Quality Assurance in Course Development and Delivery in a Post-Pandemic World: Riding the Wave of Technology Transformations

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Abstract

As higher education institutions engage in course development and delivery in this post-pandemic context, quality assurance considerations must play a key role, as emergency remote teaching is not the standard for online learning. In this position paper, the author conducted desk research and sought to answer the following questions: i) What were the main technology transformations experienced by higher education institutions during the Covid-19 Pandemic? ii) What are some post-pandemic considerations for course development and delivery in higher education?; iii) What are the quality assurance considerations for post-pandemic higher education institutions seeking to deliver online courses? Sources were identified, reviewed and evaluated for credibility based on the quality of the publication, taking account of journal impact factor, relevance to the topic and the timeliness of the information. The articles were read and sentences, paragraphs, or sections that reflected the scope of the research questions were extracted and reviewed to see how they responded to the research questions. Findings confirmed that a wave of technology transformations took place, marked by increased use of Learning Management Systems and synchronous web conferencing platforms. It was found that the use of rubrics to identify quality indicators is an important quality consideration. It was also found that lecturers gained more experience with remote examination and virtual labs and simulations. There was enhanced online student support in institutions and more options for developing faculty competencies in online teaching. Overall, there was greater understanding of the continuum of online learning, and that specific resources are required to ensure quality in course development and delivery. It was recommended that institutions engage in appropriate and timely policy development, including the development of a clear quality policy that captures the standards for online learning. There should also be the application of an appropriate quality assurance framework, and the strengthening of those entities responsible for implementation of the activities crucial for online course development and delivery.

Keywords: quality in online learning, quality assurance in higher education, technology transformations post COVID-19, transitioning from ERT

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Introduction

The COVID-19 Pandemic resulted in rapid upscaling in the use of technology in education, as educational institutions were forced to resort to remote teaching. Traditional face-to-face institutions rode a wave of technology transformations, which involved them engaging in more synchronous online delivery of courses, online assessments, and greater use of learning management systems. Just as these traditional institutions gained confidence in the delivery of remote teaching, the rise of Artificial Intelligence heightened the technology transformation wave. The desire to remain relevant, keep abreast of the technological transformations and meet the changing demands of stakeholders require higher education institutions to review course development and delivery to encompass more online approaches while considering how to cope with the challenges posed by rapid technological developments. As institutions engage in course development and delivery in this post-pandemic context, quality assurance considerations must play a key role, as emergency remote teaching is not the standard for online learning. Through desk research, this paper seeks to answer the following questions:

1. What were the main technology transformations experienced by higher education institutions during the Covid-19 Pandemic?
2. What are some post-pandemic considerations for course development and delivery in higher education?
3. What are the quality assurance considerations for post-pandemic higher education institutions seeking to deliver online courses?

The goal is to provide recommendations for ensuring quality assurance in online course development and delivery especially for traditional higher education institutions considering transitioning to dual-mode institutions.

Process for Conducting the Study

The researcher utilised desk research to answer the research questions. Desk research involves the use of secondary sources of data, or previously published research, rather than collecting new data (Goundar, 2012; Kabir, 2016). This method is usually recognised as providing a starting point for further research (Kabir, 2016).

The process used to derive the data for this study commenced with an identification of the problem and the related research questions, outlined previously. This allowed the researcher to set the scope or parameters for the research with regard to subject area, location and time frame as follows:

Research Question 1- What were the main technology transformations experienced by higher education institutions during the Covid-19 Pandemic Scope – Journal articles, papers, reports, or websites dealing with use of Information, Communication Technology (ICT) for teaching and learning between 2020 and 2021. That is, during the height of the COVID-19 Pandemic, in higher education institutions within the Caribbean and globally. Information was also sought from non-profit and professional organisations committed to advancing quality in higher education and the use of ICTs, such as Educause, Quality Matters and the Online Learning Consortium.

Research Question 2- What are some post-pandemic considerations for course development and delivery in higher education?
Scope – Journal articles, papers, reports, or websites dealing with online course design following the Covid-19 Pandemic, i.e. from 2022 in higher education institutions within the Caribbean and globally. Information was also sought from non-profit and professional organisations committed to quality in higher education and advancing higher education through the use of ICTs, such as Educause, Quality Matters and the Online Learning Consortium.

