran smoothly, with no major technical or non-technical issues.

VI.   POLICIES AND IMPLEMENTATION FOR ASSESSMENT

Assessment by its very nature is intended to measure the learning achieved by students and is central to any education system. All the courses delivered during this challenging semester base their assessments on the extent to which students meet the course learning outcomes. Within the program, each course has assessment divided into two weighted components; coursework or continuous assessment (CA) constitutes 25% weighting of the final grade, while a final exam or End of Term Assessment (EoTA), which takes place in a controlled or invigilated environment, constitutes the remaining 75%.

In the majority of the technical courses, CA includes either: i) a report based on project work or a descriptive assignment, or ii) a laboratory report based on laboratory experimental tasks. Normally, such assessments are submitted online to the VLE and were, therefore, unaffected during the Covid-19 disruption.   However, laboratory or project-based assessment requiring the use or set up of hardware was adapted to allow software or simulation-based tasks. The implementation of this change was supported by graduate teaching assistants (GTAs) who would normally assist in the running of experimental labs. In these changed circumstances, the GTAs underwent training on the new task objectives, and were thus able to assist students in an online setting.

EoTAs posed the greatest challenge in terms of how to set up and deliver such assessments in a controlled, secure environment, while still ensuring that students were given the opportunity to demonstrate their potential and thus achieve the grades they deserved.

A.   Policies for End-of-Term Assessments (EoTAs)

To address the issues detailed above with respect to EoTAs, a dedicated and detailed policy was developed. The dual aims of the policy were to attain 'a near controlled environment' set of results and to maximize the reliability and fairness in assessment. The key points of the document were:

- EoTA papers would be moderated as per normal procedure (internal then external moderation).

- Examiners were required to set questions compatible with the question types supported by the VLE platform. EoTAs had to be capable of being set as an assignment and/or a quiz on the VLE.

- The EoTAs were to be delivered in an open book *time constrained* manner with questions (Qs) presented in a *randomised* order.

- Questions would be presented one-by-one without the possibility of answers being reviewed/amended by students once submitted.

- As all technical course EoTAs on the program consist of four equivalent weighted questions, the duration for reading, attempting, completion and uploading of each exam question was to be set at 35 minutes.

- Exam instructions were required to specify clearly which answers/solutions should be submitted directly via a Moodle quiz and which were to be handwritten and submitted as a Moodle assignment.

- Examiners were required to provide a timetabled mock EoTA from the pool of past examination questions, to be available to students at least 4 weeks before the final EoTA date. This practice exam was to be made mandatory for all students.

- All EoTAs (including the mock paper) was to be made available and administered to students via the dedicated Moodle course page.

- A member of academic staff not teaching on the course would be given the role as the online invigilator during mock and final assessment. The online invigilator was required to host a real-time Zoom webinar to support students during assessments. The role of this 'invigilator' was to assist students with any technical issues associated with the exam process, such as problems uploading submissions but not with explicit subject content.

- Students would be able raise any issues with the EoTAs in real-time via the Zoom Webinar hosted by the invigilating staff.

- IT support was to be online during the online EoTAs.

- Electronic-marking (e-marking) of EoTAs was to take place. Staff training on EoTA marking was to be provided.

- The policy applied to all student cohorts and years.

- These continuity plans would remain until students were able to return to campus

B.   End-of-Term Assessment (EoTAs) policy implementation

Translating the defined policy into practical implementation posed huge challenges, especially from a technological perspective, and more specifically, around the functionality available within the VLE. These challenges were overcome through a staff group working through each issue, resulting in seven VLE EoTA pages successfully designed and developed for each of the seven courses offered by The University of Glasgow. The design included the two required constraints related to timing and randomness.

Towards the end of May, academic staff were provided with a hands-on training workshop session to understand the usability of the Moodle EoTA pages. In an effort to reduce the risk of potential plagiarism among students, question order was shuffled randomly.

After the successful completion of exam-setting for all the courses, mock EoTAs were scheduled for the third week of June, when students took part in the assessments. In total approximately 25% of Year 1, 2 and 3 students (316 of 1,461 enrolments) took part in these trial assessments. While the mock did not meet the policy requirement of mandatory attendance, it did provide extremely useful feedback that both the timing and randomization methodology had been successfully designed and deployed.

VII. STUDENT AND STAFF CARE POLICIES AND IMPLEMENTATION

From the outset of the COVID-19 lockdown, The University of Glasgow and UESTC responded to the challenges brought about by the pandemic prioritising the health and safety of both students and staff through a number of special measures which are summarised below:

- An emergency response team was established by management and the leadership team at The University of Glasgow.

- The emergency response team prepared contingency plans and training sessions for both teaching and administrative staff.

- The student counsellors in UESTC were tasked with checking the voluntary daily health reports of students using a specially designated phone app. Where Covid-19 symptoms had been missed by the students' families, these were recorded, checked, and reported where necessary.

