



Developing a Solution for Hybrid Classroom: A Pilot Study From a Malaysian Private University

Enna Ayub^{1*}, Lim Chee Leong¹, Donny Chuan Hoe Yeo¹ and Siti Ramadhaniatun Ismail²

¹ Center for Future Learning, Taylor's University, Subang Jaya, Malaysia, ² School of Food Studies and Gastronomy, Taylor's University, Subang Jaya, Malaysia

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*Correspondence:

Enna Ayub
enna.ayub@taylors.edu.my

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The COVID-19 pandemic brought about an opportunity for higher education institutions (HEI) to explore modes of education delivery other than face-to-face (F2F) and remote learning *via* fully online mode. The HEIs faced challenges for “business to resume as usual” when not all students were able to return to campus due to being held back in their home state or countries due to different stages of lockdown at their locations. At Taylor's, a hybrid learning mode was thought of to be the solution that can cater both to students who are on-campus and those who are off-campus. A pilot project based on a very practical-oriented classroom from the School of Food Studies and Gastronomy (SFSG) and Taylor's Culinary Institute (TCI) was kick-started to ensure a seamless learning experience for the students. The “pandemic pedagogy” based on real-life needs can be an opportunity to scale up learning for borderless learning in the future. This study reports on the initial development process and challenges and the findings from the pilot studies using a design-based research (DBR) approach.

Keywords: hybrid learning, borderless learning, pandemic pedagogy, design-based research, e-Learning

INTRODUCTION

The COVID19 pandemic brought about the uncertainties for business operations to run as usual, and this includes the higher learning institutions (HEI) worldwide. Given the highly infectious nature of the COVID-19 virus, classes had to be switched from corporal to virtual spaces almost instantaneously to ensure lessons can continue. Conducting classes in virtual spaces in a fully online mode has become the new norm since 2020 for most HEIs. “Pandemic pedagogy” that started as a Facebook group to support education providers navigate through the uncertainty and trauma of the pandemic became a new term introduced to describe this new norm in education delivery (Schwartzman, 2020).

As the situation around the pandemic gradually improves with new vaccines discovered, the HEIs will need to come up with a contingency plan to wade through the uncertainties around different countries' standard operating procedures (SOP) around managing the pandemic. The borders will slowly reopen and international students, as well as local students from different states will re-enter the universities in phases to continue their education. This study discusses the very early stages of the implementation of a hybrid learning solution at Taylor's University and Taylor's

College (Taylor's) to address the flexibility for any time and anywhere learning by ensuring learners can learn both on-site and remotely for a meaningful learning experience because of the COVID-19 pandemic where some students are not able to attend classes on campus. As the implementation will happen in several phases of development, a design-based research approach was implemented as its research design to investigate the learner's learning experience in a hybrid mode by examining the learning platform's ease of use, functionality, and user interface. The learner's feedback will be used by the practitioners who are the course instructors and learning technologists to improve the pedagogy and the design of the learning platform and technologies to best support the hybrid learning mode in a hands-on classroom like the kitchen.

BACKGROUND

The idea of conducting learning entirely online was conceived at Taylor's in 2018 under the new Taylor's Curriculum Framework (TCF), 2 years before the COVID-19 epidemic aggressively struck the world in 2020 (Lessler, 2018). The TCF Policy and the e-Learning Strategic Plan guide the campus-wide curriculum aimed at transforming learning into an online mode under this TCF. The original goal of the e-Learning Strategic Plan was not only to complement face-to-face (F2F) learning with online learning but also as a contingency plan for a time when the university would be partially or completely shut down so that classes could continue. The COVID-19 epidemic cleared the path for a new approach to the pedagogy implemented at Taylor's as hybrid learning to ensure learners both in-campus and off-campus can harmoniously learn together. However, how could the practitioners trace that the online technologies implemented to aid learning and teaching for a practical course in the kitchen are effective to replace face-to-face (F2F) learning and teaching pedagogy? How can the inconvenience of the spartial gaps in a very hands-on class be addressed when it is fully online? Hence, the pilot Digital Exemplar Kitchen (DEK) addresses the challenges in designing a learning space to cater to learners in F2F and virtual spaces. This innovation enables the course instructor to interact seamlessly with their learners in two separate modes of learning.

Hybrid Learning

The term hybrid learning is often used interchangeably by educators to describe blended learning or dual-mode learning, and quite frequently, the term is not clearly defined and often caused confusion (Heriot-Watt Learning Teaching Academy, 2022). Linder (2017) described hybrid learning as the deliberate use of technology to substitute class time to establish a learning environment. Saichaie (2020) on the other hand defined hybrid learning closer to blended learning or flip learning, where the approach is replacing one class period with technology-enhanced activities in a learning platform either to be completed as self-paced or collaboratively with peers. The hybrid learning in implementation from previous literature informed releasing learners from the confinement of a physical space into the virtual space to allow flexibility in class scheduling.

HyFlex, short for Hybrid Flexible Learning, on the other hand, is a term used by Beatty (2019) for a learning approach that gives flexibility to the students to select the choice of learning that best suits their needs, e.g., either F2F or online mode, based on the four key principles i.e., learning choice, equivalency (between the participation modes), reusability, and accessibility. HyFlex was originally conceived to accommodate the graduate students' working schedule, so they are given the flexibility in their learning mode. Boyarsky (2021) and Gaebel et al. (2021) provide a definition closer to what learning in Taylor's is implemented in ensuring synchronous learning can continue for learners who are in-campus and off-campus, where the off-campus students appear in class using video conferencing tool (Boyarsky, 2021). In this approach, learning can be scaled up and more learners can join the course *via* the online video conferencing mode.

