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Co-designing the first online pharmacy course with the technology-enhanced learning accreditation standards (TELAS) as a reflective tool.

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This research describes the experiences of co-designing a technology-enhanced online Pharmacy course and how the Technology Enhanced Learning Accreditation Standards (TELAS) informed the design and development of a fit-for-purpose online course. This study used Gibb's reflective model and Driscoll's constructivist learning theory to unpack and align the processes in the development of the course. Finally, we have discussed the broader implications of the TELAS framework to online courses not only as a reflective tool but as an opportunity to inform future pedagogical practices, course improvements, validations and application of TELAS in practice.

Keywords: Online Pharmacy, TELAS Framework, online learning, technology-enhanced course

Introduction

The Australasian Society for Computers in Learning in Tertiary Education (ASCILITE) has recently provided a set of standardised indicators and performance criteria to gauge the quality of Technology-Enhanced Learning (TEL). The Technology-Enhanced Learning Accreditation Standards (TELAS) framework measures the quality of four domains: online learning environment, learner support, assessment tasks, and learning resources are some of its core criteria. The Horizon Report (2021) and TEQSA risk guidelines (2021) both identify quality assurance of online learning as both a priority and a challenge. While, online learning is not new, what is new, is the development of pedagogically sound courses that support and facilitate technology-enhanced learning (Sankey, 2022). The objective of this case study is to demonstrate how a new online Pharmacy course at Charles Darwin University (CDU) used TELAS as a reflective self-assessment and a learning design tool to develop the new online course. The study aims at providing evidence of how the TELAS framework can inform or inspire good online learning design and teaching practice within online Pharmacy curricula.

Context of our (CDU) pharmacy course

Pharmacy programs have been traditionally delivered face-to-face in the belief that this was necessary to teach and assess the practical skills required for the profession. However, with the student demographics changing and most students being mature age, with life experience and life commitments opportunities to provide flexibility through online delivery are important to accommodate the needs of this cohort. The professional degree is externally accredited by Australia Pharmacy Council (APC), a professional body with well-developed student outcomes, and flexibility to ensure graduates are practice-ready (Morgan et al., 2021). It would be remiss to think that face-to-face delivery was the only way that students could be supported to achieve those competencies and that face-to-face assessment on campus was the only way to assess the student's competency. Even with the changes forced upon the sector during COVID the face-to-

face model was still used by uploading content in the same format to an online learning platform. This did not accommodate the requirements of online learning from the student's perspective. Nevertheless, there have been some criticism from students who were forced to move online and suggested that they would still prefer to have face-to-face content with respect to compounding, dispensing, counselling, and medical demonstrations (Morling et al., 2022). This was also consistent with another recent study noting students preferred the face-to-face interaction between the academic and the student that instilled a social relationship and connection with their studies (Shawaqfeh et al., 2020).

This program is only the second online pharmacy program in Australia and the first at the Master AQF Level 9. This program is different to the other online program in that it has only two units that require attendance on campus for access to specialist laboratory resources and other units utilise simulation or Work Integrated Learning (WIL) to gain the competencies historically developed face-to-face. This program demonstrates the skills online and then provides opportunities for practice in the workplace in real-life situations. Prior to WIL, students can practice dispensing, interprofessional collaboration, and clinical reasoning in a safe space with immediate feedback through simulation.

The Australia's Northern Territory (NT) has a major workforce shortage of health professionals including pharmacists (Jackson et al., 2021). Offering an accessible online education program may assist in addressing workforce's needs in the NT and Australia more generally. The University delivers its programs predominantly online platforms to address the geographical distances that would prevent many students unable to relocate for study. Relocation away from family and land is also a barrier for First Nation students alongside the lack of knowledge of career guidance and future education (Gore et al., 2017). Technology is also now easy to use and accessible for students which allows them to study in this mode without disadvantage, with one study suggesting higher rates of stress for pharmacy students in traditional mode compared to COVID response online only mode (Attarabeen et al., 2021). There has been significant research in the health field that demonstrates that students who undertake their studies in rural and remote area, or given the opportunity to undertake further training and development, or have a positive placement experience, or have a longer time on placement, are more likely to work in a rural and remote area upon qualification (Campbell et al., 2021; Cosgrave et al., 2018; Russell et al., 2021; Seymour-Walsh, Bell, et al., 2020). However, the social determinants of rural health retention are still not well understood (Cosgrave et al., 2019). Online delivery allows us to reach that cohort of students and potentially add to improvements in the rural health workforce by retaining professionals in those areas. Bringing students to major regional and metropolitan areas for study, results in students remaining in those locations upon qualification (Campbell et al., 2021).

Since COVID, pharmacy based or pharmacy delivered services increased to give pharmacists a larger role in primary health care, expanding their scope of practice (Chiu et al., 2022) This expanding scope of practice include embedding pharmacists into aged care facilities, which is a follow-on from pharmacists embedded in general practice and community-controlled Aboriginal health services (Kosari et al., 2021). Further, the online delivery mode will facilitate micro-credentialing (Wahler, 2019) and digital badges (Poirier & Weis, 2021) for these additional scopes of practice to retrofit the existing workforce with the skills needed for the new areas of practice.

Such online delivery has the potential to provide pathway studies for students considering pharmacy as a career but not wanting to commit without trying more of the profession first or for upskilling technicians in the profession, including those working in Aboriginal Health Services (similar to allied health workers). In international markets, technicians undertake the administrative roles of the pharmacies. In some cases, there are checking technicians that undertake the final check of the medicine rather than the pharmacist (Boughen & Fenn, 2020). This allows the pharmacist to be freed up to conduct their clinical reviews of the medicines and patients. A showcase that online delivery works successfully for students in the pharmacy sector will open the door to these opportunities

With all these benefits and opportunities, it is important to address digital inclusion and accessibility issues to improve uptake of online learning opportunities across remote areas of Australia. More importantly, the online courses should be modified and redefined to be more responsive to learners needs. With the shift to online teaching and learning, as Puentedura (2012) noted in his SAMR framework (substitution, augmentation, modification and redefinition), that this may include redefining teaching and learning by offering flexibilities and new opportunities for more self-directed learning rather than simply replicating or

substituting traditional teaching methods. To redefine our approach to online pharmacy education and training, it was essential to be guided by a nationally agreed upon technology-enhanced learning quality framework. This is reason why the TELAS framework was applied to evaluate, reflect, and inform best practices for designing online technology-enhanced courses.

Literature review

The Australasian Society for Computers in Learning in Tertiary Education, known broadly as ASCILITE, is a not-for-profit professional consortium that designed, developed, implemented and evaluated TELAS through member support from retrospective universities in Australia (Parrish, 2017). The self-assessment tool for TELAS is free and downloadable (while formal the accreditation and external assessment comes with a fee https://www.telas.edu.au/the-review-process/). Institutions submit their online learning materials, which are then reviewed by certified reviewers (Parrish, Campbell, et al., 2020).

ASCILITE offers a range of services including webinars for professional development, awards, local Special Interest Groups (SIGs), grants, research schools, partnerships, conferences, and boot camps to name a few (ASCILITE, 2022). The supporting authors of the framework identify that it has been "conceptualised across four phases of development, including a rigorous and extensive consultation process involving tertiary sector professionals and academics across Australia, New Zealand and Singapore" (Parrish, Christie, et al., 2020, p. 1). While TELAS was not co-developed with Student as Partners, there was a sound commitment to student voice, experience, and evaluation with the incorporation of student focus groups, student surveys and interviews focusing on what they believe was important in the conceptualisation of good online learning (Parrish, Christie, et al., 2020). Victoria University was an early adopter of the TELAS framework and demonstrated how the application of the framework allowed the easy move to online learning during COVID in the context of a high text-based first-year first year Law course (Raponi et al., 2021).

However, TELAS does not include how well an institution is meeting global technology sustainability aspirations and requirements or examining how well a course Open Educational Resources (OER) to some capacity, with critics suggesting this as an impeding factor in developing quality standards (Ryan et al., 2021). It is also difficult to measure environmental and contextual factors contingent on the institutional context, the teaching environment, and the teacher and learners (Pattison, 2017). This being said, TELAS has quickly become the preferred quality assurance standard for online courses in Australia.

