

## The role of the lecture in post pandemic institutions of higher learning: Possibilities and implications from a Singapore case study

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### Abstract

As one of the earliest instructional methods in formal education, lectures are primarily designed for students to learn through acquisition (Laurillard, 2012). Bligh's seminal work (2000) concluded with evidence that lectures are as effective, but not more effective, than other methods in transmitting simple information. Although large, didactic, 'sage on the stage' (King, 1993) lectures have been much criticised over the past few decades, evolution to 'guide by the side', facilitated approaches has been slow.

Keywords: Lecturer role, face to face lectures

### Background

Large face to face (F2F) lectures were first to be moved online to reduce large gatherings when COVID-19 disrupted the education of 1.3 billion students and forced emergency adoption of remote learning world-wide (Oh, 2020; Li & Lalani, 2020). The pandemic and the switch to emergency remote teaching (ERT) necessarily accelerated the agenda for more technologically enabled learning to prepare students for a digital workplace, provide flexibility and encourage students to be more independent learners (Hodges et al., 2020; Singapore MOE, 2020; Ewing, 2021; Times Higher Education, 2021). In Singapore, the Ministry of Education launched a "big review" to restructure the educational landscape as a blend of online and F2F learning experiences to "harness the best of both worlds in a modern education system" (Minister of Education, 2 June 2020, cited in Oh, 2020).

A persistent theme in interviews of educational leaders globally was replacement of in-person large lectures as an instructional method. Only 10 leaders of 43 institutions in Australia and New Zealand surveyed by the Australasian Council on Open Distance and eLearning (ACODE), indicated a return to on-campus lectures post-2021 (Sankey, 2021). More than half the institutions highlighted sound pedagogy as one of the main reasons for the decision to discontinue F2F lectures. Ewing's (2021) study of educational leaders across nine Asian/Australasian countries noted that educators forced to adopt online learning are increasingly convinced that online learning with its potential to maximize flexibility and engagement is preferable to physical attendance. Many educational institutions have found that shorter, chunked, online asynchronous lectures offer more flexibility and address evidence based research on retaining attention (Bligh, 2000).

F2F lectures are likely to become less frequent and focus more deliberately on engaging students and deepening learning (Times Higher Education, 2021). Many educators would identify this as a "flipped" learning model, where lecture content is moved out of classrooms and online to use F2F class time to deepen understanding through teacher facilitated activities (Jenkins, et al., 2015). This paper offers a collective case study of online lecture replacement models adopted by eighteen teaching staff for a more structured blend of asynchronous lectures and F2F learning at an institution of higher learning (IHL) in Singapore. Findings identify implications for policy, practice and subsequent research to inform the inevitable move to more asynchronous lecture blends.

## Case Study Site Context

The research site, a large polytechnic in Singapore engaged in a phased pre-COVID-19 Online Learning initiative (OLi) intended to leverage technology for learning to encourage self-directed learning (SDL) and develop work-ready, digitally competent graduates. Asynchronous learning online would provide physical distance between the learner and teaching staff, potentially encouraging students to be more self-directed independent learners. Communication and professional development were emphasized to ensure all staff could design and deliver online learning (OL) courses with at least baseline elements (Ng, 2019). To enable and expand OL adoption, the majority of staff attended a two-day compulsory OL workshop. From 2019, all students experienced at least seven (7) profession specific courses online, with six at 25% and one at 100% OL, during their three-year diploma program.

In the pre-pandemic norm, key instructional methods included lectures, small groups of up to 25 students for tutorials and/or practicals or a blend. A wide range of instructional strategies were implemented across the institution. Depending on the course domain, signature pedagogies like Project Based Learning, Experiential Learning, Problem Based Learning and Scenario Based Learning were adopted during tutorials and/or practicals. Performance assessment and internships enabled the development of industry relevant skills and competencies. From the lead researcher's observations as a staff developer, lectures had multiple purposes: to trigger interest; link prior knowledge to new concepts; teach factual, conceptual and procedural knowledge; model thinking processes; and share industry relevant examples to help students see application and relevance of subject matter. Lecture activities may include quizzes, peer discussion, role plays, for example. This paper focuses on OL lecture strategies adopted by the case study participants.