Research Question 3- What are the quality assurance considerations for post-pandemic higher education institutions seeking to deliver online courses?
Scope- Journal articles, papers, reports, or websites dealing with quality considerations for online learning in general and specifically considerations following the Covid-19 Pandemic, i.e. from 2022 in higher education institutions within the Caribbean and globally. Information was also sought from non-profit and professional organisations committed to quality in higher education and advancing higher education through the use of ICTs, such as Educause, Quality Matters and the Online Learning Consortium

After setting the scope, resources were identified by conducting online searches utilising firstly, The University of the West Indies UWILinC information portal, and later using references made within resources identified, comprising academic journal articles, websites and blogs. This allowed for a compilation of a range of sources consistent with the scope identified for the research questions.

All sources were reviewed and evaluated for credibility based on the quality of the publication, taking account of professional reputation of the source, journal impact factors, relevance to the topic and the timeliness of the information. The articles were read and sentences, paragraphs, or sections that reflected the scope of the research questions were extracted and reviewed to see how they responded to the researcher's questions, and a narrative developed based on this review.

Technology Transformations Experienced by Higher Education Institutions During the COVID-19 Pandemic

As the COVID-19 pandemic spread globally in the early part of 2020, traditional institutions of higher education were forced to stop in-person teaching and go into complete lockdowns, shifting to remote teaching and learning. The exact timing and duration of lockdowns varied according to country and institution. In Trinidad and Tobago, all schools, including higher education institutions (HEIs) were closed by the Government initially for one week commencing March 14, 2020. This closure was later extended as the pandemic progressed, with schools finally reopening for in-person attendance two years later, in April 2022. During the period of lock down institutions were forced to transition to delivery of teaching and learning, using online technology. The rushed, unplanned nature of this transition was termed Emergency Remote Teaching (ERT) rather than online learning (Bates, 2020; Hodges et al., 2020) and required rapid, and significant technology transformations to survive the remote teaching experience. These transformations involved the use of hardware and software, or innovative strategies, to structure and deliver teaching and learning remotely and provide student support.

Learning Management Systems and Synchronous Platforms

The increased use of Learning Management Systems (LMSs) and other online platforms such as videoconferencing systems that could facilitate synchronous communication represented a significant technology transformation for some institutions that traditionally delivered in-person teaching and learning. An LMS is a software application or web-based technology used to plan, implement and assess a specific learning process (Kirvan & Brush, 2023). LMSs such as Moodle and Canvas allowed faculty to provide course materials, assignments, quizzes, and assessments for asynchronous learning, enabling students to access content at their own pace. Online platforms which allowed synchronous audio and videoconferencing such as Zoom, Microsoft Teams, and Google Meet were also used more widely for conducting virtual classes and meetings (Al-Badi & Khan, 2022; Mhlanga et al., 2022). These collaboration and communication tools were used to maintain connectivity and real-time interaction among students, faculty, and staff. The increased use of these platforms required some institutions to invest more to obtain licenses, in cases where there were none, or to expand licenses, for those where they existed for a limited capacity. The increased reliance on digital platforms required more robust cybersecurity measures and data privacy safeguards by the institutions. Universities were also obliged to invest in upgrading their networks, expanding bandwidth capacities, and ensuring reliable internet connectivity to support remote learning (Teich, 2022). In many cases universities had to also provide Internet access and digital devices to faculty, staff and students, to facilitate access.

The remote delivery of teaching and learning via LMSs and videoconferencing required a shift in assessment strategies.

Remote Examinations and Proctoring

With in-person restrictions and the closure of physical testing centres, higher education institutions implemented remote examination solutions which required technological transformations. There was an increase in use of proctoring software for those institutions which could afford it, with the most popular being LockDown Browser (a custom browser that locks down the testing environment within a learning management system) and Respondus Monitor (Students use a webcam to record themselves during an online exam) (Flaherty, 2020). These tools functioned as surveillance tools, in an effort to minimize instances of cheating during online examinations. For those institutions who either could not afford proctoring solutions, or who were averse to the use of surveillance, alternative assessments were used. Alternative assessments "comprise various types of assessments such as oral assessment or VIVA via Zoom or similar video conferencing, submission of video recordings of presentations, live psychomotor skill demonstration via Zoom, take-home open book assessments, time-limited online open-book assessments and assignments" (Adama et al., 2023, Introduction section, para. 4).