The Commonwealth of Learning published an article titled e-learning, "a guidebook on principles, procedures, and practices", which outlined the emergence of OER that paved the way for e-learning evaluation and benchmarking (Naidu, 2006). Perhaps one of the earliest and continuing works in quality teaching and learning in Australia is the Australian University Teaching Criteria and Standards Framework. Which involves all the main criteria developed in TELAS including learning activities; teaching and supporting student learning; giving feedback, learning environments, student support and evaluation of practice (Chalmers, 2017; Chalmers & Hunt, 2016; Chalmers & Tucker, 2018; Cummings et al., 2014). The framework has been used nationally to set standards for promotions, professional development, probation, and good practice within teaching and the scholarship of teaching and learning. However, and critical to TELAS development, technology standards were not mentioned in their criteria rubrics (even though they do suggest it as an "unintended outcome" of the project (Cummings et al., 2014). Building on the work of other frameworks, TELAS was selected for this study as it is now the preferred quality assurance benchmark within technology enhanced learning environments in Australia.

Benchmarks and accreditation standards are often confined by legislative, regulatory, and local policy requirements. For instance, the Web Content Accessibility Guidelines (WCAG), provide an internationally recognized set of accessibility standards for web content. As a result, accessibility is included in TELAS (Standard 1), as in other standards. The Universal Design for Learning (UDL) principles are in the TELAS, but lightly, with not all tiers of UDL being covered (multiple means of action and expression, engagement, and representation) (UDL, 2020). However, it has helped others in the scholarship of paramedicine

education, whereby TELAS supported innovative online classroom practices by setting clearer learning outcomes, a decrease in slide use with increased multi-modal output (images and video), a decrease in texts on slides for accessibility, and improved peer-to-peer collaboration through breakout rooms (Seymour-Walsh, Weber, et al., 2020). Furthermore, with increased technology enhanced vertical degree pharmacy programs, such as the Monash Model of Care (MMoC) (Malone et al., 2021); could be further strengthened with an overarching framework for quality online teaching and learning This lead to the timely importance and premise of the current case study, that the TELAS framework could be used as a model for other online pharmacy units to self-audit their courses without the need for external accreditation.

Theoretical and Conceptual framework: Driscoll's Constructivist Learning Theory

Various systematic literature reviews of technologies in health education noted that theories are almost non-existent in most empirical research (Fontaine et al., 2019; O'Connor et al., 2020; O'Connor et al., 2018). However, those that have a theory afforded to their research design, either tend to choose Kolb's Experiential Learning Theory or Driscoll's Constructivist Learning Theory due to the practicability, usability and feasibility of these two theories within allied health (O'Connor et al., 2022a). However, it is not the sheer popularity of the theoretical lens that made it a suitable theory for application. Rather, Driscoll's Constructivist Learning Theory purports that constructivists alike all have one underpinning feature. That is that knowledge is constructed by learners as they attempt to make sense of their 's experiences (Driscoll & Burner, 2005). For learning designers, Jonassen et al. (2008) provided five broad theoretical principles that are recommended for instructional designers adopting a social constructivist framework drawing upon Driscoll's previous work, noting it needs to:

1. Embed learning in complex, realistic, and relevant environments.
2. Provide social negotiation as an integral part of learning.
3. Support multiple perspectives and the use of multiple modes of representation.
4. Encourage ownership in learning.
5. Nurture self-awareness of the knowledge construction process.

For instance, Pharmacy simulated environments lend themselves well to principle one, such virtual walkthroughs, games, and simulated case studies within Pharmacy practice. Second, Virtual Classroom breakout rooms and discussions (Collaborate, Zoom, MS Teams) support such social negotiation. Third, Universal Design principles are essential to this cause, as well as Feedback opportunities, authentic assessment, and a host of third-party providers on the internet can help here. Regarding principle four, flipped, blended, active, and hurdled-based learning is also vital on this front. Lastly, self-awareness through e-portfolio reflections such as PebblePad offers examples of this principle in action within the Pharmacy classroom.

Benchmarks and models: A brief review

For example, Alonso, Lopez, Manrique, and Vines' e-Learning instructional model uses a social constructivist lens to an information processing pyscho-social underpinning (Alonso et al., 2005). With respect to learning design models, there are two prominent forms models within the literature being the Dick and Carey E-learning instructional Model (Dick et al., 2001) and the ADDIE Model (Analysis, Design, Development, Implementation, and Evaluation) (Nadiyah & Faaizah, 2015). However, as Castro and Tumibay (2021, p. 1367) note that, "though online learning has been existing for a long time, there are few online instructional design models, theories, and standards exist". The most common models and standards used within technology-enhanced learning include 1) Quality Matters (QM) 2) Quality of Online Learning and Teaching 3) Publisher Rubric (PR) 4) The Alonso, Lopez, Manrique, and Vines' E-Learning instructional model 5) community of inquiry model and 6) the Instructional Design Model for Online Learning (IDOL) (Chen, 2016).

QOLT for example, while it is a great rubric that considers various factors within online instruction; it fails to provide a system for implementation, besides a self-assessed rating system. Furthermore, QOLT was developed with a particular Californian context in mind and is now a decade out since its initial development (Castro & Tumibay, 2021). Drawing upon ADDIE, IDOL was developed with higher education online learning in mind, following three main steps, that being analysis, strategy, and evaluation. Similar to ADDIE with Analysis, Development and Evaluation, the model offers twenty-four suggestions for pedagogical practice. However, it lacks the ability to be a standard and it is best used as described by the authors in conjunction with other instructional design models (Siragusa et al., 2007). QM on the other hand, is more closely related to Community of Inquiry conceptual frameworks, whereby knowledge is understood by quality based on the teacher presence, learner presence and cognitive presence being afforded (Bogle et al., 2009; Hall, 2010).

Furthermore, covering a literature review of its use cases, QM has shown to be continually evolving, developing, validating, and aligning itself with other standards (Shattuck, 2015). However, aspects of QM while useful, seem more contextually appropriate for the U.S. than for Australia. ACODE was perhaps one of the earliest benchmarks for Technology Enhanced Learning in Australia prior to TELAS and is one of seventeen other online benchmarks for quality online learning (Yeung et al., 2019). Yeung et al., (2019) note that at least sixty percent of these frameworks covered four main themes: learner support; course content and instructional materials; assessment, and course evaluation. For Quality Matters (QM); a popular online benchmark, seven key categories and presented being 1. Course overview and introduction;2. Learning objectives 3; Assessment and measurement 4; Instructional materials 5; Learning activities and learner interaction 6; Course Technology 7; Learner support and 8; Accessibility and usability (Lowenthal et al., 2021). QM is one of the most well-known non-for-profit organisations and their standards is arguably the most cited rubric specific standards today.

Methodology and Research Design

Participants

The stakeholders involved in the development of the course were the course coordinator/ Subject Matter Experts, learning designers, a learning resource developer, a learning technologist, a learning management systems specialist, and course educational developer. The course lead and lecturers focused on the course accreditation and unit development, with other professionals dedicated on online learning design, technology scoping, learning technology integration into the university learning management system and learning resource development. However, the researchers who were actively engaged in this reflection were the digital learning designers, the pharmacy course lead/lecturer, and the academic lead.

With the researchers doubling as participants in this participatory study, there was no ethics approval sought from the University ethics committee. This is because the study focused on participants' reflection on own practice and roles played in the co-design process, analysing the course design through the frame of the TELAS Framework. Therefore, there were very minimal risks to participants. While reflexivity is uncommon in the scholarship of teaching and learning in pharmacy education (Faisal, 2021); it is important to be reflexive and identify our positionality all coming from a rich culturally and linguistically diverse background who have often found technological assumptions prevalent in our education system firsthand.

Reflective co-design

The participants engaged in a co-design reflective process for a period of one year discussing and reflecting on good online learning practices, models, while at the same time developing and implementing learning resources and activities for the new program. For example, the co-design team reflected and evaluated what learning pedagogical affordances should be made paramount (i.e. collaborative, self-regulated etc), what technologies currently exists within the university ecosystem, what new technologies were needed, how to develop new learning resources based on the needs identified, and how to do constructive alignment and leverage technology enhanced assessment with learning outcomes.

The participants engaged in regular meetings to plan various stages of the course development and implementation. The meetings lasted for one and a half hours. Despite, the participants engaging in such regular meetings and discussions (weekly, fortnightly, and monthly), they also attended a one-day co-design workshop to develop a shared understanding and values of co-designing principles. In a traditional sense, co-design means cooperatively designing services, products or processes (Burkett, 2012 which can be applied to other contexts, such as co-designing an online pharmacy course. Increasingly, the codesigning practice is becoming more common in technology enhanced environments, with task management, motivation, planning, cognition, and collaboration being critical success factors that most co-design practices have in common (Villatoro Moral & De Benito, 2021). While still relatively new in higher education it offers the ability for collective decision-making of products, policies, and innovations.