Borderless Learning Initiatives at Taylor's

Taylor's academic leadership shifted the direction for classes to be conducted entirely online during the lockdown, and the challenge transpired during a period of transition to normalcy while a sizable number of students were still unable to return to campus to resume classes as usual. While teaching as a hybrid mode is thought of as an alternative means to instruction during unprecedented events, there was an intentional effort prior to the COVID-19 pandemic for borderless learning for the purpose of scaling up learning at Taylor's. Conducting courses as a massive open online course (MOOC) and micro-credential were the modes experimented for borderless learning at Taylor's (Ayub and Leong, 2017; Lim et al., 2018). Nevertheless, the COVID-19 pandemic expedited the necessary processes and support from the relevant stakeholders such as the Academic Leadership Team and ICT to ensure the urgency of having a hybrid learning ecosystem at Taylor's.

The Concept of Borderless Learning

To deal with the situation, Taylor's introduced their unique "Borderless Learning" approach starting from August 2020 intake (Teaching learning for a borderless world., 2020). This borderless learning is a concurrent in-person and online class approach that aims to ensure that no student gets left behind. Through this approach, Taylor's new students will enroll in their program fully online but with the freedom to continue classes at the Taylor's Lakeside Campus at any point of time. Students with practical classes will also take turns to go back to campus for the laboratory or studio session.

There are three important components of the borderless learning approach: (i) classroom population, (ii) learning delivery platform, and (iii) communication channel. Classroom population consists of lecturers, in-campus students, and online students (see **Figure 1**). In a typical learning scenario, a course instructor is teaching in a classroom with live streaming facilities such as Zoom, ReWIND, or Microsoft Teams, and the course instructor's role will slightly change. A course instructor is now a learning curator who curates the learning activities based on the existing classroom population as well as playing the role of an online learning facilitator to facilitate those who are accessing the class online. In addition, learning circles are also



FIGURE 1 | The concept for hybrid learning in Taylor's as borderless learning.

created among in-campus and online students to ensure equal access to facts, opinions, and arguments taking place during the class.

The learning delivery platform refers to virtual learning environment (VLE) which hosts learning resources and conduct online learning activities (refer **Figure 2**). Through this learning delivery platform, students will attend live stream classes and engage with course instructors through their tutorial and interactive activities. Online tools for group activities are created so that online students can also participate and responded to the activities using icons (thumbs up in Zoom) or emojis (in Teams). In general, it is through this learning delivery platform that the lecturer will curate lessons so that it will offer a hybrid best of in-person, online synchronous, and asynchronous learning experience to students.

The third component of this borderless learning approach is the communication channel. Social media such as Telegram, Facebook group, WhatsApp, and WeChat are used as communication channels. A communication channel is a platform for students to channel all questions and comments for real-time response. To ensure effective communication and equal information dissemination, in-campus students are also encouraged to post their questions in the communication channel so that it will benefit the online students as well.

In short, borderless learning @ Taylors makes learning equitable and accessible to all students, no matter where they are or the nature of their courses. Students' learning will be orchestrated by the course instructor, who will act as a learning curator and a learning facilitator. The in-person student will be in the classroom accessing the same material as the virtual student simultaneously. This is to ensure that both the learning communities have an equal access to facts, opinions, and arguments. Upon the successful implementation of this

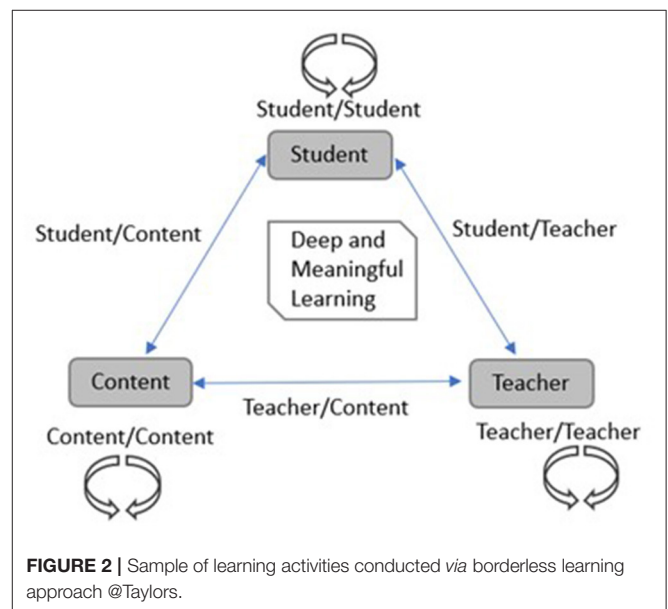


FIGURE 2 | Sample of learning activities conducted via borderless learning approach @Taylors.

approach, it surely can be shared and replicated by other institutions to ensure learning continuity during this pandemic.

Conducive Learning Environment During the Pandemic

In a F2F setting, although some form of pedagogical planning goes into course delivery, the interactions during the class session are spontaneous between the course instructor, the learner, and other learners. On the other hand, designing for online learning requires deliberate planning on its learning design to

ensure a certain learning object is selected to set the stage for engaging and meaningful learning. Learning in the online learning environment should be designed to mirror learning in the F2F setting. Moore (1989) and Anderson and Garrison (1998) research revealed that the most critical interaction is between teachers and students. This observation is still relevant for today's learners learning in a virtual environment. In the online environment, Moore (1989) informed three forms of online interactions: (1) learner–instructor interaction, (2) learner–content interaction, and (3) learner–learner interaction. Hence for hybrid learning, the challenge is for the course instructors to ensure they engage not just with the F2F students but also include the learners in the virtual space in the discussions or class activities.