Virtual Labs and Simulations

Apart from concerns with assessment strategies and academic integrity, a major challenge of the transition to remote teaching was the teaching of science courses with a laboratory component. Those courses and programmes that relied on hands-on laboratory work and practical training had to find remote alternatives during the pandemic. Virtual lab solutions and gamified simulations were transformations engaged in by traditional in-person institutions. These strategies allowed students to gain practical experience remotely by replicating lab environments and enabling students to conduct experiments virtually (Alvarez, 2021; Vasiliadou, 2020).

Enhanced Online Student Support

During the pandemic it was even more important for higher education institutions to maintain student support services remotely. As noted by Bouchey et al. (2021), the student services required included:

- retention services such as orientation, advising, coaching, course registration;
- student engagement services such as, counseling, and health services; and
- learning support such as library, writing centre services, tutoring, career services, and technology support.

To facilitate the continuation of these activities, some institutions deployed online help desks using existing staff responding online via email or texts via mobile phone, virtual advising sessions, and chatbots. These strategies using information and communication technology, aimed to replicate the support services previously offered in person.

Professional Development for Faculty

The shift to ERT required both faculty and students to function in roles of online teacher and learner, for which many were not prepared. Institutions were tasked with providing faculty and

students with training and orientation respectively. This training involved at the most basic level, the use of the technology required to teach for example, an LMS or web conferencing software, to the more complex adaptation of online teaching and learning methodologies. The technology transformation in this case was the use of various forms of online training to facilitate professional development of faculty (Bates, 2023b).

Post-Pandemic Considerations in the Context of Course Development and Delivery in Higher Education

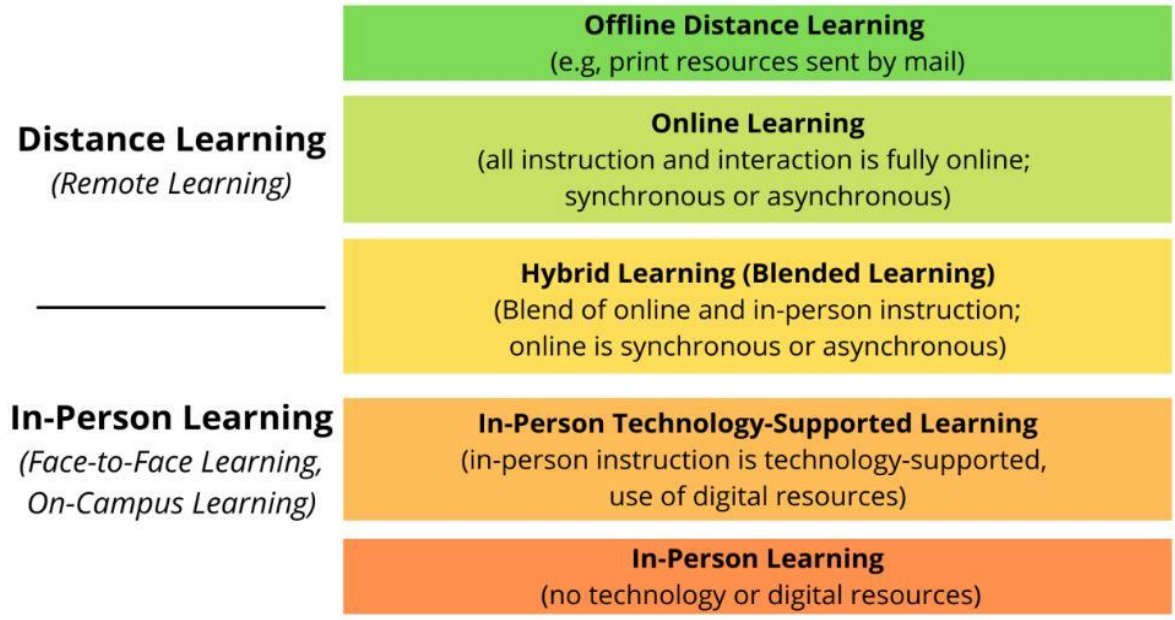
The various technological transformations which took place as a result of the shift to ERT, and the ability of the institutions to continue operations during the pandemic, provided them with greater confidence in online modalities. There was consensus among HEIs that we should learn from the ERT experience and that remote teaching should remain a part of how we deliver teaching (Benito et al., 2021; Tesar, 2020). With the transition back to in-person delivery in the post-pandemic period, universities continue to explore ways to capitalize on the gains made through ERT. These post pandemic considerations need to be considered in the context of course development and delivery, as core aspects of the higher education landscape.