Research Questions

In this case study the researchers reflected overtime about ideas and approaches to develop the new online Pharmacy course. Some of the questions participants reflected upon were: how to ensure learning activities are aligned to assessments and intended learning outcomes, what educational technologies are available in our ecosystem, do we have learning technologies to support online learning, do the tools fit the intended pedagogical approaches, what learning support is available in the university, what is important for this course, what learning theories and online framework should we draw from to develop this course? The premise here is that no overarching explicit and definitive research question defined the online course design. Rather, it was an ongoing, sustained iterative process of continual reflection through what is known broadly as Gibb's reflective cycle.

Gibbs reflective Cycle

The Gibbs model reflective cycle provides tools to conceptualise the codesign process used in the development of this online course. Gibbs' model outlines six stages. The 6 stages cover description, feelings, evaluation, analysis, conclusion, and action plan (Gibbs, 1988). This model provided the tools needed for the team to reflect on the lived experiences of developing this new online course. To collect data for this study, the participants reflected on the things that went well or did not, what roles each played, and how to implement online learning pedagogies. This reflective model was well suited as it allows a larger product to be understood through a series of repeated events and processes

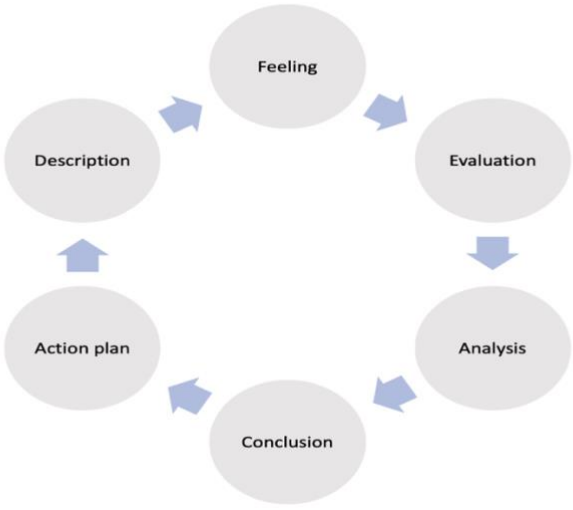

Figure 1: Gibbs Reflective Cycle

Results

Based on the TELAS framework used to create the reflective questions, the results were organised under the framework domains and sub themes that emerged in the reflections.

Learning resource: learning resource development and constructive alignment through Storyboarding

Unlike face-to-face teaching, in online teaching and learning, it is critical to make explicit synergies between learning outcomes, assessment tasks, and learning activities (Biggs, 2014), in what Biggs (2014) refers as constructive alignment. To achieve the constructive alignment in the course, the team utilised expertise of the digital learning design team to transform content in an online-friendly format for students while ensuring all the learning objectives and outcomes were well designed for inclusion in the program of study. This was to clearly articulate why the students are undertaking an activity and how it links to both the unit and course objectives. Positioning ourselves as students, allowed us to constantly reflect on the "so what", "what's the point", and "where's the relevance" in our design. In addition to focusing where activity sits in the overall program, we ensured that we explained why the activity is relevant and worthy of the student taking time to engage and complete the activity. This is particularly important in the context of time-poor students with multiple competing priorities.
The course coordinator engaged with digital learning designers, product specialists, learning resource developers to discuss pedagogical and technology support for the new course. These professionals were critical in providing tips and support to the online design of learning activities, media production, integration of third-party tools, development of appropriately aligned, engaging, and interactive learning resources.

Importantly, the learning designers worked collaboratively with subject matter experts to ensure the constructive alignment happens through mapping learning opportunities, resources, and activities to assessments. To achieve this, a guided, supportive, and collaborative process through "storyboarding templates" conducted to map out the content to learning objectives and outcomes, the learning activities, and assessment tasks before implementing them in the learning environment. Such a process helps to avoid using the LMS as a digital repository rather a meaningful place as part of the students' learning process. The constructive alignment was also important to avoid putting technology before pedagogy. This way the learning resources and activities intently scaffolds learners towards achieving the intended learning outcomes, increase the quality of learning events and the overall experience in the course.

Whole of course approaches to scaffolding learning
The other key factor was to address how to prepare students to be competent to enter the pharmacy profession. To address this, planning and implementing on how to integrate WIL, professional placements, and simulations into the programs for students was vital. This was to safeguard and demonstrate how students build competence in the required skills. But before implementing such learning opportunities, we used a whole of course approach to avoid duplication of learning activities and scaffold assessment activities across the course. This shift suggests that online delivery does have an opportunity to deliver a program with well-structured/scaffolded WIL activities to achieve the same competencies as a traditional face-to-face program. To achieve these outcomes, we planned to use a range of educational technologies using tools, such as Pebblepad to collect evidence of practical and experiential learning opportunities from their WIL, progressive case studies, professional competencies and other activities that is not traditionally covered in the course content area.

Integration of discipline content knowledge
In this course, some learning units combine rudimentary anatomy/physiology, pathophysiology of disease, pharmacology and pharmacy practice for a particular body system content with the integration of MyDispense (an online technology online that is mainly used to teach dispensing) for students to practice how to fill prescription and dispense medication. The rationale here is to provide students with a complete understanding of the body system to enhance their understanding of anatomy, physiology, pathophysiology, pharmacology and pharmacy practice. This way we are able to provide an in-depth study of the cardiovascular system and disease pathologies associated with that system to facilitate understanding of the pharmacology of drugs used to treat these conditions. In addition, having a deeper understanding of cardiovascular pharmacology will result in a deeper understanding of disease pathology particularly in terms of identifying therapeutic targets on the pathological pathway of the particular disease. This will result into a deeper understanding of the relationship between these areas of study to develop student's ability to apply these knowledges in pharmacy practice appropriately and safely dispensing medications.

This is further supported with other learning opportunities available in specialised laboratories, delivered through intensives, vaccination training, simple compounding of medicines, aseptic techniques, and the practical component of first aid.

Online learning environment: Bridging the technology gap

The program developers were pharmacy content experts who have been predominantly trained in the lecture/workshop mode of delivery. As the university enriches and evolves its educational technologies ecosystem, its important to support educators to create meaningful and engaging learning content to assure a high-quality learning experience for students. Such experiences are likely to lead to a "more active, collaborative, authentic forms of assessment and online learning" (Sankey, 2022, p. 1). The university has acquired video capturing, social learning, e-Portfolio, video assessment, and collaboration software, and have resourced learning designers (who are also most of the researchers of this case study) to ensure such tools are pedagogically sound, quality controlled and well-integrated into the teaching and learning of university courses.

The online move was not without difficulty. Some of the main barriers included time but also that the content experts were out of their comfort zone. It was necessary to establish a common understanding between the program developers and the learning designers to build and grow trust together to enable the project to move forward without other forces. From the digital learning perspective, it required patience to bring the content experts on a journey of being creative, critical, and curious when learning new technologies. To achieve this, various mock-up iterations were done for each tool to evaluate use cases within the course contexts and how it might fit within the educators' pedagogical practices. The importance here was to ensure that the technology considerations were second, and that the pedagogical affordances of the course were paramount.

To ensure a range of learning and teaching technologies are adapted and used to compliment educators' pedagogical practices and enhance student learning, learning designers played a driving role in the adoption of the educational technologies. This involved training and guiding the use of multimedia tool for pre-recorded chunked lectures in order to give students the flexibility to watch lectures at their own time and anywhere. This also included use of Padlet for social learning opportunities, Pebblead e-portfolio for students' reflective practice and collection of WIL, career planning, progressive case study and collection of professional competencies, VoiceThread for video assessments, Microsoft Teams for collaboration, and H5P for interactive asynchronous learning activities.

Further, the digital learning team developed bespoke user guides to support students to navigate the use of all learning technologies used in the units with clear instructions for each learning activity. In addition, a collection of information regarding technical support, academic learning support, library support, were populated in the Learning Management System (LMS) for students.

Mapping of TELAS standards to CDU educational technology ecosystem

The educators felt that the digital learning team was influential in the development of quality online learning. For example, the content experts are not across all digital learning opportunities, as the digital learning team are also not content experts. The role of the TELAS framework was crucial in bringing the teams to a common ground as it was effectively used as an audit tool to successfully gauge the quality of technology enhanced tools, practices and processes into the future. As part of educational technologies adoption and use, the learning designers evaluated various learning frameworks and theories, with the TELAS framework being the most translatable, current, contextually appropriate for Australia, and holistic in its breadth and depth of indicators that proved itself worthy to inform the online learning design of the new pharmacy course. To conceptualise how meaningful the framework was, we mapped the framework standards to the institution learning technologies ecosystem and its affordances to guide the online learning design of the units in the course (refer table 1 below).