While Anderson and Garrison have clearly outlined the online delivery strategy that it is still applicable today, pre-pandemic learning was always thought of as either F2F in the classroom or some revisions, practices, or self-learning components that will be flipped in the institution's LMS as blended learning. Hybrid learning practice pre-COVID-19 was in some way a blended learning approach with parts of the lesson in either F2F or online. It was never imagined that there was a need for a very practical course in a kitchen to be delivered entirely online. It was no longer a learner's choice to be onboard to the fully online experience, but learning online has become necessary to ensure class continuity. While research on pedagogy delivery for practical based classes to cope with the forced disruption emerged for nursing (Sharma et al., 2021; Sezer et al., 2022), psychology counselling and guidance (Alkiş Küçükaydin, 2021), undergraduate medical students and their instructors (Khanom et al., 2020; Rafi et al., 2020; Dulohery et al., 2021), teacher education (Kalloo et al., 2020), general chemistry (Wilson, 2020), the strategy of applying synchronous lecture seems to be the pedagogy method of choice while studies acknowledging the loss of “hands-on” experience and impact on the workload of the educator, the students and the educator's own educational philosophies. The studies insinuate a forced strategy to deliver lesson as synchronous online lecture was used to cope with the inability to produce high-quality instructional videos over a short time as creating self-instruction videos were noted as too time-consuming (Hodges et al., 2020; Wilson, 2020). The studies insinuate a forced strategy to deliver lesson as a synchronous online lecture that was used to cope with the inability to produce high-quality instructional videos over a short time as creating self-instruction videos were noted as too time-consuming (Hodges et al., 2020; Wilson, 2020).

On the other hand, Alkiş Küçükaydin (2021) reported that the students of the “psychology counseling and guidance” programme experience difficulties to develop strategies to deal with the uncertainties of learning during the pandemic period. Further, the nursing students experienced an overload of online sessions and described not learning enough to be a good nurse (Sharma et al., 2021; Sezer et al., 2022). The instructors reported decreased effectiveness of remote teaching and called for a change in the strategies for online education (Sharma et al., 2021). Some of the strategies implemented were breaking students into smaller groups for discussion and maintaining engagement with

students *via* a discussion forum, while learning online was the strategy applied for lab classes at an Arabian Gulf University (Wilson, 2020). Nevertheless, no comprehensive studies focused on practical classes conducted in a hybrid setting, with online and on-campus students attending the class simultaneously for practical classes in the kitchen, especially for student chefs who need to practice what they learn.

The Pedagogical Strategy for Hybrid Learning

In a hybrid learning setting, the course instructor must be able to skillfully manage learners in the F2F settings as well as learners in the virtual learning space as both learners will “attend” the class together synchronously. Learner engagement with the course instructor, the learning content, and their peers ensures a deep and meaningful learning experience can take place, and this is through learners' active participation in the class environment (Figure 3).

In a hybrid learning model, irrespective of the learning environment of the learner, they are expected to complete the same type of tasks, activities, assignments, and projects. Saichaie (2020) informed of hybrid learning models that require students to complete preliminary tasks that are the foundation in nature, prior to the synchronous class for example reviewing learning resources that can be in form of instructional videos or research articles or completing the assigned tasks in the VLE. During a synchronous meeting with students or the “class time,” opportunities are given to students to discuss the content learned in the asynchronous session, or active engagement in collaborative activities with their peers to promote higher-order thinking during class time.

Asynchronous learning necessitates students building their knowledge from the ground up, and the instructor designs the course with learning resources and activities that help to scaffold the learning by focusing on lower-order cognitive processes that allow for the recall of theories, concepts, and facts. Matthew et al. (2016) shared that in-class activities should focus on achieving the learning outcomes by fostering critical thinking skills with problem-solving activities which require a student to analyze and evaluate the application of the knowledge collaboratively as a team. To ensure that a meaningful learning happens, a learning design model or a framework could be used to guide the instructors in the learning design planning (Ayub et al., 2020). The pedagogy strategy for hybrid learning must be thought of from a learner's perspective coming from dual learning modes with many of the learning design strategies adapted from the blended learning approach.

Instructor–Learner–Learners Interaction

It has been established that teaching F2F combined with online learning is the best option for teaching today's learners, and academicians should adopt a blended approach to their pedagogy for hybrid learning (Ananga and Biney, 2021). More importantly, communication between learners and instructors is crucial in creating a conducive online learning environment (Anderson, 2003). Hence, a platform that can ensure a fluid interaction for deep conversations between the online learners and instructor,

as well as online learners and in-campus learners, must be considered in the learning design of a classroom for hybrid learning. With the aid of technology that can enable hybrid learning, the course instructor must be able to seamlessly shift their attention from the F2F learners to the online learners and ensure the in-class learners and online learners can participate in discussions for collaborative activities.

Learner–Content Interaction

In the online learning environment's design, overloading learners with too much information must be avoided at all costs. Learning content shall be revealed to learners timely for effective teaching and learning. Project-based learning (PBL) allows an online classroom to be divided into teams, collaborate with their peers, share their work, and be in touch with real-world experiential learning (Lin and Tsai, 2016). Project-based learning (PBL) has been outlined as an effective way to get learners to develop engagement and interaction with the content and their peers meaningfully and is still relevant for the hybrid learning approach.

Learner–Learners Interaction (Peer Learning)

Peer learning is growing internationally as a beneficial pedagogical strategy in conceptualizing learning and teaching in the global classroom (Brannagan et al., 2013). Many researchers see learning effectively with peers as one of the wealthiest learning resources, especially when it is integrated successfully into a higher education culture (Topping, 2005; Havnes, 2008). In addition, according to the research report from the Australian Learning and Teaching Council Ltd, integration of peer learning has also been proven as an effective learning strategy, which enables students to gain confidence in their knowledge (Keppell et al., 2011). Specifically, in the blended learning environment, interaction among learners is crucial to ensure successful learning. Learning becomes more effective when participants become closer and form a stronger relationship in the learning community. This can happen during online dialogues where learning materials are discussed and members help each other to learn and understand more (Silvers et al., 2007).