On February 7, 2020, the Singapore government raised the Disease Outbreak Response System Condition (DORSCON) to Orange alert. All IHLs in Singapore announced that large lectures of more than 50 would either be live streamed or made accessible online (Oh, 2020). The site institution was amid its end of semester study and examination weeks. Staff were briefed that the April 2020 semester would be offered minimally within the Orange alert level but with possible conversion to full Home Based Learning (HBL) or ERT. Depending on exigencies of other projects, staff worked through semester holidays, over four to six weeks to revamp their sixteen-week courses for full online delivery.

In preparation for the ERT semester, briefings, communications, workshops, self-help guides, consultation and coaching sessions were offered almost round the clock by the Teaching & Learning department. Teaching staff were strongly encouraged to adopt asynchronous modes for content delivery and synchronous delivery for tutorials. Where virtual simulation practicals were not possible, staff were encouraged to design practical familiarization segments in preparation for post ERT F2F delivery. This rationale underpinned: avoidance of technical/bandwidth issues during large synchronous classes; development of students' SDL skills; and provision of flexibility during the unprecedented lockdown period. Synchronous small group sessions could provide opportunities for deeper interactions, individual and social emotional support. Similar to OL initiative guidelines, constructively aligned designs with manageable chunks, clearly stated learning outcomes and instructions, a range of activities, formative assessment and feedback for learning were emphasized.

## Data collection and analysis

Interview data for this study were collected in individual sixty to ninety-minute interviews between October 2019 and November 2020, across the pre-COVID19 divide into compulsory ERT OL experiences. Interview guiding questions were based on O'Donoghue's (2019) unpacking of the term perspectives to four strands (intentions, strategies, significance, and outcomes). Interviews were collected, initially F2F and subsequently through MS Teams virtual meetings after the introduction of the Circuit Breaker (CB) lockdown in March 2020.

Participants were a selected group of eighteen staff who were part of the initial OLi phases (2017-2019), with at least five semesters of OLi design and delivery experiences. Teaching experience ranged between seven and thirty years; all had received recognition for good teaching practices. The participants were drawn from nine professional domains across the institution offering both pre-employment (PET) courses to post-secondary students and continuing education (CET) courses for adult learners. Domains are mapped to SkillsFuture Singapore, the national skills mastery and lifelong learning movement.

Only data from eighteen participants who participated in pre- and post-lockdown interviews and adopted lectures as an instructional method are reported in this paper. Transcripts of the interview data were analysed in a grounded theory process using an inductive open coding approach (Cohen, Manion, & Morrison, 2018).

## Findings and discussion

Prior to the ERT period, only two staff had redesigned their courses for 80-100% OL mode. Most participants had redesigned and delivered at least 25% of each of their courses in OL mode for a two-year period. OLi strategies included certain weeks of combined lectures, tutorials and/or practicals, a combination of asynchronous lectures and F2F tutorials, or asynchronous lectures only. Pre-COVID-19, participants were adopting “flipped” approaches to varying degrees. Usually, lectures were converted to self-paced learning components with formative assessment activities to check understanding and monitor learning. Content was created using narrated presentations, with intermittent quizzes, end of segment quizzes or other activities hosted on the LMS with additional curated resources. Some participants curated content from commercial elearning platforms. Others assigned students the responsibility to co-create content through research and presentations. Besides developing SDL and digital competencies, this approach allowed flexibility and replayability of asynchronous OL, especially for academically less able students, who could now consume the content at their own pace. Asynchronous lectures allowed maximization of F2F sessions for more meaningful interactions and activities beyond delivering “boring” lectures. Beyond OL for content, a range of asynchronous experiential and collaborative activities were adopted more prominently in the 80- 100% OLi courses. Staff reported no significant changes to student performance post OLi, with some indicating better performance particularly for less able students.