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Table 1. Unpacking and mapping of TELAS framework standards against CDU educational technologies

		CDU TECHNOLOGY ECOSYSTEM														
		BLACKBOARD LMS INTEGRATED TOOLS										MICROSOFT OFFICE 365		THIRD PARTY		
	*RELEVANT STANDARD & PERFORMANCE CRITERIA	Blackboard LMS	Ally	Collaborate	VoiceThread	Kaltura	Padlet	PebblePad	Leganto	H5P	FeedbackFruits	Turnitin	Forms	Teams	Pressbooks	MyDispense	SimPharm
DOMAIN ONLINE LEARNING ENVIRONMENT	**1.4 Learners have opportunities to provide feedback**	Allows discussion forums, messages, automated feedback in quizzes, conversations in document areas	N/A	Chat, live tutorials, breakout room discussions	Multimodal feedback (text, audio, video)	Allows comments (Media Gallery), Annoto learner to learn/teacher interactions	Allows posting, comments and rating	Allows peer feedback, teachers and supervisor in multiple formats	Allows learners comments	Automated feedback	Formative feedback	N/A	Surveys	Allow quizzes and channel	N/A	N/A	Possible to give feedback to learners
	2.1 The navigation and layout of the online learning environment is functional, consistent and intuitive.	Allows modularisation, hyperlinks, attachments, downloads & embedding of content	By Default	lecture/tutorial schedule, recordings gallery	Gallery view of videos, images or text files, scaffolded instructions for assignments	Chaptering of video, audio content, use of playlist	Easy to post, publish content; Pre-built layouts	Use of workbooks for scaffolded learning	Allows sections, Chapters, Collection	Clear instructions	By Default	By Default	By Default	Teams and Channels and tabs	Provides navigation pane, breadcrumbs, Rich Content Editor	Game based simulation with Dashboard navigation	Game based simulation
	2.2 The online learning environment is logically sequenced and organised	Can allow organisation of content into modules, folders, documents and supports progress tracker, release condition, grade centre view of grades	By Default	Titled recorded lectures/ tutorial recordings	Slide gallery view, slide navigation, student submissions gallery	Chaptering of content, use of playlist	Learning activities aligned to content pre-built layouts	Provides navigation pane, progress trackerand rich content editor	Allows sections, Chapters, Collection	Embedded learning aligned activities	By Default	N/A	By Default	By Default	Provides navigation pane, breadcrumbs, Rich Content Editor	Program allows best practice process for safe supply of medications to a patient	Program allows best practice process for clinical decision making
	3.2 Clear instructions for accessing technical support resources	User support guide & technical support contact	Support guide/support contacts	LMS Support guides/support contacts	User support guide/support contacts	Support guide, support contacts	User support guide	User support guide/support contacts	user support guide available via Library	User guide	Support guide	User guide, technical support	User guide, technical support	User guide, technical support available	User guide, technical support	learner support guide available	learner support guide available

	ERSUPPORT	**3.3 Clear and consistent instructions/guides for using the technology**	Bespoke student guides	Support guide	LMS Support guide/support contacts	Support guide/support contacts	Support guide, support contacts	User support guide	User support guide/support contacts	User guide	User guide	User guide	User support guide/support contacts	N/A	User guide, technical support available	User guide, technical support	User support guide available	User support guide available
		3.4 Support and information to answer learner questions is available	Bespoke student guides	N/A	LMS Support guide/support contacts	Support guide/support contacts	Support guide, support contacts	User support guide, support contacts	User support guide/support contacts	user support guide available via Library	User guide	Support guide, support contacts	User support guide/support contacts	N/A	User guide, technical support available	N/A	Support guide, vendor support contacts	Support guide, vendor support contacts
		4.1 Opportunities for learner-to-learner interactions are provided.	Groups, Discussion, Q&A, consultation forum, messages, Conversations	N/A	Breakout groups, chats/discussions, live discussions	Comments to content, view of content	Video/audio (Annoto) interactions	Posts and Comments	Possible in formative activities	Allows text comments	N/A	Peer feedback	N/A	N/A	Allows channels, Chat, groups	N/A	N/A	Real time video conferencing interaction with peers
		4.2 Opportunities for learner-to-teacher interactions are provided.	Allows use of groups, discussion, announcements, messages & conversations	N/A	Breakout groups, chats/discussions, live discussions	Supports view of content, feedback to content, comments to content, recording of lecture/tutorials	Video, audio, annoto, interactions	Posts and Comments	Possible in both summative and formative activities	Comments	N/A	Allows teacher feedback	N/A	N/A	Teams Channels	N/A	N/A	Support interaction with instructor
		4.3 Explicit activities to develop and foster the learning community as well as establish relationships and connections are provided.	Group projects, discussions forum	N/A	Breakout groups, chats/discussions, live discussions	Interaction with each other and content in text, audio, video	N/A	Learning activities to support learners' connection	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Team based IPL learning opportunities
	LEARNING & ASS	**5.1 The aims, learning outcomes, schedule of learning and assessment tasks, and participation expectations are provided.**	Overviews of expectation: Assignments, content, welcome to units, lectures, learning schedule	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Learning activities aligned to learning objectives	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		5.2 Details of assessment tasks, their requirements, assessment criteria and feedback are provided.	Learning activities, Assignments, Tests, Grade Centre, learning schedule, Rubrics	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Allows peer review, group member evaluation, rubrics	N/A	N/A	N/A	N/A	N/A	N/A

ESSMENTTASKS	**5.3 Expectations and outcomes for the learning and assessment tasks are provided**	Participation, learning expectations pages, rubrics	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	5.4 Opportunities for learners to actively engage in a variety of learning and assessment tasks are provided.	Discussion, assignments, tests, conversations	N/A	Breakout room activities	Multimodal learning opportunities	Personal notes and Formative learning activities	Formative learning activities	N/A	N/A	N/A	Allows Peer and group feedback	N/A	N/A	Formative learning activities using chats & channels	N/A	Formative learning activities	Formative learning activities
	5.5 Opportunities for learners to receive both formative and summative feedback are provided	Assignments, tests, discussions	N/A	N/A	Multimodal formative learning, assessment activities	Formative learning activities with automated feedback	Formative learning opportunities: posts and comments	Allows feedback and Comments	N/A	Automated immediate Feedback	Allows feedback	Feedback Studio	N/A	N/A	N/A	Automated immediate Feedback	Automated immediate Feedback
	6.1 Learning and assessment tasks are supported by relevant digital technologies.	Supports integrations of LTis	N/A	N/A	Learner guide support	Learner guide support	N/A	Allows assessment submissions	N/A	N/A	Allows peer feedback and group evaluation	Turnitin Submission Point	N/A	N/A	N/A	Provides feedback as student moves through simulation scenario	Provides feedback as student moves through simulation scenario algorithm based for individual student parameters
	6.2 Opportunities to develop and demonstrate digital literacies are provided.	Possible with use of all tools in the ecosystem	N/A	N/A	By Default	By Default	User guide support	User support guides, development of e-portfolio	By default	N/A	By default	By Default	N/A	By Default	N/A	User guide provided, and repetition of scenarios provides support to develop digital competency	user guide provided, and repetition of scenarios provides support to develop digital competency
LEARNINGRESOUR	**7.1 Learning resources are available and functional.**	Possible use of multimodal content info rm of text, videos, links, Images	Support and make content accessibility in alternative formats	Live tutorial, recorded lecture/tutorials	Default settings	Allows upload of videos, audio	Formative learning activities	By Default	Readings	Formative learning activities	Peer feedback and group activities	Assignments	N/A	Allows learners collaboration	Content appropriately attributed	Prescriptions case studies	Case studies
	7.2 Learning resources are copyright compliant and appropriately attributed.	Correct attribution & citation of sources	N/A	N/A	Content appropriately attributed	Resource metadata descriptions	N/A	Workbook templates appropriately attributed	Reading list reviewed through the library dashboard	Content appropriately attributed	N/A	Plagiarism Checker	N/A	N/A	Provide resources metadata	Content appropriately attributed	Content appropriately attributed
	7.3 Learning resources reflect diversity.	Use of unit banners, images, videos, use of	Alternative format, accessibility check	N/A	N/A	N/A	N/A	Learning resources aligned to	N/A	N/A	N/A	N/A	N/A	N/A	Content appropriately attributed	Avatars and content represent	Avatars and content represent

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C E S		text formatting for screen readers						learning outcomes							population diversity	population diversity
	8.1 Learning resources are relevant.	Content mapped to learning outcomes	N/A	N/A	N/A	Multimodal content aligned to learning outcomes	Learning activities aligned to learning outcomes	Learning activities aligned to learning outcomes	Allows specification of pages, sections and chapters to be read	User instructions and context for formative activities	N/A	N/A	N/A	N/A	Learning activities aligned to learning outcomes	Content mapped to learning outcomes and regularly reviewed for currency	Content is mapped to learning outcomes and regularly reviewed for currency
	8.2 Learning resources are provided in a range of modalities.	Allows use of multimodal content: text, video, audio, attachments	Alternative formats	Collaborate tutorial recordings, whiteboard, breakout rooms, screenshare, webcam share	Texts, videos, audio comments and feedback	Video, audio, transcript, Annoto interactions	Allows texts, video, audio, images, hyperlinks, emojis	Allows multimodal content	Reading list with shareable hyperlinks	Formative activities using multimodal content types	Allows peer feedback and Group evaluation of multimodal content	Allows quick text comments, audio/ video feedback	Allows multimodal files and embeds; Text and file uploads only for input	Allows multimodal files	Interactive resources and content downloadable for offline use	Allows multimodal Interactive simulation content	Allows multimodal Interactive simulation content

(Adapted from Charles Darwin University Digital Learning Design 2022).