The Temporary Hybrid Learning Setup and Challenges

The suggested pedagogical innovation extends the existing practice established as a temporary remedy to ensure class continuation in the present learning settings such as classrooms, lecture halls, kitchen suites, and laboratories. The location of the design case is the kitchen suites located in the ground floor area of the building. Due to the pandemic, the students could not have practical experience with their chef instructors in the kitchen suites.

The instructor chefs brainstormed ideas to incorporate interactive demonstrations at a distance using the equipment suggested by eLA (refer to **Figure 4**). Effective known methods to manage an online classroom includes (1) social presence, (2) facilitating discussion, (3) supporting students, and (4) live online teaching (Ni She et al., 2019). With disruptive technologies like



FIGURE 3 | Interaction for online learning is an iterative process between the teacher–student–content (Anderson, 2003).

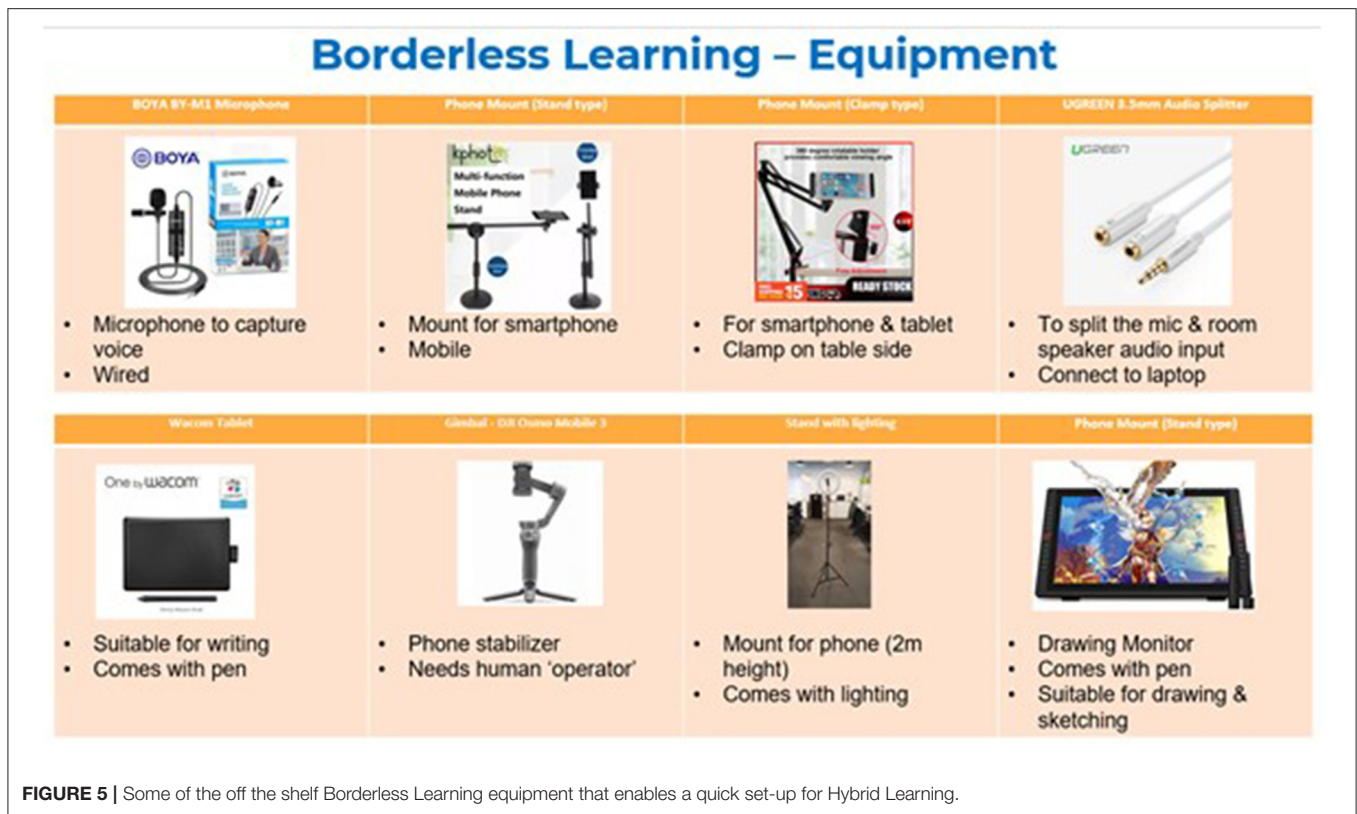


FIGURE 4 | The design-case site: proposed exemplar kitchen in the culinary suite and pastry kitchen.

Zoom, chef instructors conduct virtual cooking demonstrations and facilitate discussions with the students. However, there were still limitations with having limited devices to stream the cooking demonstrations from the campus. While the gadgets suggested can quickly enable hybrid learning, in practice, due to the nature of the classroom that requires views from multiple angles of the kitchen area and different movements of the chef instructor to showcase cooking techniques, the off-the-shelf gadgets can be clumsy to be operated. As an example, a phone stabilizer or gimble (see **Figure 5**) will need a human operator with a steady hand to follow the chef instructors in the kitchen. Requiring another human resource may not be a viable option during a pandemic.