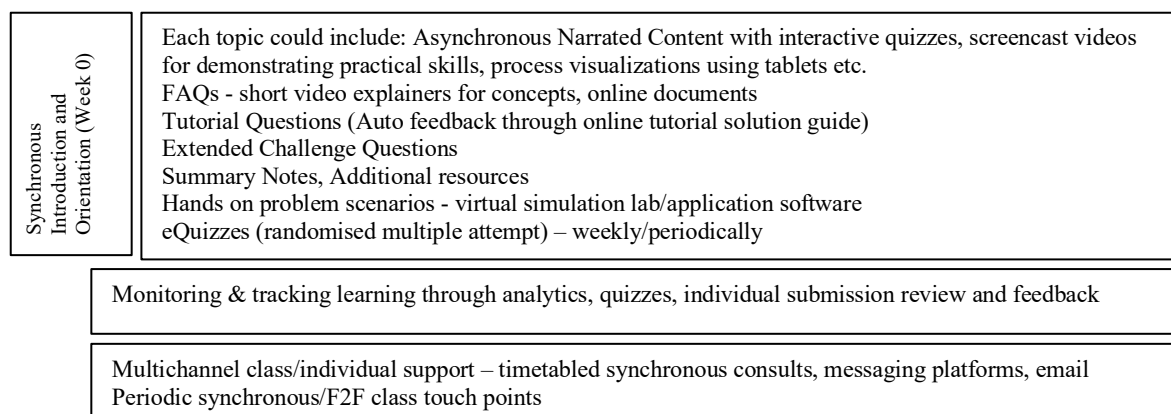
The pivot to completely OL and ERT under intense time and resource pressure during the lockdown inevitably made additional demands on workload and competencies. Participants had already developed some level of tech competence and experience in OL design and delivery and worked within their means to adopt, adapt and even innovate OL learning experiences in more revolutionary ways. As one participant highlighted, “the need to move to a 100% HBL suddenly provided a clean slate to redesign the learning experiences”.

What surfaced from the interviews were varied strategies to replace F2F lectures with a focus on maximizing engagement and humanizing interactions. To many participants, turning on cameras and doing a virtual presentation with “whiteboard talk” to replace the fifty-minute lecture was a last resort, no-time solution. “From F2F performer to designer, observer and facilitator when necessary” was how a participant summarised the change in his role for asynchronous OL. Participants increased the number of formative assessment activities to address lack of F2F cues. Monitoring learning through activities and analytics, providing feedback to individuals/groups were the key tasks across approaches. Back channels (instant messaging tools like WhatsApp, MS Teams, Telegram) became an integral part of the learning environment to create a community of learners. Almost all participants highlighted a wait time strategy when responding to some questions to encourage student led discussions. Back channels inevitably blurred the boundaries of work and personal time.

Post ERT, all participants shared plans to increase the number of asynchronous content delivery lectures with some preferring to move all lectures online. The following discussion explores the range of F2F lecture replacement strategies adopted, with a focus on distilling key practices.

### Online Lecture Delivery Strategies

#### Model A



**Figure 1. Model A The flipped mastery approach: combined asynchronous lectures, tutorials/practicals**

*Model A Details:* Synchronous/F2F for consultations, to demonstrate performance with immediate feedback, key checkpoints. Domains: Engineering Services, Electronics, Bioinformatics and Critical Core skills. ERT adjustments included replacement of physical lab and equipment with virtual simulations or software-based projects.

*Common Design Features:* Well organized, clearly chunked segments. Each topic starts with layman explanations, everyday examples, and objectives. All content and activities for the course are provided at the start to allow students to learn at their own pace with assessment checkpoints to evidence mastery. Teaching staff focus on assessing learning and supporting students who need additional help. Bergmann and Sams (2014), the educators who popularized the flipped approach refer to this as the flipped mastery approach. Participant 6 typified the design intention:

standalone, as clear, and concise and hopefully ... address common questions that students usually ask before online learning. ...FAQ, ...try to address in this online learning package.

*Flipping hands-on practicals:* Virtual simulation labs can replace F2F labs and allow for anytime, anywhere practice to develop skill sets required in the workplace. Synchronous/F2F sessions assess students' demonstration of practical skills, solve problems and offer over the shoulder, immediate feedback from teaching staff. With virtual simulations, students may lose out on some physical connection troubleshooting skill sets. Shorter F2F practice sessions or personal at-home kits may address this gap.

*Role of Teaching Staff:* Beyond developing learning packages and instructions, closely monitor analytics and submissions to identify difficulties or at-risk students in the early stages. Staff reach out and conduct one to one counselling or consultations for students who are falling behind; "(Individual) feedback is important – must tell them if they are learning or not learning". In F2F classes it is possible to have quick side chats with students.