Learner support

Learning support is critical to students' learning success. In this case, the TELAS framework was instrumental in identifying learner support structures within the university. Besides course educators being critical in students learning process, the course lead identified important services within the university to support both the educators and students. These included links to academic learning support for students, pharmacy liaisons librarians, learning resource developers, learning designers, LMS systems specialist and product specialists. All these professionals were important in developing learning support and resources in the following areas:

Technical and learning support
The learning design team collected and developed guides of support services available within the university. Some of these support services including Blackboard LMS support, information technology support, study support, enrolment support, library support, peers assistant support, student advocacy, access and inclusion, and disability support. All these support services are crucial in creating a meaning educational experience for students by offering and promoting the various digital, institutional, academic, social, and technological literacies they need to be successful thorough their program.

Learning activities and objects
In terms of learning activities and objects, the educators and digital learning team developed a range of constructively aligned interactive activities using various learning tools within the LMS. Clear information to guide learners on how to do and submit the activities and how to interact with learning objects. For example, in Padlet, a quick guide was made to demonstrate how to post and publish on Padlet, with an example provided also within Padlet itself. For H5P activities, students were given instructions on how to drag and drop or submit answer to receive automated feedback. With respect to Voice thread, students were given the opportunity to see how to post slides, make audio and video comments. The objective here was to provide learning opportunities for students to ensure they are fully supported so they can interact with visually engaging and aligned activities that meet not only the learning objectives, but also the learning outcomes.

Learner-teacher interaction and teacher presence
While teachers and learners can interact during the tutorials, lectures, or formal channels like emails, in this course we also used discussion boards as an informal opportunity for interaction with each other, seek clarification from their teacher, or to ask questions or consult with their educators about their learning. This is particularly important for students to ask questions regarding assessments, concepts covered, and other contextual questions. These opportunities facilitate and reinforce students learning with learners benefiting from the interactions and responses from the educators and peers. This is also important for educators to manage learners' expectations and own workload of responding to individual students. Learners with private questions are advised to consult with lecturers using email.

Learner-peer interaction
To support learner interactions online we provided the prospect to engage with one another and develop a sense community and connectedness in an effort for student to learn together. To develop such relationship, we used a suite of tools available in the LMS, such as discussion boards, MS Teams, Voice thread and Padlets to develop activities that foster both synchronous and asynchronous peer-to-peer learning. For example, in the first unit, students were required to introduce themselves in Padlet, in an effort to share their motivations to join the course and the expectations in their learning journey among other interests. Such opportunities are likely to foster affective positive emotions and mutual awareness amongst learners as they share and shape their personal values. This way students can discuss, consult, reflect, connect, and negotiate learning in the context of the subject, newly formed community and the support available to each other.

Learning and Assessments
The learning and assessment domain within TELAS highlights that assessments should be constructively aligned, have opportunities for learners to formatively practice on assessment tasks, receive formative feedback, with assessment being delivered using appropriate technologies. To achieve this, we reflect through the lens of Transparent in Learning and Teaching (TILT) framework (Felten & Finley, 2019) that suggests assessments/learning activities should have a clear purpose, highlight the tasks involved, and the criteria of those tasks, before students undertake any work. In this program, we have used various technologies for students to practice, undertake, and deliver assessment tasks.

Before students undertake any assessments in the first year, they are required to complete a mandatory academic integrity module and provide evidence of completion. The academic integrity module is important in raising awareness and promoting ethical behaviour as students develop their cognitive, critical, and empathetic traits in the pharmacy profession. Additionally, it is important to provide learning opportunities and support learners to prepare students for tests, to avoid some forms of cheating or any academic dishonesty. To address academic integrity issues, we aim to develop more of authentic assessments so that students can apply acquired knowledge to real-world pharmacy contexts. However, it should be noted that authentic assessment does not in itself assure for academic integrity (Ellis et al., 2020). For example, use of progressive case studies for students to gradually apply the knowledge gained in the course by working between several cases to address certain problems within cases presented to them.

The other important part in supporting student learning is to ensure that assessments are scaffolded through low stakes formative assessments to allow provision of formative feedback with ongoing constructive guidance and direction throughout the learning process. In such case, we have used tools within the university ecosystem inclusive of, but not limited to: Feedback Fruits, discussion forums, Padlets, and Voicethread. These technologies allow for peers to peer and peer to teacher feedback with a larger focus than summative type of assessments. Such formative feedback are delivered in the form of verbal discussions, written comments, recorded oral, video, or checklists, depending on the form of assessment.
The other skills will embed and assess students are critical thinking, analysis and reflection skills across this course. In such assessments, students will be presented with complex problems that must be solved using their own creativity and analysis individually or in groups. Such activities will support students to synthesise, evaluate, apply knowledge and make informed decisions in clinical settings.

Work-Integrated Learning
In this course, students undertake intensives and placements in the second year of the course to ensure they have developed practical, relevant, and professional competencies from the work integrated learning experiences. This provides room for the learners to have an experiential learning opportunity to apply some of the knowledge developed over the course and to apply their abstract and conceptual understandings into real-life practice. During such placements, students are expected to work directly with experienced professionals in the receiving pharmacies to gain valuable industry expertise in addition to practising, reflecting, and reinforcing what they have learned within formal online instruction

Discussion: Aligning theory with practice via TELAS

Critical to the co-design process, was the alignment to Driscoll's constructivist theory underpinning with the pedagogical motives that align with the TELAS framework. In each section below, the connection between these four domains is made and are tabulated in Table 2. The reflective discussion aims to connect the why, what, and how of our practices meaningfully to allow other educators to utilise the TELAS framework through a constructive aligned storyboarding model.

Learning being complex, realistic, and relevant

In terms of Driscoll's first principle of learning being complex, realistic, and relevant, the fully online Pharmacy course had to simulate learning environments using MyDispense and SimPharm tools. This ensured that learning simulated realistic pharmacy environments, while also navigating the complexities of the dispensing system and putting the conceptualisations and theory in class into practice. Linking this to TELAS, one of the key domains "Learning and Assessment Tasks" define such tasks as those that "authentically engage learners and enable them to develop new capabilities". Within standard five, there are five sub-domains regarding learning outcomes, rubrics, expectations, variations in learning tasks, and summative and formative feedback.

Social negotiation as an integral part of learning

With respect to the second principle, providing space for social negotiation was an integral part of the learning design. Students in the pharmacy course were given various opportunities in which social learning could occur through various educational technologies. Such as using discussion forums and MS teams (interaction with peers and teachers); Padlet (formal peer to peer discussion); Zoom (live synchronous collaboration); and Feedback Fruits (formative peer to peer feedback). Further, we were guided by standards 4.1 in creating opportunities for

learner-to-learner interaction, 4.2 opportunity for learner-to-teacher interaction, and 4.3 provide activities to develop relationship, connection and a learning community amongst learners.