More Online and Blended Learning

One of the main considerations post pandemic, which has implications for course development and delivery, is the increasing use of technology for teaching and learning and the shift to more online delivery. Bates (2023a) opines that while there is a preference for in-person teaching by faculty, blended learning will increase in the future. He notes that in Canada "80% of administrators believe there will be an increase in courses offered partially online and 69% believe there will be more fully online courses, while only 58% believe there will be more in-person" (Bates, 2023a, CDLRA Research section, para.3).

Blended and online learning can be considered as existing on a spectrum, which is captured most succinctly in Figure 1: Modes of Learning Spectrum.

Figure 1
Revised Modes of Learning Spectrum



Note. From *Evolving Definitions in Digital Learning: A National Framework for Categorizing Commonly Used Terms* (p. 7), by N. Johnson, 2020, Canadian Digital Learning Research Association (http://www.cdlra-acrfl.ca/wp-content/uploads/2021/07/2021-CDLRA-definitions-report-5.pdf). CC BY-ND 4.0.

The Modes of Learning Spectrum framework makes a distinction between distance learning and in-person learning. It equates distance learning with remote learning, while the term "in-person learning" is equated with face-to-face or on-campus learning. It is also noteworthy that hybrid learning and blended learning are used interchangeably, and there are variations within these modes such as the flipped classroom and HyFlex learning. The flipped classroom involves the use of lecture capture to facilitate teaching and learning. In this mode, students are provided with video recordings of lectures prior to an in-person class, and they attend the in-person class for discussion or class activities (Bates, 2019). HyFlex learning, which is sometimes used interchangeably with the terms multi-access learning and co-modal learning, "allows students to choose their mode of learning on any given day and move fluidly between attending their classes in-person, synchronously online, and asynchronously online as they see fit. A key characteristic of HyFlex learning is that the locus of control lies with the student" (Johnson et al., 2022, p.95).

The variations of blended and online learning can become quite complex. The Modes of Learning Spectrum reflects the fact that given the variations, institutions considering transitioning from in-

person to online learning, should be aware that these variations will require varying levels of financial resources, guidelines for faculty, staff and students, and different levels of support and infrastructure, for quality assurance.

Coping With Assessments and the Challenges of AI

As institutions increase the use of technology and as exemplified in the experiences during ERT, maintaining the integrity of online assessments is a challenge. Holden et al. (2021), believe that a rise in online assessments will present new opportunities for cheating. Bates (2023b) notes that "One of the concerns about online assessment is that instead of memorizing important facts and concepts, students will just look them up on Google or some other search engines" (p.7). Many instructors do not trust online assessments and as HEIs have returned to in-person teaching, some have returned to in-person proctored examinations. There is some confusion about what the nature of assessments should be in order to support academic integrity and reduce instances of cheating. One of the most concerning aspects has been the challenge of generative AI tools such as Open AI's ChatGPT, which was launched in November 2022. One survey conducted by the global strategy consulting firm Tyton Partners found that the usage of Chat GPT will increase. They state "While institutional stakeholders are debating the next steps, students are adopting these tools at an exceptionally fast rate. Within just 100 days of ChatGPT's launch in November 2022, nearly one in three surveyed students reported regular use of generative AI tools" (Bharadwaj et al., 2023, p.20).