*Considerations:*

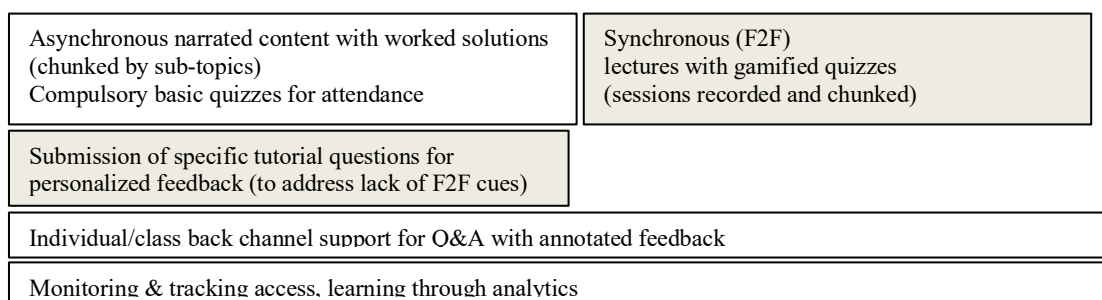
(F2F cues on off task behavior)...students who are always late, distracted by mobile phones, not able to answer questions. But fully online a bit difficult (to identify students who are off task), have to purely base on assessment or e-quizzes. (As we) don't meet them, so the submission is important. Participant 2

Variations to model: Where students lack prior knowledge, the concepts to be learnt are more complex or to accommodate busy adult learners, content may need to be released by sections to avoid overwhelming students.

*Humanizing interactions, maximizing engagement:* The course starts with a synchronous/F2F orientation highlighting available support modes including consultation schedules and use of back-channel to build a community of learners. Regular announcements and updates to keep students on track and to provide teacher presence are necessary to develop SDL skills. "I don't believe in talking to air...that's why no synchronous (lectures)"

*Challenges:* Providing timely and meaningful, individual feedback for asynchronous activities; monitoring learning and analytics across platforms can be time intensive. A unified tech platform would provide a seamless experience as current practice involves multiple platforms with content and quizzes on LMS, assessment submission on Google Classroom (for ease of tracking and feedback), videos on institutional video platforms, practicals on a virtual simulation platform.

## Model B



**Figure 2. Model B Partial flipped asynchronous lectures & synchronous/F2F lectures**

*Model B Details:* Specific weeks of traditional flipped with synchronous/F2F tutorials for summarising and deepening learning. Real time sessions provide students immediate feedback on concept application. Domain: Engineering Services (no hands-on equipment required). Introductory foundational course focused on conceptual, procedural knowledge. Large diverse cohort of students including students with less prior experience and lower academic ability.

*Design Features:* Asynchronous lecture content is presented as narrated videos with worked solutions for specific weeks. The focus is on modelling and visualizing the process and solutions to application questions. Clearly chunked videos by subtopics allow ease of replayability and increase findability. To track learning and manage attendance across a large cohort and build confidence of less able students, 75% achievement is required on simple quizzes (multiple attempts allowed). LMS achievement badges are awarded on completion. This allows both staff and students to track progress and completion of lecture materials.

*ERT Adjustments:* To address lack of F2F visual cues and over the shoulder monitoring, post tutorial, students upload solutions for specific questions. Teaching staff annotate and provide individual feedback.

*Development (Pre-COVID-19) for large teaching team:* A small team of selected staff with competence in different areas (curriculum design, video animation, narration skills) designed and developed all the content. (Curated content could confuse students with different terminology and deviations from the institution's curriculum). The rest of the team tested designs and provided feedback prior to launch. All content was hosted on the institution's video platform and embedded with quizzes on LMS, to enable consistent tracking of a large cohort of students on one platform.

*Rationale:* F2F/synchronous lectures are seen as necessary to address needs of less able students. Some with low self-esteem issues were unlikely to ask questions on back channels for "fear of looking stupid". Team feared frequent asynchronous sessions may lead to "lost" students, with remoteness making it difficult to address learning gaps.