This aligned with TELAS subdomain 5.4 relating to the extent to which there are opportunities for learners to actively engage in a variety of learning and assessment tasks. More specifically, 5.4.2 the ability to engage in a variety of tasks, 5.4.3 the ability to engage independently or in collaboration, 5.4.4 the ability for learners to respond in a variety of formats (H5P, Padlet, Zoom, Feedback Fruits, Teams, PebblePad), and 5.4.5 the opportunity for learners to observe the work of others (Feedback Fruits, PebblePad, Padlet, MS Teams) were all well considered, adopted and integrated within the course design

Support multiple perspectives and the use of multiple modes of representation

Critical to the design of the course, was the explicit application of the third principle regarding multiple means of representation and perspectives. Drawing from multimedia learning theory, people learn in different ways with multimodal content improving accessibility, remembering, understanding and learner experiences (Mayer, 2005). Researchers have indicated learners prefer multimodal representation of content to support their comprehension and retention of learning content (Sankey et al., 2010). In our case, the multimodal presentation of content was important to give learners the flexibility to explore the content in a self-directed way and asynchronously. Here, the learning designers reflected with the course coordinator how to increase alternatives in auditory, visual, and the display of information; guided by TELAS standards 7 and 8.

In particularly TELAS subdomains of standard 7 addressing accessibility and functionality of learning resources, learner agency in controlling the content e.g. able to turn on/off captions in videos, downloadable and content is responsive in mobile devices and culturally considerate to learners. With standard 8 subdomain guiding on relevance and multimodality of learning resources.

Through the use of the Blackboard LMS and a variety of Learning Tools Interoperability (LTIs), educators were able to develop learning opportunities and resources to facilitate accessibility, self-directed learning opportunities and flexibility as core tenets to the online learning needs for students. We offered alternatives to auditory information through various LMS features. Such as Blackboard LMS collaborate for synchronous lectures, Kaltura media software for pre-recorded video lectures and YouTube for supplementary content. Moreover, this was our best practice model to provide flexible and accessible content with students that offered multiple perspectives in interacting with each other, learning resources, while developing and practicing their professional skills.

Cognitive load: Content sequencing and chunking of content
Based on the second generation of Cognitive Load Theory, learners cognitive load is not necessarily cognitively fixed. Rather, they are malleable and can be manipulated through learning design by selecting adequate learning tasks that push students within and through to the Zone of Proximal Development (ZDP) (Schnotz & Kürschner, 2007), which is the area in which students are cognitively challenged albeit not making the content too difficult. As a result, we ensured that the sequencing of content was conducted in such a way that developed a scaffolded approach to learning design where cognitive load was increased, ever so slightly, ever more challenging. For instance, to allow students explore pharmacy practice and pharmacotherapy content in the course, we provided a range of opportunities and resources in videos and interactive activities, recorded lectures, text descriptions to complex terms, pharmacotherapy formulas activities, and explanations. This was important to manage students' cognitive load even how the learning resources are presented in the LMS and to ensure consistency across the course.

Encourage ownership in learning

Encouraging self-regulation and ownership of learning is a critical feature in the learning process and is central to the Self-Regulated Learning Theory (SRL) proposed by (Zimmerman, 1990, 2002; Zimmerman & Schunk, 2013).

However, ownership of learning is not a cognitive trait such as intelligence, reading proficiency or writing ability, rather it is a self-directed process whereby students transform their cognitive capacities into academic skills through a series of three stages, the forethought, the performance and the self-reflection (Schunk & Zimmerman, 1998).

Hence, a critical technology that supported the ownership of learning through interactive activities and assessments feedback in form of peer and group member evaluation was the use and application of a software known as Feedback Fruits. The technology allows students to receive feedback from their peers as well as their instructors, whereby useful and fruitful information is provided from students to regulate and increase their cognitive load through formative feedback. By doing so, students can use and comprehend feedback before submitting their final assessment. This further allows students to take ownership of their feedback by providing and using feedback before the summative assessment piece is due. The other opportunity is self-directed learning activities presented to them in interactive learning activities and objective using a tool known as H5P. The expectation is that learners will engage with H5P with the activities to check their knowledge after exploring and actively engaging with the weekly content. This way learners are able to see where their knowledge base is at, reflect and fill the gap, before undertaking summative assessments.

Nurture self-awareness of the knowledge construction process

A critical aspect of the course was to ensure that through reflective practice, students can make meaning of their experiences, and by doing so driving their own learning process. This is often referred to as reflective abstraction in the literature (Amarin & Ghishan, 2013; Fosnot & Perry, 1996; O'Connor et al., 2022b). The units in the course provide ongoing opportunities for students to reflect on what they have experienced prior to class, what they have learnt during class, and how this can be applied to their professional practice. In this program we ensured that reflective practice was inbuilt within the course. This was to allow students to develop knowledge, shape attitudes and behaviour towards their own learning, weaving themselves, their lived experience, and their conceptualisation, abstraction and experimentation of such knowledge in their profession. For example, using Pebblepad for placement reflections, allowed room and place for students to unpack their pharmacy related case studies, blackboard LMS weekly contextual discussion forums and Padlet discussion in a concrete manner.

Table 2: A summary alignment of constructivist learning theory, pedagogy principles, and practice with the TELAS framework to achieve intended outcomes (Examples of the tools used: https://v3.pebblepad.com.au/spa/#/public/q4yHmm8n45Ht4G66jgz3nfqxpc).

Theoretical constructs	**Pedagogy principles**	**TELAS standard**	**Example Tool to use**	**Why and how to tips?**
Social Negotiation	Social learning and community	The online environment includes learner and teacher interactions that are designed to support and progress Learning: Standard 4	Padlet, discussion boards, Collaborate breakout rooms, Annoto, MS Teams	**Why:** Online learning can be isolating. Thus, it is vital to provide opportunities for learner-learner and learner-teacher interactions. Such interactions can be a great way to build context, spark interests in new topics, activate background knowledge and give students an opportunity to get to know each other and develop relationships. This way, learners can actively engage in collaborative activities and projects that allow learners to engage with peers and be exposed to different approaches and ideas to deepen their knowledge. As well as learners can develop tacit skills such as communication, negotiation, and teamwork which are vital in modern workforce. **How:** Used tools such as Voice thread, MS groups, MS Teams, MS Flip & Padlet to

				get students know each other, share their prior knowledge, experiences, assumptions, and connect with each other authentically and meaningfully.
Support multiple perspectives and the use of multiple modes of representation	Multimodality	The online environment design supports learning: standards 1 & 2	Kaltura YouTube, readings, discussion forums H5P-Interactive activities, Kaltura lectures, workshops	**Why:** With online learning and teaching, it's vital to avail content in a variety of accessible modes to compliments learners' preferred types of learning. This also allows flexibility in accessing the content at their own convenient and allows learners to attend synchronous workshops and tutorials. This is core to student online learning experiences. **How**: This includes the use of multimodal content (videos, interactive media in H5P, slides, reading, lecture videos with captions) for learners to engage with content in a variety of ways, in the form of videos, audio, text and animations.
Nurture self-awareness of the knowledge construction process.	Active learning and metacognition	Learning and assessment tasks engage learners through planned learning experiences and feedback: standard 5	Padlet, discussion board, Annotto, Voice thread	**Why:** Students need to develop self-awareness in their knowledge construction. Self-awareness involves one's reflection upon cognitive processes as well as analysing one's own thinking before, during, and after problem solving activities or decision-making. This means educators should provide opportunities for students to engage, reflect and recall what they have learned by stimulating or checking knowledge or apply what they have learned before. **How**: Consider what students are likely to do (if they are likely to passively receive information: listening to podcast, lecture, a video) and how to make them actively interact with such content, make meaning, and apply in context.
Encourage ownership in learning	self-directed and self-assessment	Learning and assessment tasks engage learners through planned learning experiences and feedback: standard 5	H5P, Feedback fruits, Padlets	**Why:** Students' agency in their learning is essential. This means learners should have significant control over their learning and exercise their own influence within the learning process. Such expectation is to enhance learners' ability to make choices and take initiative and responsibility for their own learning. This way, learners can plan and decide, how they learn, why they learn and what they want to achieve in their learning. The expectation here is that learners should actively engage with the content, learning activities, peers and teachers to enhance their learning process. **How:** Provide learning opportunities for learners to practice, provide feedback to

				peers, and demonstrate their understanding of the content/concepts.
Relevant, realist, complex	Practicing and assessing performance	Learning resources are relevant and support learner engagement: Standard 8	MyDispense, SimPharm	**Why:** Practicing and exposing learners to professional knowledge and skills before they go for practical placements or enter the workforce is critical. In pharmacy, such knowledge and skills can be learned and practised in simulated environment using tools like MyDispense and SimPharm to enhance learner's understanding of the prescription fill and dispensing medication. This way trainees can use such tools to perform pharmacy practice during tutorials. Providing more opportunities in intensive weeks to practice such skills in the simulated University "Mock pharmacy" with role playing using MyDispense before they proceed to actual placements to perform this with actual clients. **How**: Use relevant tools like MyDispense and SimPharm to develop case studies for learners to explore and unpack the simulated real-world scenarios to practice their skills
	Reflective practice Work Integrated Learning Professional competencies		Pebblepad	**Why:** With learners developing professional competencies throughout their studies, there is a need for them to reflect on the competencies developed and collect such evidence to support their professional practice and registration. Opportunities to collect such evidence can be scaffolded across the course in placements, reflective practices, and progressive case studies using tools like Pebblepad. Such rich collection of evidence can be a valuable for future employment. **How:** Map out activities across the course that can be submitted through Pebblepad during the course of their studies.