Competencies of Teachers

Just as the move to ERT required orientation for faculty and students, the move to a planned hybrid or online delivery in the future will require enhancing and supporting the competencies of teachers to be more effective in such an environment. It is not enough to transfer what may be done in an in-person lecture to the LMS or to the Zoom platform (Bates, 2023b). Teachers must be prepared to apply the technology to facilitate learning beyond core content. They must be able to facilitate the development of core 21st-century skills, such as critical thinking, and problem-solving, ensuring, that "content, pedagogy, and technology play unique and interactive roles in the teaching and learning process" (Ward & Benson, 2010, p. 484).

The Digital Divide

Although during the pandemic efforts were made to alleviate challenges due to lack of access, the digital divide is still very much alive. Bates (2023b) notes that in North America there are significant numbers of higher education students who have inadequate or no Internet access, while the Tyton report states that up to 40% of students in the US experienced stress due to limited access to computers and unstable internet connections (Bharadwaj et al., 2023). As noted previously, the situation is worse in the Caribbean. A major consideration therefore for effective course delivery will be access to stable internet, devices, and applications. Instructors and product developers

should operate under the working assumption that students are under-connected, using multiple devices and browsers, and need to download content for offline access (Bharadwaj et al., 2023).

Quality Assurance Considerations in Post-Pandemic Higher Education Institutions

Seeking to Develop and Deliver Online Courses

Quality in higher education has varied definitions. It is an elusive term with many interpretations. Schindler et al. (2015) suggest that institutions take a multifaceted approach to defining quality. They note the importance of getting stakeholder perspectives to develop a broad conceptualization of quality. Schindler et al. developed a conceptual model of quality which shows the interrelationships between stakeholder perspectives, concepts of quality, and indicators used to measure quality. This is depicted in Figure 2. The innermost section of the model depicts the importance of stakeholder feedback in contextualizing a definition of quality, and the next section presents four broad conceptualizations of quality (quality as purposeful, transformative, exceptional, and accountable). The outer portion of the model provides examples of quality indicators. The outermost layer is particularly important as it suggests those elements that can guide the development of standards. Even as it is acknowledged that there are many interpretations of quality, the concept continues to evolve as the higher education environment changes to take account of a climate that is Volatile, Uncertain, Complex and Ambiguous (VUCA) (Meri, 2021). It should be noted that many of the challenges to higher education in this new normal, are not new to distance education and online learning in particular. These challenges suggest the need for specific quality assurance standards and tools (Thurab-Nkhosi & Marshall, 2009) and the indicators identified in Schindler et al.'s (2015) conceptual model serve as a useful guide towards the development of standards for quality assurance specifically with regard to course development and delivery in online environments in higher education. In fact, many checklists and rubrics have been created to capture such standards, but perhaps the most popular are the SUNY Online Course Quality Review Rubric (OSCQR) (Online Learning Consortium (OLC), n.d.) and the Quality Matters (QM) Rubric (Quality Matters, n.d.), with slight variations.

Figure 2

Conceptual Model of Quality Depicting Broad and Specific Strategies for Defining Quality in Higher Education