*Role of Teaching Staff:* Track and monitor learning through achievement badges and video analytics. Provide individual feedback with annotations on specific submissions. Collate and summarize common mistakes for discussion at next synchronous/F2F lecture. Back channel for Q&A was specifically selected as it allowed searching and organising of annotated solution images/videos.

I didn't make myself so visible, so available to them (F2F)... now (ERT) .. even on weekends, at night – (although the) ground rule is still office hours, I will still reply them... if I'm free. If their doubts are not clarified, they cannot proceed.(Participant 14)

*Considerations:* Design is pitched for lower academic ability students. Ideal scenario would be to design personalized learning paths to challenge more able students.

Personalized Learning would be better...but I don't know how to (develop that). Tool S allows simple branching only. (Participant 14)

### Model C

F2F/Synchronous Lectures, practicals to build relevance through discussions, social, experiential learning	Assigned asynchronous content and simulated practice activities on Industry Leader's eLearning Platform – (students have choice to do more) Students submit completion evidence (completion points awarded) to LMS
Class back channel support for Q&A	

**Figure 3. Model C Traditional flipped with curated eLearning platform for content and practice**

*Model C Details:* F2F/Synchronous sessions for combined lecture, practicals to focus on building relevance through discussions. Domain: InfoComm Technology.

*Design:* Curated content and gamified practice activities with automated feedback from industry leader's eLearning platform to align training to industry needs. Teaching staff focus on bringing content to life through

design and facilitation of discussion and experiential learning activities, preferably F2F or synchronous classroom.

*Rationale for curating industry partner’s eLearning:* Students need to train with industry products to develop industry ready skill sets. Industry professionals upgrade with this eLearning platform and in-person certification assessments. Creates a win-win situation: students have a potential employment advantage; industry partners will have access to trained graduates in the future. Staff are not trained professional content developers; industry partners are better positioned to ensure content currency with frequent content updates. Professional designers can address younger learners' need for visually engaging content and gamified activities.

*Role of Teaching Staff:* Staff make content relevant, by curating appropriate learning paths, facilitating deeper learning through discussions, designing experiential learning activities and providing feedback. Curating content allows the focus to shift from content development and maintenance to designing social, experiential learning activities during F2F/synchronous sessions.

almost like we are no longer the musician, we became the conductor...at the right time, bring in the wood section, the strings...hopefully make music and not noise (*laughs*). (Participant 17)

*Considerations:* F2F classes are necessary but not for didactic approaches: “We are social beings, you cannot email a smile”. There is now greater pressure to design F2F learning with a focus on social, experiential learning so that students will see value in attending a F2F class. The move to curating content may create a possible teacher identity crisis for some colleagues, with a fear of being replaced if all content is curated. The message this participant conveys to his team members - “eLearning platforms are 21<sup>st</sup> century textbooks, 20<sup>th</sup> century textbooks did not replace teachers”.

#### Model D

<p>F2F (Synchronous) Lectures</p> <p>Use of Tech Tools for collaboration/interactivity, role plays etc. (2-3 weeks)</p>	<p>Asynchronous narrated content, additional content from student research and exploration.</p> <p>Apply content and research to projects. (1-2 weeks)</p>	<p>F2F (Synchronous) Lectures</p> <p>Use of Tech Tools for collaboration/interactivity, role plays etc.(2-3 weeks)</p>
<p>Monitoring &amp; tracking learning through analytics on institutional platforms</p>		
<p>Individual and class group back channel support</p>		

**Figure 4. Model D Interspersed asynchronous lectures with student research content**

*Model D Details:* F2F/Synchronous tutorials focus on application of skills, for example, role plays, activities t manipulate simulated physical spaces. Domain: Early Childhood. ERT adjustment: Use of immersive environments to introduce simulated physical spaces

*Design:* F2F lectures and tutorials are interspersed with one or two weeks of asynchronous OL. To promote SDL, students are required to do further contextual research to complete assigned tasks. During the ERT period, staff created immersive videos (with support) to introduce physical spaces and related content. This resulted in more independent exploration with less reliance on staff for direction.