Conclusion

The premise of this paper was to demonstrate the capacity of the TELAS framework to design, develop and deliver a quality assurance methodology for a fully online Pharmacy course. The findings indicate the framework was valuable especially, the four domains and sub-standards which provided foundational criteria to flesh out the areas the online course should, could, and would address. Moreover, the framework provided a cyclic process of reflective action and evaluation that served as a functional reflective tool to influence the online design of this course through deliberate alignment and constant iteration and reflection with the research team. Further, the framework proved effective in the constructive alignment between theory, pedagogy, and technology. Thus, the

framework provides tools that are important for online course development as well as for blended or hybrid delivery.

The paper also showcases TEL practice to others within the field to engage and enhance their students' learning experiences through TELAS. The intersection of constructivism learning theory with social learning pedagogies and TELAS provided the ideal breeding ground for the adoption of new ways of teaching and learning. The aim here a deep critical reflection, hopefully inspiring others to be adaptive to new educational technologies and theory to support students learning as Artificial Intelligence (AI) technologies emerge and disrupt traditional ways of teaching and learning. As we continue to develop more courses online, driven by data and attention, it becomes increasingly important to evaluate, reflect, align, design, and assess our practices. With TELAS providing a method for other pharmacy courses to follow suit.

References

Australasian Society for Computers in Learning in Tertiary Education (ASCILITE), 2022, https://ascilite.org/about-ascilite/

Alonso, F., López, G., Manrique, D., & Viñes, J. M. (2005). An instructional model for web-based e-learning education with a blended learning process approach. *British Journal of Educational Technology*, *36*(2), 217-235. https://doi.org/10.1111/j.1467-8535.2005.00454.x

Amarin, N. Z., & Ghishan, R. I. (2013). Learning with technology from a constructivist point of view. *International Journal of Business, Humanities and Technology*, *3*(1), 52-57.

Attarabeen, O. F., Gresham-Dolby, C., & Broedel-Zaugg, K. (2021). Pharmacy student stress with transition to online education during the COVID-19 pandemic. *Currents in Pharmacy Teaching and Learning*, *13*(8), 928-934. https://doi.org/10.1016/j.cptl.2021.06.011

Biggs, J. (2014). Constructive alignment in university teaching. HERDSA Review of Higher Education. In (Vol. 1, pp. 5-22).

Bogle, G., Cook, V., Day, S., & Swan, K. (2009). Blended program development: Applying the Quality Matters and Community of Inquiry Frameworks to ensure high quality design and implementation. *Journal of the Research Center for Educational Technology*, *5*(2), 51-66.

Boughen, M., & Fenn, T. (2020). Practice, skill mix, and education: the evolving role of pharmacy technicians in Great Britain. *Pharmacy*, *8*(2), 50. https://doi.org/https://doi.org/10.3390/pharmacy8020050

Burkett, I. (2012). An introduction to co-design. *Sydney: Knode*, 12. https://www.yacwa.org.au/wp-content/uploads/2016/09/An-Introduction-to-Co-Design-by-Ingrid-Burkett.pdf

Campbell, N., Farthing, A., Lenthall, S., Moore, L., Anderson, J., Witt, S., & Rissel, C. (2021). Workplace locations of allied health and nursing graduates who undertook a placement in the Northern Territory of Australia from 2016 to 2019: An observational cohort study. *Australian Journal of Rural Health*, *29*(6), 947-957. https://doi.org/10.1111/ajr.12784

Castro, M. D. B., & Tumibay, G. M. (2021). A literature review: efficacy of online learning courses for higher education institution using meta-analysis. *Education and Information Technologies*, *26*(2), 1367-1385.

Chalmers, D. (2017). A case for an Australian tertiary teacher standards framework: Discussion paper. *Retrieved January*, *29*, 2020.

Chalmers, D., & Hunt, L. (2016). Evaluation of teaching. *HERDSA Review of Higher Education*, *3*(27), 25-55.

Chalmers, D., & Tucker, B. (2018). A national strategy for teaching excellence–one university at a time. In *Global Perspectives on Teaching Excellence* (pp. 93-105). Routledge.

Chen, L.-L. (2016). A model for effective online instructional design. *Literacy Information and Computer Education Journal*, *6*(2), 2303-2308.

Chiu, K., Thow, A. M., & Bero, L. (2022). "Never waste a good crisis": Opportunities and constraints from the COVID-19 pandemic on pharmacists' scope of practice. *Research in Social and Administrative Pharmacy*, *18*(9), 3638-3648. https://doi.org/10.1016/j.sapharm.2022.03.045

Cosgrave, C., Malatzky, C., & Gillespie, J. (2019). Social determinants of rural health workforce retention: a scoping review. *International journal of environmental research and public health*, *16*(3), 314.

Cosgrave, C., Maple, M., & Hussain, R. (2018). An explanation of turnover intention among early-career nursing and allied health professionals working in rural and remote Australia - findings from a grounded theory study [Other Journal Article]. *Rural and Remote Health*, *18*(3), 1-17. https://doi.org/10.22605/RRH4511

Cummings, R., Elliott, S., Stoney, S., Tucker, M. B., Wicking, R., & de St Jorre, T. J. (2014). Australian University Teaching Criteria and Standards Project Ref: SP12-2335. *Retrieved from Australian Government Office for Learning and Teaching*.

Dick, W., Carey, L., & Carey, J. (2001). The systematic design of instruction (5th). *New York: Longmann*.
Driscoll, M. P., & Burner, K. J. (2005). *Psychology of learning for instruction*. https://ocw.metu.edu.tr/pluginfile.php/9013/mod_resource/content/1/driscoll-ch10 (1).pdf
Ellis, C., van Haeringen, K., Harper, R., Bretag, T., Zucker, I., McBride, S., Rozenberg, P., Newton, P., & Saddiqui, S. (2020). Does authentic assessment assure academic integrity? Evidence from contract cheating data. *Higher Education Research & Development*, *39*(3), 454-469. https://doi.org/10.1080/07294360.2019.1680956
Faisal, S. (2021). Lessons in reflexivity of a pharmacist conducting ethnographic research. *Research in Social and Administrative Pharmacy*, *17*(10), 1849-1855. https://doi.org/10.1016/j.sapharm.2021.02.015
Felten, P., & Finley, A. (2019). *Transparent design in higher education teaching and leadership: A guide to implementing the transparency framework institution-wide to improve learning and retention*. Stylus Publishing, LLC.
Fontaine, G., Cossette, S., Maheu-Cadotte, M.-A., Mailhot, T., Deschênes, M.-F., Mathieu-Dupuis, G., Côté, J., Gagnon, M.-P., & Dubé, V. (2019). Efficacy of adaptive e-learning for health professionals and students: a systematic review and meta-analysis. *BMJ Open*, *9*(8), e025252. https://doi.org/10.1136/bmjopen-2018-025252
Fosnot, C. T., & Perry, R. S. (1996). Constructivism: A psychological theory of learning. *Constructivism: Theory, perspectives, and practice*, *2*(1), 8-33.
Gibbs, G. (1988). Learning by doing: A guide to teaching and learning methods. *Further Education Unit*.
Gore, J., Patfield, S., Fray, L., Holmes, K., Gruppetta, M., Lloyd, A., Smith, M., & Heath, T. (2017). The participation of Australian Indigenous students in higher education: a scoping review of empirical research, 2000–2016. *The Australian Educational Researcher*, *44*(3), 323-355. https://doi.org/10.1007/s13384-017-0236-9
Hall, A. (2010). Quality Matters Rubric as "teaching presence": Application of CoI framework to analysis of the QM Rubric's effects on student learning. The 2nd Annual Quality Matters Annual Conference, Oak Brook, IL,
Jackson, J. K., Liang, J., & Page, A. T. (2021). Analysis of the demographics and characteristics of the Australian pharmacist workforce 2013–2018: decreasing supply points to the need for a workforce strategy. *International Journal of Pharmacy Practice*, *29*(2), 178-185. https://doi.org/10.1093/ijpp/riaa022
Jonassen, D., Spector, M. J., Driscoll, M., Merrill, M. D., van Merrienboer, J., & Driscoll, M. P. (2008). *Handbook of research on educational communications and technology: a project of the association for educational communications and technology*. Routledge.
Kosari, S., Koerner, J., Naunton, M., Peterson, G. M., Haider, I., Lancsar, E., Wright, D., Niyonsenga, T., & Davey, R. (2021). Integrating pharmacists into aged care facilities to improve the quality use of medicine (PiRACF Study): protocol for a cluster randomised controlled trial. *Trials*, *22*(1), 390. https://doi.org/10.1186/s13063-021-05335-0
Lowenthal, P. R., Lomellini, A., Smith, C., & Greear, K. (2021). Accessible Online Learning: An Analysis of Online Quality Assurance Frameworks. *Quarterly Review of Distance Education. Q. Rev. Distance Educ*, *22*, 15-29.
Malone, D., Galbraith, K., White, P. J., Exintaris, B., Nicolazzo, J. A., Brock, T., Bruno-Tomé, A., Short, J. L., & Larson, I. (2021). Development of a Vertically Integrated Pharmacy Degree. *Pharmacy*, *9*(4), 156. https://doi.org/10.3390/pharmacy9040156
Mayer, R. E. (2005). Introduction to multimedia learning. *The Cambridge handbook of multimedia learning*, *2*(1), 24.
Morgan, K., Adams, E., Elsobky, T., Darr, A., & Brackbill, M. (2021). Moving Assessment Online: Experiences within a School of Pharmacy. *Online Learning*, *25*(1), 245-252.
Morling, A. C., Wang, S.-Y., & Spark, M. J. (2022). Exploring the Experiences of Pharmacy Students and Their Transition to Online Learning during COVID-19. *Pharmacy*, *10*(5), 110.
Nadiyah, R. S., & Faaizah, S. (2015). The development of online project based collaborative learning using ADDIE model. *Procedia-Social and Behavioral Sciences*, *195*, 1803-1812. https://doi.org/10.1016/j.sbspro.2015.06.392
Naidu, S. (2006). *E-learning: A guidebook of principles, procedures and practices*. Commonwealth Educational Media Centre for Asia (CEMCA).
O'Connor, S., Daly, C. S., MacArthur, J., Borglin, G., & Booth, R. G. (2020). Podcasting in nursing and midwifery education: An integrative review [Review]. *Nurse Education in Practice*, *47*, Article 102827. https://doi.org/10.1016/j.nepr.2020.102827