THE RESEARCH APPROACH

The transformation of the design-case sites from its traditional F2F culinary suite and pastry kitchen setting to digital exemplar kitchen (DEK) equipped with Hybrid Learning facilities must



be done seamlessly. Because the DEK needed to be constructed rapidly yet using a rigorous research approach, referring to **Figure 6**, an agile Successive Approximation Model 2 (SAM2) that served as the framework for project management was adapted using design-based research approach (Penuel et al., 2011; McKenney and Reeves, 2019). The DEK will serve as a prototype for future classrooms for hybrid learning, and having a prototype is necessary to ensure the product built meets the end-user requirement and will be subject to test and refinement in iterations (Allen and Sites, 2012). Having a systematic approach to constructing a hybrid learning facility using the agile framework SAM2 will ensure that continuous improvement can be made to the process without affecting the project timeline and deliverables. The design of the DEK will be reflected upon and refined in a maximum of three iterations. Using SAM2 model, the process flow is divided into three phases: (1) preparation which includes project planning i.e., information gathering of the background information as well as brainstorming, termed as SAVVY Start; (2) iterative learning design, to create initial design prototype ideas and a review of the design; and (3) iterative development of the resources and activities for the hybrid learning facilities, implementing the prototype and evaluating the prototype. In each iteration, the lesson learned in the design and development of the hybrid learning facility is recorded and change is implemented in the next prototype cycle. For phases two and three, the development process is broken down into smaller incremental steps or stages, which allows the stakeholders to decide on the refinement or change required for the design

of the DEK and refine the prototype development. In the final rollout (4), the DEK shall be finalized based on reflecting on the design process and enhance the solution implementation, with inputs from experts and the key stakeholder from the school in delivering the hybrid learning solution.

Development of the First Iteration of the DEK Prototype

Due to a tight timeline given to the technologists from eLA to have the DEK sites ready to be operationalized by January 2021, the preparation phase of the design took a month followed by 2 months of iterative design and development to ensure the DEK is fully transformed into a functional hybrid classroom that meets the needs of the end-users. In finding the gaps in this design-case, the technologists reflected on the learning design process together with the stakeholder, including the end-users, that includes strategies that resonate with learning theories and best practices for a meaningful learning experience.

The DEK must be able to support both in-campus and off-campus learners and have a potential for the off-campus learners to be scaled up. However, the operations of this hybrid learning set-up were never tested before. To assist the technologists and the stakeholders to refine the design of the DEK, this first iteration, a pilot study, was conducted to include end-user's experience in the final design refinement consideration. In a design-based study, an initial study such as a pilot or focus group may be undertaken at the earlier stages of intervention

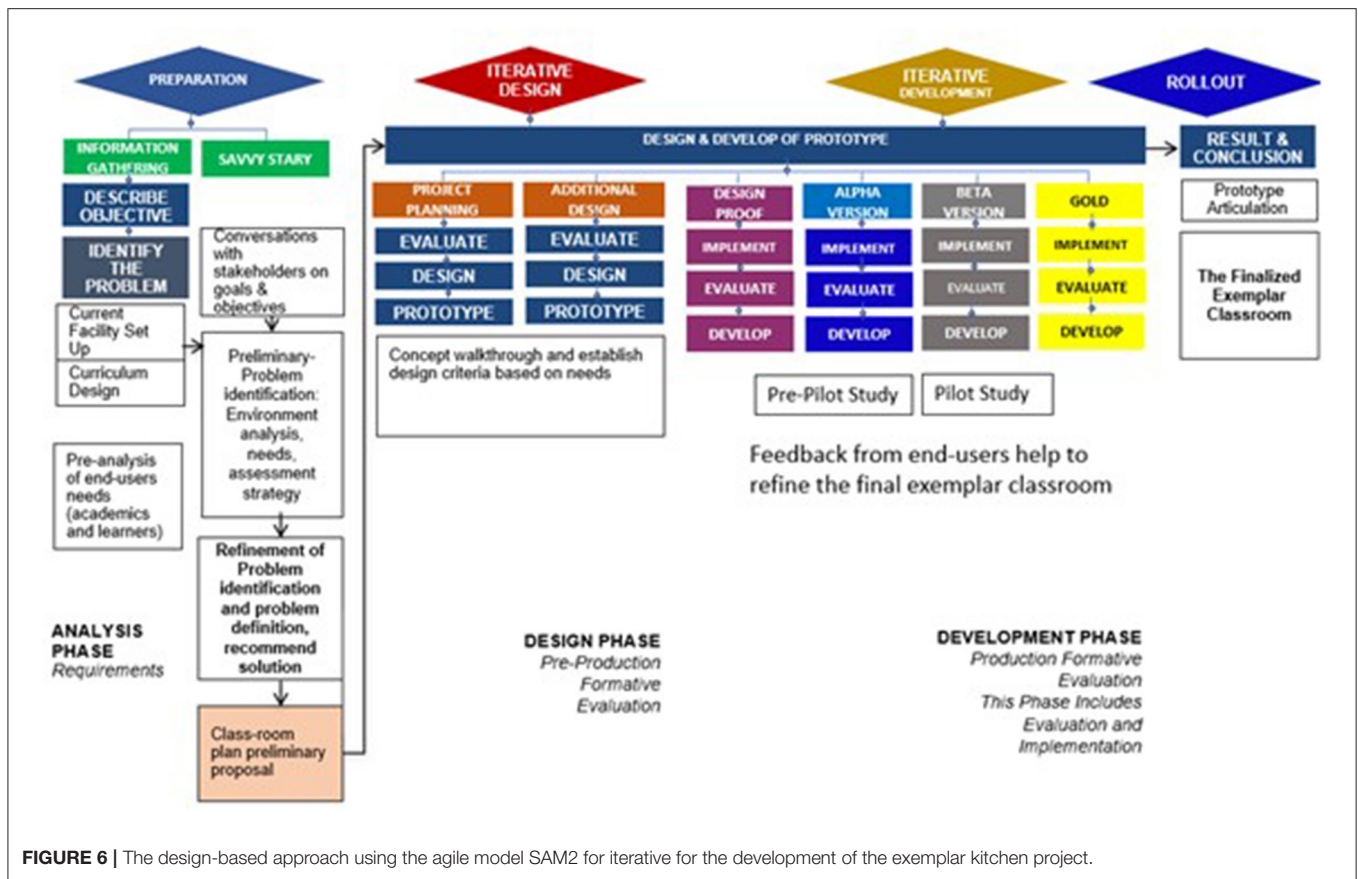


FIGURE 6 | The design-based approach using the agile model SAM2 for iterative for the development of the exemplar kitchen project.