Lecture materials...(and) relevant resources ... read, understand, go and explore ...do your own research... then tie up whatever you (have) learned, what I gave plus what you gathered and complete the tasks. Participant 17

*Rationale:* Starting with F2F lectures is necessary for large cohorts of students, to connect names to faces and familiarise students with technology platforms. Peer-peer interaction is essential for the social emotional needs of young adults. Unlike F2F, students are less likely to interact before or after OL lessons. From a course perspective, “exploring the (simulated) physical environment, reading emotions, etcetera are crucial to equip students with relevant industry skills”. Although OL activities can be designed, F2F practice is required.

*Role of Teaching Staff:* As the facilitator, the “bridge to connect content and real world”. Designers of learning experiences to develop industry, learning to learn and digital skills

*Considerations:* Requires awareness of possible miscommunications (text/audio) due to lack of facial and body language cues.

### Model E

Synchronous\F2F Introduction and Orientation (Week 1)	Asynchronous created and curated content mapped to project work requirements	Student identified content/skills demonstration to support assignments (F2F/synchronous) Submission of weekly project progress updates and learning reflections	Asynchronous created and curated content mapped to project work requirements
	Submission of weekly project progress updates and learning reflections		Student identified content/skills demonstration to support assignments (asynchronous) Submission of weekly project progress updates and learning reflections
Monitoring & facilitating learning of project work continued dialogue and individual feedback via working files			
Individual and class group back channel support			

**Figure 5. Model E Flexible flipped with student identified content**

*Model E Details:* F2F/Synchronous tutorial sessions are for students to present work in progress for feedback from peers and teaching staff. Domain: Design and Media.

*Design:* All content is asynchronous. Besides staff created content, certain slots are deliberately planned for students to take ownership of their learning. Students are required to identify content/techniques they need in order to complete the assignments. Additionally, weekly reflections on the learning process and progress allow students to identify gaps. Teaching staff will curate or create accordingly.

*Considerations:* Flexibility in syllabus and timetable to address students learning needs

Timetable, syllabus...it's not cast in stone, depending on students' feedback and pace ... a few places in the syllabus when I can manage the time like buffers. (Participant 18)

*Role of Teaching Staff:* Orient students by framing and developing the importance of independent thinking, stressing the need for students to learn to dialogue and provide rationale for their choices, no right or wrong answers. The frontal delivery time is replaced with personalisation of learning by providing students with feedback on work in progress and facilitating metacognition.

### Model F

Synchronous\F2F Introduction Orientation, highlights learning is beyond grades Introduction to creating explainer	Asynchronous narrated videos, previous semester student created content. Weekly exercise submissions working towards design project.	Students assigned different topics to created explainer "talking head" videos. Feedback and questions for peers' videos. Students curate list of resource videos with summary to help whole cohort (voluntary activity)	End of semester, students reflect on their contributions to the community of learners with screenshot evidence.
Monitoring & facilitating learning of exercise activities, analytics, reflections on contributions			
Peer sharing of content videos with QA on social media, individual and class group back channel support			

**Figure 6. Model F Fully asynchronous community of learners**

*Model F Details:* F2F/Synchronous: 3-4 sessions per semester for key milestone checks, consultations by requests. Domain: Built Environment, Design.

*Design:* 80% of the course is offered asynchronously. Content is staff or student created. Learning activities include creating instructional explainer videos which could be incorporated for future semesters. Co-creating content promotes SDL skills and student confidence,

Software C is not rocket science, when the students do videos, their confidence level increases... very powerful...learning from peers is always better (than from teaching staff). (Participant 16)

*Rationale:* Design promotes a community of learners and learning to learn skills. For certain activities, students post their videos on a closed social media platform. Students are required to respond to peer posts with feedback, share tips or ask questions. At the end of semester, students submit reflections on their contributions to the community. Teaching staff do not respond immediately to back-channel questions; wait time is practiced, encouraging peers to respond to queries, clarifications.

*Role of Teaching Staff:* The key aim is to facilitate SDL through collaborative learning. To achieve this, staff focus on setting and maintaining a conducive environment, by encouraging and applauding students' efforts to contribute to peer learning rather than providing answers. Monitoring participation and contributions is necessary to ensure staff can step in to correct misconceptions. Assessment related roles include monitoring peer contributions, reviewing reflections and providing feedback on projects.