O'Connor, S., Jolliffe, S., Stanmore, E., Renwick, L., & Booth, R. (2018). Social media in nursing and midwifery education: A mixed study systematic review. *Journal of Advanced Nursing*, *74*(10), 2273-2289. https://doi.org/10.1111/jan.13799

O'Connor, S., Kennedy, S., Wang, Y., Ali, A., Cooke, S., & Booth, R. G. (2022a). Theories informing technology enhanced learning in nursing and midwifery education: A systematic review and typological classification. *Nurse Education Today*, *118*, 105518. https://doi.org/10.1016/j.nedt.2022.105518

O'Connor, S., Kennedy, S., Wang, Y., Ali, A., Cooke, S., & Booth, R. G. (2022b). Theories informing technology enhanced learning in nursing and midwifery education: A systematic review and typological classification. *Nurse Education Today*, 105518.

Parrish, D. (2017). Professional development: Introducing ASCILITE [Other Journal Article]. *Education Technology Solutions*(81), 50-53. https://search.informit.org/doi/10.3316/informit.584378635606389

Parrish, D., Campbell, C., & Christie, A. (2020). ASCILITE Technology Enhanced Learning Accreditation Standards Update. https://blog.ascilite.org/ascilite-technology-enhanced-learning-accreditation-standards-update/

Parrish, D., Christie, A., & Campbell, C. (2020). Teaching on-line–what students want: Students want eight-essential elements in on-line learning.

Pattison, P. (2017). Standards and quality in Australian higher education. *Visions for Australian tertiary education*, 101-109.

Poirier, T. I., & Weis, L. (2021). Exploring pharmacy students' interest in digital badges. *Currents in Pharmacy Teaching and Learning*, *13*(5), 506-511. https://doi.org/https://doi.org/10.1016/j.cptl.2021.01.004

Puentedura, R. R. (2012). Building upon SAMR. *Retrieved May*, *6*, 2014.

Raponi, K., Samarawickrema, G., Everett, G., England, L., & Galloway, T. (2021). Academics Embrace Disruption: Lessons Learned Teaching First Year Law During a Pandemic. *Legal Educ. Rev.*, *31*, 27. https://heinonline.org/HOL/Page?collection=journals&handle=hein.journals/legedr31&id=26&men_tab=srchresults

Russell, D., Mathew, S., Fitts, M., Liddle, Z., Murakami-Gold, L., Campbell, N., Ramjan, M., Zhao, Y., Hines, S., Humphreys, J. S., & Wakerman, J. (2021). Interventions for health workforce retention in rural and remote areas: a systematic review. *Human Resources for Health*, *19*(1), 103. https://doi.org/10.1186/s12960-021-00643-7

Ryan, T., French, S., & Kennedy, G. (2021). Beyond the Iron Triangle: improving the quality of teaching and learning at scale. *Studies in Higher Education*, *46*(7), 1383-1394. https://doi.org/10.1080/03075079.2019.1679763

Sankey, M., Birch, D., & Gardiner, M. (2010). Engaging students through multimodal learning environments: The journey continues. Proceedings ASCILITE 2010: 27th Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education: Curriculum, technology and transformation for an unknown future,

Sankey, M. D. (2022). The state of Australasian online higher education post-pandemic and beyond. *Journal of University Teaching & Learning Practice*, *19*(2), 14-26. https://doi.org/https://doi.org/10.53761/1.19.2.2

Schnotz, W., & Kürschner, C. (2007). A reconsideration of cognitive load theory. *Educational psychology review*, *19*(4), 469-508.

Schunk, D. H., & Zimmerman, B. J. (1998). *Self-regulated learning: From teaching to self-reflective practice*. Guilford Press.

Seymour-Walsh, A. E., Bell, A., Weber, A., & Smith, T. (2020). Adapting to a new reality: COVID-19 coronavirus and online education in the health professions. *Rural and Remote Health*, *20*(2). https://doi.org/10.22605/RRH6000

Seymour-Walsh, A. E., Weber, A., & Bell, A. (2020). Practical approaches to pedagogically rich online tutorials in health professions education. *Rural and Remote Health*, *20*(2). https://doi.org/10.22605/RRH6045

Shattuck, K. (2015). Research inputs and outputs of Quality Matters: Update to 2012 and 2014 versions of What We're Learning from QM-Focused Research. *Annapolis, MD: Quality Matters*.

Shawaqfeh, M. S., Al Bekairy, A. M., Al-Azayzih, A., Alkatheri, A. A., Qandil, A. M., Obaidat, A. A., Al Harbi, S., & Muflih, S. M. (2020). Pharmacy Students Perceptions of Their Distance Online Learning Experience During the COVID-19 Pandemic: A Cross-Sectional Survey Study. *Journal of Medical Education and Curricular Development*, *7*, 2382120520963039. https://doi.org/10.1177/2382120520963039

Siragusa, L., Dixon, K. C., & Dixon, R. (2007). Designing quality e-learning environments in higher education. *Proceedings ascilite Singapore*, 923-935.

Villatoro Moral, S., & De Benito, B. (2021). An Approach to Co-Design and Self-Regulated Learning in Technological Environments. Systematic Review. https://doi.org/10.7821/naer.2021.7.646

Wahler, R. (2019). *Implementation and Evaluation of Micro-Credentials on the Pharmacists' Patient Care Process in Pharmacy and Pharmacy Technician Programs: Promoting Patient-Centered Care* [Grant]. Tier Three. https://dspace.sunyconnect.suny.edu/handle/1951/71553

Yeung, C. L., Zhou, L., & Armatas, C. (2019, 19-21 Nov. 2019). An Overview of Benchmarks Regarding Quality Assurance for eLearning in Higher Education. 2019 IEEE Conference on e-Learning, e-Management & e- Services (IC3e),

Zimmerman, B. J. (1990). Self-regulated learning and academic achievement: An overview. *Educational psychologist*, *25*(1), 3-17.

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into practice*, *41*(2), 64-70.

Zimmerman, B. J., & Schunk, D. H. (2013). Reflections on theories of self-regulated learning and academic achievement. In *Self-regulated learning and academic achievement* (pp. 282-301). Routledge.