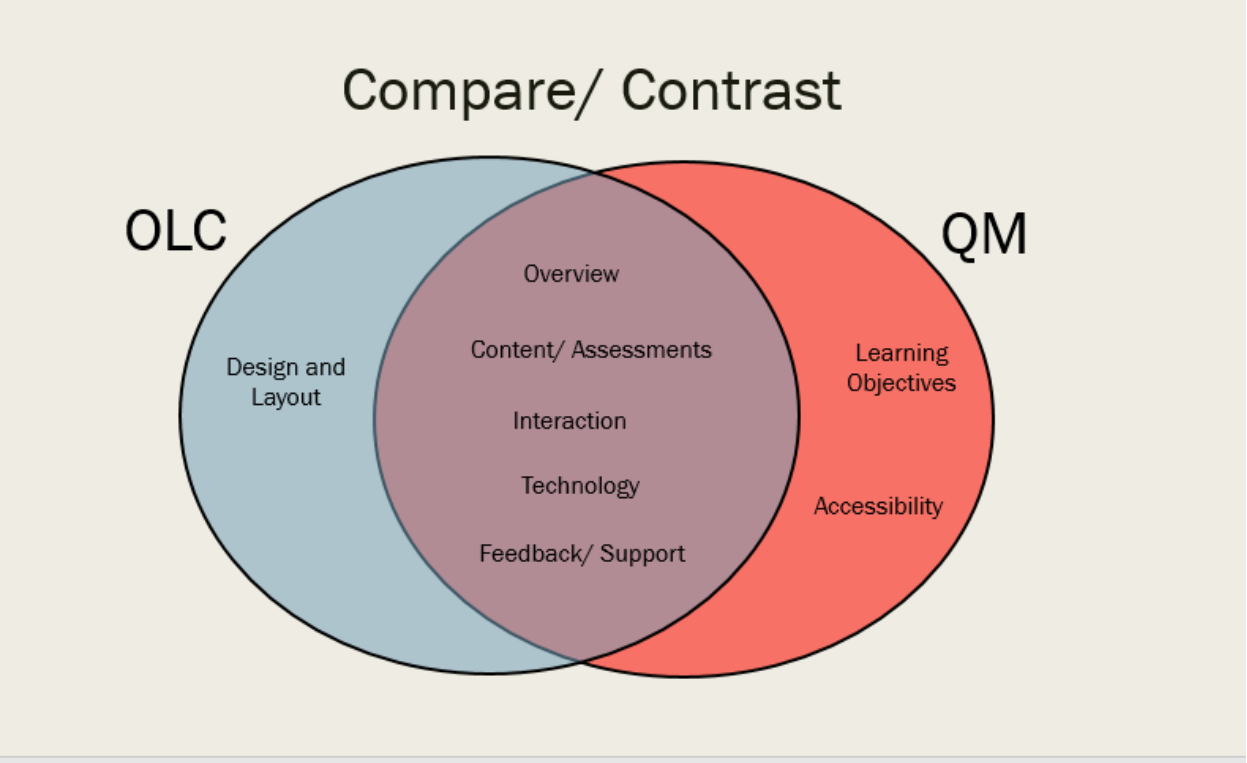
Note. From "Definitions of Quality in Higher Education: A Synthesis of the Literature," by L. Schindler, S. Puls-Elvidge, H. Welzant, and L. Crawford, 2015, *Higher Learning Research Communications*, *5*(3), p. 7 (http://dx.doi.org/10.18870/hlrc.v5i3.244).

The OSCQR rubric is available for public use from the OLC. It addresses instructional design of a course and as such can be used during course design and after the course has been implemented. The OSCAR rubric has 50 criteria or indicators, across six categories: Overview and Information, Technology and Tools, Design and Layout, Content and Activities, Interaction, and Assessment and Feedback (Baldwin et al., 2018).

The QM Rubric is part of a national subscription-based program that involves professional training. While the instrument is available for download from the Internet, the QM Rubric cannot be used without the explicit written permission of the QM organization (Baldwin et al., 2018). QM has 43 criteria over eight categories: Course Overview and Introduction, Learning Objectives, Assessment and Measurement, Instructional Materials, Learning Activities and Learner Interaction, Course Technology, Learner Support, and Accessibility and Usability.

As depicted in Figure 3, the OSCQR and QM rubrics share some similarities with regard to the broad categories, such as Overview, Content and Assessments, Interaction, Technology, and Feedback/ Learner Support. The differences are that the QM rubric specifically mentions design and layout, while QM addresses learning objectives and accessibility.

Figure 3
OSCQR vs QM Rubrics



Note. From "OSCQR Scorecard Vs QM Rubric," [PowerPoint Slides] by A. Sizemore, n.d. https://uc.instructure.com/courses/1287475/files/101539734/download?wrap=1

The use of rubrics to identify quality indicators is an important quality consideration. However as noted in the conceptual model by Schindler et al. (2015) there are important interrelationships that contribute to a quality assurance system, which will affect course development and delivery. Institutions therefore need to ensure that any rubric or checklist used, is placed within a quality

assurance system that promotes continuous quality improvement and that fall within the institution's definition or conception of quality (Martin, 2011). It is proposed that three main considerations be given, namely:

- appropriate and timely policy development
- application of an appropriate quality assurance framework such as Plan, Do, Check, Act (PDCA)
- the strengthening of entities responsible for implementation of the actions within the quality assurance framework, that are crucial for online course development and delivery