as an opportunity for discovery to assess and revise the design prototype or “to seek proof of an impact with the intention to explain how and why the effect is observed (or not)” (McKenney and Reeves, 2019, p. 176).

In its design, the DEK focuses on delivering high-quality multimedia with interactive engaging moments with the chef instructors. The classes are streamed live from the kitchen using an online meeting platform. The camera view will be changed according to the movement of the chef instructor, which ranges from the working table to the cooking range and the oven area. With the DEK, students attend a live session with a 2-way communication whilst the session is also recorded to resolve the time zone difference for international students.

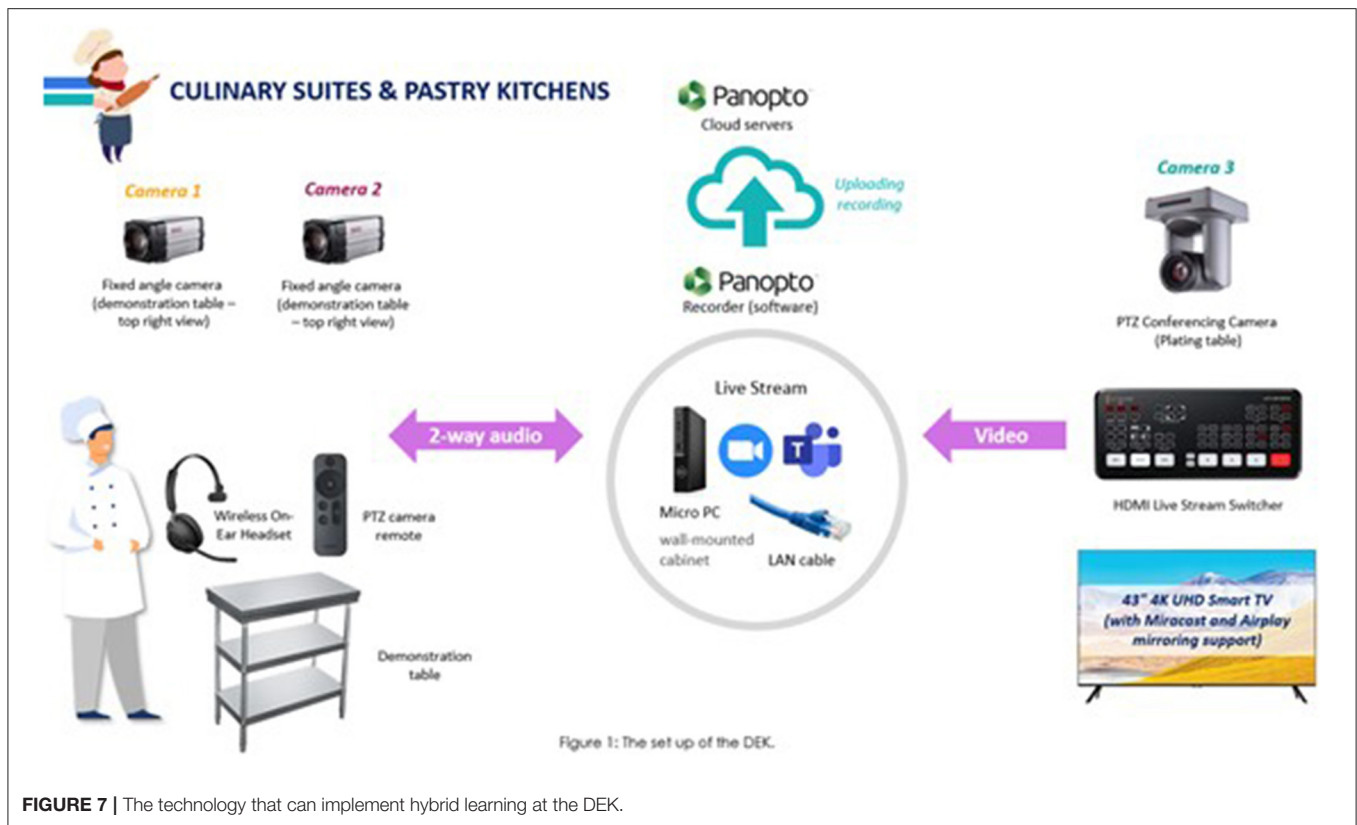
The DEK is a culmination of high-speed internet connection, online platforms, as well as disruptive educational tools. Other than Zoom, Panopto, and the hardware installed, the same learning management system (LMS), TIMEs (Moodle), was utilized as the personal learning environment (PLE). A video management system (VMS) using Panopto was integrated to make the video storing efficient for the end-users. The recordings uploaded into Panopto allow for a greater engagement with students to interact with their chefs about the instructional videos.