- The University of Glasgow provided well-being support to all students whether on the Chinese or UK campus (2+2 students). A consultant psychologist was hired, and provided 1-1 online sessions for students.

- Student counsellors in UESTC provided support to potentially distressed students via Zoom and Wechat. These meetings were extended to 2+2 students who were able to connect to their home university to seek advice about their studies, travel arrangements and ongoing policies, helping to reduce anxiety.

- The University of Glasgow sought to reduce the impact of lockdown on student learning by developing diversified support approaches to online education, including podcasts of academic content.

- To ensure the students felt connected, social media was used. A Wechat corporate account encouraged students to post stories and photos of homemade food, exercise regimes and study practices.

By mid-May, senior (Year 4) students were allowed to return to the China campus; UESTC made preparations to ensure the safety and wellbeing of students. In school buildings, hallways and dormitories, posters and sanitation facilities were set up. Masks, hand sanitizer, thermometers and other essential items were issued to every student, and bespoke graduation gifts were handed out to celebrate their achievements

VIII. REFLECTIONS & FINDINGS ON THE POLICY DEVELOPMENT AND IMPLEMENTATION

During this time, feedback was sought from both staff and students to gain an understanding of how well the policies had been developed and implemented. The aim of this was to provide information for reflection and to allow for feedback loop closure, with additional information for future improvements. The following summarises the feedback received:

In terms of policy implementation, it mainly fell to the staff to meet the requirements as it was their responsibility to carry out the necessary activities within the policy guidance. Although the staff worked hard to follow the guidance, there were concerns about the lack of time to create material, deliver teaching and learning at the normal quality level. While disruptive circumstances demand swift actions, it is essential that consideration is given to the time required to implement policies.

There were differing levels of engagement in the policy making process among staff, partly related to levels of experience and role within the organization. While all staff relayed that they considered themselves 'well informed at each stage', some comments were made on the uncertainty and ambiguity in some policy items. At the same time, it was accepted that this was in part due to circumstance as the duration of the pandemic was unknown. Some staff members also stated that the amount of work expected had been underestimated, but acknowledged that it was well recognized by the management retrospectively.

In contrast, students were not comfortable with the move to on-line delivery and assessment and therefore it was important to involve students in the policy making process as much as possible; keeping them well informed to reduce their anxiety and stress due to uncertainty, particularly regarding assessments.

The students were surveyed on whether the university policy had taken their health and well-being into account during the challenging circumstances. Approximately 30% of the student responses (206) did not think the this was the case. This type of feedback highlights the need to take account of student perspectives more when developing policies.

Considering the feedback received from both staff and students as a whole, certain issues were brought into stark contrast and should be given special consideration during any future event resulting in unplanned disruption:

- Staff should be given information related to the purpose and rationale of any given policy as early as possible; they also need to be given realistic timescales for policy implementation.

- Students should be consulted throughout the policy design and creation process.

- Communication of policies and their related requirements to staff and students should be clear and timely.

- The risk of technology failure should be considered while preparing the timeline for assessments. Back-up plans should be in place for cases where technology does not work.

- IT should be involved in policy level discussions as input on connectivity feasibility and appropriateness of tools for delivery and assessment is key.

- Student engagement and interactivity are critical components of successful online delivery and therefore a key policy design principle should be related to enhancing the student experience.

- An enhanced quality control system to monitor how live lectures are converted for on-line delivery should be developed.

- Training for staff to develop online education content and the adoption of a 'buddy system' where lecturers can work as 'critical friends' should be put in place to foster the improvement and evaluation of teaching and learning content prior to uploading for student use.

- Technical issues, such as the Zoom whiteboard function being unable to be used with large student cohorts connecting over limited bandwidth, need to be addressed. Solutions, for example a conference system hosted in country with the lecturers dialing into the system, could be explored.

- Students need to be more directly trained in independent techniques so they might engage more effectively with online course material and self-study tasks.

IX. CONCLUSIONS

Undoubtedly the impact of the Covid-19 virus has been one of the most significant to have affected us globally and is predicted to continue to impact on all facets of life over many months and years. While there is little that organisations can do to guard against such unknown threats or disturbances to their business, there are actions and processes that managers can and should adopt to improve early detection of emerging threats and to predict the likely impact on operations. Scenario planning is a well-known method used in strategic planning; it is less often used in crisis management, either in commercial enterprises or the Higher Education sector. Through this combination of classic crisis management methods and scenario planning, the management team of the TNE operation in both institutions were able to predict the likely impact on their students and estimate the severity of such impact. This early detection facilitated the development of a pro-active policy for staff that placed the student at the centre of its design. It also allowed for the implementation of online learning, teaching and assessment procedures and policies which helped to manage the impact. Furthermore, using scenario planning and regular communications, learning, teaching and assessment of students was able to continue in a planned and managed manner despite the impact of sequential lockdowns on both Chinese and UK staff.

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