*Development:* Staff opted to create content to ensure better fit for purpose as opposed to content from eLearning platforms. The decision was made after gathering student feedback. Instructional videos focus on getting students started with the first few steps; students then learn from exploring resources, research, and peers to complete activities

if we can bring the students on the first and the second step, which is the hurdle for them...the third step, fourth step ...is very small height...then magic will happen. (Participant 16)

*Considerations:* During F2F session, staff conduct tool familiarisation sessions for recording narrated videos. To take ownership and reduce plagiarism, students are required to "appear" on camera and narrate their instructional videos. Closed group social media platforms allow ease of threaded posts as compared to LMS.

## **Implications and conclusions**

Courses at the polytechnic focus on developing industry ready graduates. Traditionally, lectures promote students' knowledge acquisition, tutorials/practicals and assessment approaches target integrating knowledge with applied skills and graduate competencies. The OLi was introduced to develop SDL skills and digital competencies. A 25% OLi course frequently translated to a flipped approach, shifting selected content acquisition and the responsibility of time, place, and pace management to students. The fully OL and COVID-19 ERT designs were not one size fits all. To create efficient, engaging, and effective learning experiences, participants in this study adopted variations of flipped models. Design considerations included: course outcomes; student profiles, academic abilities, and motivation levels; staff's pedagogical values and technical competencies.

Flipped pedagogy assumes that all learners can master the pre-class content independently, but evidence suggests flipped learning works best for motivated students with good metacognitive skills (Lucardie & Busari, 2016). Younger or less able learners may require more support through engaging narratives, gamified or personalised learning experiences. Some participants highlighted gaps in their abilities to design engaging learning experiences: "my strengths are in curriculum development not eContent development"; "the learning curve keeps getting steeper". Despite the challenges, participants also highlighted examples of stepping out of their comfort zones and exploring new technologies for learning. Participant 8 highlighted the "e" option offered new opportunities for student projects.

... I wouldn't have explored certain tools, if not for HBL. I was thinking, how am I going to bring (physical field trips) environment to them (students)?..(At) the COVID-19 pre-semester briefing and sharing sessions, one of the learning technologies staff suggested (and helped develop) 360° videos. (Participant 15 on introducing 360° immersive videos during HBL)

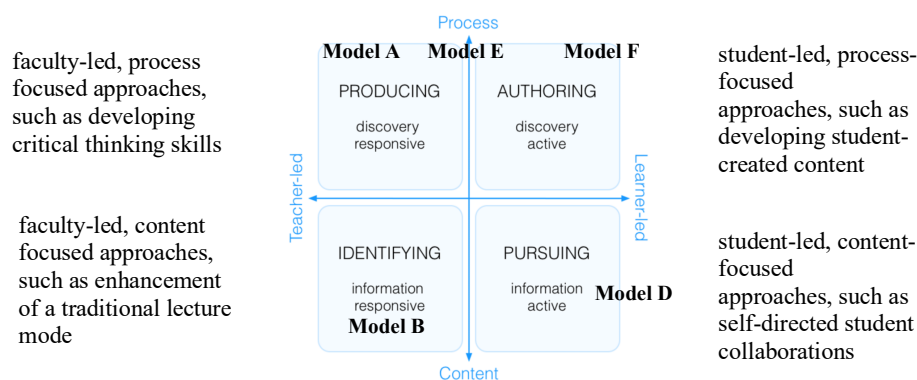
Participants selected for this study had already completed the institution's professional development programs and many indicated a keen prior interest in tech enabled learning. With the pivot to completely OL and ERT, even these very competent staff recognised the need to improve their competence and range of skills. For institutions with less developed staff there could be major implications for staff development.



Participants also flagged the need for more flexibility of software/hardware and web resources to design and deliver fully OL: “not one tool can address all needs”; “the right tools make (learning) happen in easier and engaging ways”. There are always newer web tools with exciting features, but some participants indicated compromising on features to use tools requiring institution accounts to address privacy, analytics, and authentication concerns. Institutional provisions for flexible hardware/software require cross platform IT support expertise, comprehensive security and personal data protection policies that come with large monetary and resource implications.