The hardware comprises of 42’ TV for display; 8’ full HD Mini Monitor panel facing the curator to allow the chefs to observe what he is doing and what the student is viewing; two (2) fixed

HD cameras pointing at a precise angle for maximum view with one (1) omnidirectional HD PTZ (Pan-Tilt-Zoom) camera that allows the curator to adjust, zoom in or out where necessary and allows the chefs to have 10 different preset camera views and a Jabra headset with noise cancellation to ensure pristine audio delivered to the audience, making the chef easy to be heard with high-definition sound quality to both ends (see Figure 7).

Focus of Classroom Management in DEK

For online classroom management, the chef instructors engage with students with a wide array of pedagogical methods. For example, miniature tasks were given to test students formatively based on the menu of the day to keep them concentrated throughout the session. Upon completion, the session is immediately uploaded to a video management system (VMS), i.e., Panopto that allows students to re-access ubiquitously. The proposed innovation of classroom management for hybrid learning extends to current practice and prior literature in three ways. First, prior research on the HyFlex model focused only on two learning modalities where students may choose to attend F2F class in-person or complete learning activities online without physically attending a class (Beatty, 2014; Liu and Rodriguez, 2019; Sowell et al., 2019). This model is expanded upon by adding an additional modality, i.e., the option for students to participate in a F2F class synchronously online. This option is critical in driving engagement for students who may feel distracted in a



large class setting or who may feel the need to quarantine, without sacrificing the benefits of F2F interactivity. Second, the HyFlex model is further extended to not only include flexibility but also engagement. Referring to Beatty (2014) definition, HyFlex considers flexibility in terms of attendance and content delivery. However, there was no guidance on how instructors can promote student engagement in hybrid settings. The problem in practice is particularly serious for large class sizes where the instructors are already struggling with devoting attention to individual students in need or engaging them in a meaningful discussion (Dean et al., 2016). This problem is especially exacerbated in a hybrid setting, where the instructor needs to engage students in an unbiased way *via* multiple learning modalities. Third, a reference to past scholarly literature on best practices of hybrid learning environment, using existing tools and technologies, in which the chef instructors carefully craft the learning design of the course by combining a menu of different tools and options in which students can receive equitable access to content.

THE FINDINGS

The pre-pilot test was performed at a small scale, and 21 students agreed to participate in the survey to evaluate how learning was conducted as a hybrid mode in the DEK with Zoom and eventually Panopto, as the tools to present the output for the classes which was conducted in DEK. The students experienced a few sessions of learning in DEK and subsequently

answered a survey with a 5-point Likert scale. All participants' information was kept anonymous. Histogram illustrates the mean score and standard deviation regarding the item (a). Ease of use, (b) Functionality, (c) User Interface and open-ended responses were also included in each construct to further probe on how learning is experienced by learners after implementing the Hybrid Learning design set up in the DEK. In the pre-pilot test, referring to **Table 1**, the highest mean score ($M = 4.24$) is the 'Functionality' while 'User Interface' has the lowest score ($M = 4.00$). The average standard deviation (SD) on the other hand is 0.7756. The data spread from the histogram further shows a low standard deviation, and the data clustered around the mean or 4 and 5 from the 5-point Likert Scale suggest a higher acceptance rating of participants on "Ease of Use" as "easy" or "very easy," "Functionality" of tools used for effective learning as "good" or "very good," and "User Interface" of the learning environment as "good" or "very good."

The open-ended questions are purposely inserted into each construct to gather information to further give insights on refining the design setup. The participants generally gave positive feedback on the "Ease of Use," "Functionality," and "User Interface." In refining the design, negative responses were purposefully sought in the text analysis of participant's responses. On the "Ease of Use," participant 18 included a response to inform "sometimes the video has no sound." On "Functionality" participant nine informed "the lecture video appears lagging at times" and there was no further feedback given on "User Interface" to provide insights. Due to the response of the learner,

TABLE 1 | The mean and standard deviation of student's experience from pre-pilot test.

	Mean	SD
Ease of use	4.10	0.8310
Functionality	4.24	0.7822
User Interface	4.00	0.7138

TABLE 2 | The mean and standard deviation of student's experience from pilot test.

	Mean	SD
Ease of use	4.39	0.6077
Functionality	4.17	0.7432
Speed	4.17	0.8185
User Interface	4.33	0.7691

the learning technologists made an assumption that the speed of the internet may have contributed to the negative experience of the learners. Additional Wi-Fi hotspots were added in the area to ensure no disruption to the class being streamed synchronously to the online learners. Hence, a follow-up pilot test is run after some design refinement to the setup of the design of DEK with a different group of learners.

In the overall learning experience, participant 11 compared the experience from last semester when the class was conducted as an hybrid but using the temporary hybrid learning equipment (Figure 5) as *"It is easier to view the demonstration than last semester which requires someone holding the camera which is sometimes shaky."* Participant three compared the experience to indicate learning in DEK environment equipped with the Hybrid Learning facilities as better *"this year is better. I find it easier to study and listen to lecture."*

The subsequent pilot test was also performed in a small scale and 17 learners agreed to participate in the survey. The learners experienced learning in DEK for a semester and subsequently answered a survey with a 5-point Likert scale. All the participants' information was kept anonymous. The same constructs were measured as the pre-pilot; however, in the pilot test, "Speed" was added as one of the items to measure. The same constructs were measured as the pre-pilot, however, in the pilot test, 'Speed' was added as one of the items to measure. Referring to Table 2, the highest mean score is 'Ease of Use' (M 4.39), while both 'Functionality' and 'Speed' have the lowest score (M = 4.17). The average SD is 0.73462. The data spread from the histogram further shows a low standard deviation and the data clustered around the mean or four and five from the 5-point Likert Scale to suggest a higher acceptance rating of participants on the "Ease of Use" as "easy" or "very easy," "Functionality" of tools used for effective learning as "good" or "very good," and "User Interface" of the learning environment as "good" or "very good." On "Speed," the data is more spread out as compared with the other constructs; however, the neutral response at three does not indicate the participant is experiencing slow speed.