A Quality Policy

A Quality Policy sets the framework for the commitment of the institution to continuous quality improvement. It provides the institution's conceptualization of quality aligned with the organisation's strategic direction. The quality policy "provides a framework for quality objectives and includes a commitment to meet applicable requirements … as well as to continually improve" (Huckabone, 2020, p.1). Institutions that have a quality policy in place will need to ensure that it adequately takes account of objectives relevant to online teaching. The shifts in the post pandemic period will also require development of additional policies that address what is required for the move to online learning, specific assessment policies, including those related to the use of AI, such as academic integrity policies and curriculum development policies and processes.

Application and Entities

The Plan, Do, Check, Act (PDCA) framework, also known as the "Deming Wheel," and "Shewhart Cycle" (Mindtools, n.d.) represents a continuous loop, involving 4 stages of activities, geared towards continuous quality improvement. The first stage, Planning, involves defining the problem or challenge in an institution and devising actions to address these. One can see that post COVID, the cycle suggests that any move to online or blended learning should involve planning as the first step. Important within this stage is the use of data analytics and learning analytics. It should be noted that online learning generates vast amounts of data which can provide insights into student engagement, performance, and learning patterns. The shift to ERT would have generated much data, in the planning stage it is important for institutions to collect such information to help administrators and educators provide relevant curricula and targeted support to students. This stage of the framework therefore requires the resources to facilitate planning activities. This may be planning units or planning officers and the technology that supports data analytics and learner analytics.

The second stage of the cycle involves implementing planned actions. This will require the human and infrastructural resources for course development and course delivery. Appropriate hardware and software and human resource requirements, including faculty who can function as not only lecturers, but course developers in the online environment. This will require the support institutions such as technology centres and faculty development units. Beyond development of courses and programmes there are support units that must address recruitment and retention issues in an online environment.

The third stage of the cycle is the monitoring and evaluation stage. This involves checking the effectiveness of the actions taken to allow for improvements, which will be the fourth stage. In the third stage of the cycle stakeholder feedback is critical, thus student, staff and employer surveys can yield useful information on the course and programme experience. Data on graduates and student outcomes is also critical at this stage, with all stakeholder data feeding into the fourth stage to guide revisions which can encompass changes to curricula, modes of delivery, hardware and software used, or to guide training for staff and students. Follow-up activities after the fourth stage should then lead to a return to the planning stage, where the cycle starts again. PDCA is an iterative process and, while there are stages, there is some level of interaction and dynamism across the stages which is represented in Figure 4 by the double-headed arrows.

While the PDCA considerations can be applied to almost any aspect of the operations within an HEI, here it is being applied to course development and delivery in a context of online learning. This is depicted in Figure 4, where Course Development and Delivery is represented as the core of the activity and the quality assurance considerations are placed within the PDCA framework.

The conceptual model assumes a shift that involves a move to an increased use of technology. It is focussed on course development and delivery but recognises that there are other operational issues to be addressed. Using the PDCA it reflects some of the considerations for quality assurance. There is however recognition that the model represents an ideal. Resource-strapped institutions will have to adjust and will have to determine what can be risked.

Conclusion

The context for quality assurance in course development and delivery in a post-pandemic world is one of a wave of technology transformations marked by increased use of LMSs and synchronous Web conferencing platforms, more experience with remote examinations, virtual labs and simulations, enhanced online student support and more options for developing faculty competencies in online teaching. There is now greater understanding of the continuum of online learning, from in-person to fully online options, with a range of blended options in between. Within

this continuum various levels of resources are required to ensure quality in course development and delivery. It is proposed that institutions desirous of quality in curriculum development and delivery for online learning must ensure a robust QA framework that addresses at least three main considerations. These are appropriate and timely policy development, including the development of a clear quality policy that captures the standards for online learning; application of an appropriate quality assurance framework such as Plan, Do, Check, Act (PDCA) to guide activities; and the strengthening of those entities responsible for implementation of the activities crucial for online course development and delivery. Policy development by HEIs must address requirements for effective blended and online teaching and should establish relevant frameworks that encompass the internal entities.

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