To compensate for the lack of F2F interactions and cues, back channels have become an essential tool to build online class communities. Participants reported spending more time tracking analytics, “nudging” students, responding to back channel queries, assessing and providing feedback to every learner. Some staff found innovative ways to address workload issues – curate rather than develop, enlist students as co-developers. Tech tools offered possibilities to automate feedback through quizzes and generic summaries. Solutions that focused on partnering with industry for access to their training platforms offered alternative approaches to work-based learning and materials development. Increased demands for more frequent feedback and back channel support have implications for staff time management and workloads.

The pivot to fully OL accelerated the need to move towards more flexible and efficient instructional methods; it makes inherent sense to move content delivery focused lectures online. Participants recognised that F2F sessions will become more “precious and need to be more carefully planned”. Participants raised practical concerns about timetabling across online, F2F spaces and issues like travel time and resource allocation when designing flexible flipped approaches. IHLs will require innovative timetabling and management of physical and human resources.



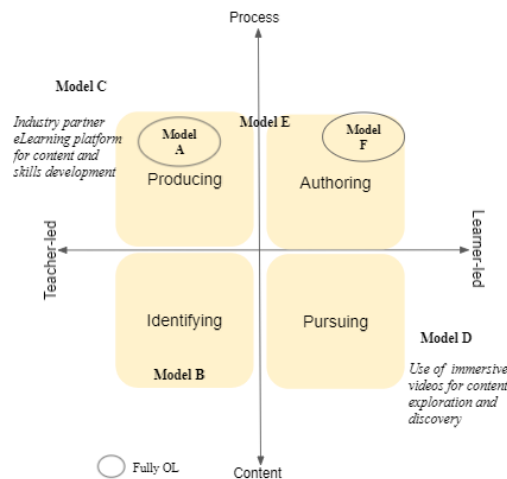
**Figure 7. Models mapped to the Flipped Learning Matrix (Jenkins et al. 2017 p. 5)**

Figure 7 shows the Models mapped to Jenkins et al. (2017)’s ‘Flipped Learning Matrix model’ with a focus on active, engaged pedagogical strategies. This matrix is based on two dimensions: content-focused to process-focused and teacher-led to student-led to emphasise the design intentions of flipped learning experiences. Jenkins et al. offers three additional models beyond the traditional “Identifying” flipped. As indicated by Jenkins et al., a model may have elements from across the quadrants. Situating models in the matrix can help staff reflect on the purpose and place of content in their overall design and identify design or technical challenges. For example, the participant adopting Model B with a teacher led content focus, would like to design for student led personalised learning approaches but expressed a lack of technical skills to achieve these intentions. Jenkins et al. models are discussed with reference to in-class (group learning space) and out of class (individual space) activities (with one example of in-class, absent teacher approach). Models A and F were mostly asynchronous, with in-class/synchronous (group space) components mainly for rapport building, orientation, student presentation/ demonstration for peer learning and feedback. At the institution, back channels have emerged as the consistent group learning space.

Data from this study demonstrated that staff developed additional models influenced by a range of learner needs and staff expertise. The push factors associated with the OL initiative and accelerated by the ERT, encouraged staff to expand their instructional repertoire and harness additional resources and partnerships, expanding the possibilities envisaged in the original model. For example, Model C adopts industry partner’s content and skills practice activities. Model D adopts an immersive environment for students to explore and discover content. Participants’ reflections on ERT: “opportunity to rethink the organisation of the course”; “spend time on what is crucial, look at work in progress... feedback”; “focus on making learning social and experiential” “more

independent exploration...less reliance on teacher directions” highlight more student centred strategies. Several value-added features emerged for learners: original contributions to learning resources, collaborative contributions to peer learning, engagement with state-of-the-art industry resources for teaching.

Based on the models in this study, the researchers propose adaptations to the Flipped Learning Matrix model (Figure 8) to expand and extend conventional teacher-student environments. In today’s context of distributed expertise and blurred boundaries between F2F and OL, the traditional in- or out-of-class flipped components have evolved. Flipped models will need to expand to support seamless experiences across time, modalities and learning partners. New collaborative models could involve professional eLearning platforms, industry partners, multidisciplinary teaching teams or even AI (Wiley, 2020).



**Figure 8. Proposed adaptations to Jenkins et al.’s model to incorporate the emerging features.**

What will not change is the need for student-centered, skills-focused, engaging and active learning experiences.

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