Generally, the participants gave a positive feedback on the "Ease of Use," "Functionality," "User Interface," and "Speed." There was no negative response to any of the constructs. On the "Ease of Use," participant 16 informed following the class from the online environment as *"It is not very complicated; everything has a label to state the use of it."* The experience of participant five indicated the ease of use because *"can adjust the speed by ourselves"*. On "Functionality," Participant five informed *"everything functions well for me, no technical issues,"* while Participant 11 informed the experience of "Functionality" is *"Smooth could easily fast forward."* On "User Interface," Participant four informed it is *"easy to understand even for someone new to the software,"* while Participant 14 informed, it is *"easy to understand and navigate."* On "Speed," Participant five informed: *"nothing is wrong and slow for me; it was fast to load everything"*. Whereas, Participant 13 on the other hand informed *"It is fast but wouldn't be as fast if it were face to face"*.

In the final open-ended question, unlike the pre-pilot test that asked for any other further comment for the pilot, the question was constructed to specifically ask the participant to compare their learning experience with their previous semester. A mixed review was given by the learners. However, most participants noticed an improvement in the way lessons were delivered in terms of audio and visual clarity, such as recording is clearer, cooking demonstration is clearly recorded, comparing last semester where lecturers shared similar videos from YouTube, and this semester they are able to view the course live with the on-campus students as Participant two stated *"live; online. Able to hear clearly"*. However, it is important to note, from the responses, the learners still prefer to attend this very practical-based class in the kitchen. Participant five informed because they are *"losing practical skills,"* and Participant four stated *"need to be able to cook in the kitchen"*.

DISCUSSION, IMPLICATION, AND CONCLUSION

The findings from the pre-pilot study indicate as an overall learning experience that learners can accept the hybrid learning setup as a temporary measure for class continuity, but some improvement could be made to the quality of the videos, for example, to reduce shaky video footage. Considering feedback from end-users of some discomfort due to the spatial gaps in learning for a practical-based classroom due to being online, some improvement was made to the design set-up in the DEK. The learner's feedback in the pilot indicates an overall better experience than the pre-pilot study after the learning is being conducted in the DEK equipped with hybrid learning facilities using the PTZ cameras instead of hand-held equipments, such as the gimbal or using a smartphone to stream videos. It was reported that learners have a preference for learning to be conducted as F2F compared to hybrid mode due to concerns about the very practical nature of the course. The socio-emotional learning process is somewhat hampered in an online classroom (Lathifah et al., 2020).

This DEK innovation was introduced to improve the socio-emotional learning process when the students' motivation was at an all-time low during the uncertainties of the COVID-19 pandemic. Although the pre-pilot and pilot study data are very small the findings gave useful information to gather students' acceptance of learning in the experimental stage of the Hybrid Learning mode, particularly for a classroom that is very practical in nature.

This pilot study insinuates positive impact can be obtained with the correct application of hybrid learning for practical classes with considerations on pedagogy and the course instructor's technique to ensure balancing activities between learners from the online and F2F. Secondly, the flexibility between study time and practical classroom which was unprecedented before could be adjusted according to the learner's abilities and their unique situations. As an example, when the F2F practical session starts, the Panopto system will automatically record the class in session so that the learners could review the class again at a later time or participate in the learning activities on the online platform at their own time. Thirdly, it reduces the tendency for learners to procrastinate on submitting assignments because a clear deadline is given in the learning platform. A deadline that is managed by the system increases the learner's self-awareness and trains them to become a more independent and self-directed learner. Finally, students' review was positive as they were able to interact with peers and instructor chefs in real-time as in the F2F classroom. This means that even though some students were coming from online mode, they were not isolated within that environment. All learners, irrespective of being online or F2F, were able to socialize and interact with their peers and instructors. This impact is positive because learning is a social activity, and even though learners are online, they were able to become familiar with the indirect interaction and socialization. This indicates that interaction and socialization could happen with others not just in a F2F setting but in different ways *via* online activities as well.

Contrarily, some obstacles were overcome within Taylor's eco-system to ensure the application of hybrid learning is successful. Firstly, learners' experience in the online mode for the synchronous practical demonstration session is highly dependent on the condition of the internet network. While the institution recognizes that they could only control the eco-system within Taylor's, learners' own internet network is beyond their control. Technical disruption due to unstable network causing screen time to freeze or course instructors or learners having to leave the Zoom session and re-enter becomes a norm that they have grown to accept and adapt with online learning. Recording the class in session and sharing the recording at a later time mitigates the issues with

technical disruptions during a synchronous session. Secondly, the course instructors must adapt to the new teaching method in designing their modules for the hybrid learning mode. The adaptation to managing a classroom in both F2F and online could be a challenge for some lecturers. A new teaching curriculum with flexible activities to replace what students normally do during the F2F class ensures student learning time is achieved within the Malaysian Qualifications Agency (MQA) standards. This includes a redesign of activities that includes techniques, assignments, and evaluations. Hence, research to investigate the course instructors' experience will provide an insight into managing a hybrid learning classroom. The learning conducted in the DEK will continue to be monitored closely for improvement based on the end-users feedback. Situations like COVID-19 may occur in the future, and learning as a hybrid mode has become a new norm for education today. For the study to be more meaningful, a follow-up or a long-term study can be conducted with more end-users experience from both learners as well as the course instructors as they deal with the spatial gaps as learning approach has shifted to the hybrid learning pedagogies post-COVID.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

Ethical review and approval was not required for the current study in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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