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Synchronous and asynchronous academic support for online students: A review of three technological tools

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The need to provide academic support to online students has become a pressing issue. This paper reflects on the application of three technological tools to provide academic support in blended learning environments. Structurally, the paper describes the application of an asynchronous interactive tool called Office Mix to 1) embed discipline specific academic skills within online courses and 2) embed generic academic skills programs across online courses using Microsoft PowerPoint. Then the paper provides an overview of the two most popular web conferencing programs, Blackboard Collaborate (BC) and Adobe Connect (AC). These two synchronous technological tools provide new avenues of online academic support through Moodle that can act as a "Virtual Drop-In Centre". The research uses a Participatory Action Research (PAR) methodology to incorporate an ongoing reflexive inquiry. The Technology Acceptance Model (TAM) provided an analytical framework that allowed it to be determined that BC and Office Mix were easier to use, and more useful for academics in their adoption. The significance of this research lies in its guidance for other institutions to adopt either or both of these no-cost, minimal training, in-house technological solutions for online academic support.

Key Words: Asynchronous, Synchronous, Adobe Connect, Blackboard Collaborate, Online Academic Support, Office Mix.

1. Introduction

Over the last decade, there has been a 50% increase in low-SES, regional and remote, and international students entering university (Universities Australia, 2017; Department of Education & Training, 2015). Of particular interest are the 175,000 + online students studying in Australia who need access to tailored, online academic support mechanisms (Universities Australia, 2017). To tackle these challenges, some have utilised outsourcing services by companies such as YourTutor (now Studiosity) (Lee & Hanham, 2017) or Smart-thinking (De Fazio & Crock, 2008) that aim to offer around-the-clock academic support services. While outsourcing has been seen as a speedy solution to growing online student numbers, research into its effectiveness is still in its infancy.

Beyond describing and reviewing the tools, the two broad aims of our research are to demonstrate how a) virtual classrooms can be modified to become virtual drop-in appointments for learning advisers and b) how PowerPoint slides can be made interactive using a plug-in called Office Mix from Microsoft. The research is structured into five sections, with the first part overviewing Office Mix and two of the two most popular web conferencing programs, Blackboard Collaborate (BC) and Adobe Connect (AC). Second, the application of BC, AC and Office Mix for academic skills support are discussed in detail. The third section outlines the PAR method and the role of TAM in the research. The Findings offer a practical guide for academic advisers to turn their PowerPoint presentations into interactive PowerPoint using Office Mix. Lastly, an 'open discussion' of how online academic support can be integrated within Moodle is provided.

A caveat to this research is the need to temper enthusiasms about the pedagogical applications and educational possibilities of technology as an unbiased, inevitable, and impervious force within academic labour service (Henderson, Selwyn, & Aston, 2017). Noble (1998) was one of the earliest scholars questioning the positivity and impartiality of technology. This paper follows Chanock's (2013, p. 107) recommendation that "online provision should [not] be uncritically embraced as a solution to problems of relevance, scale, and equity in teaching ALL. It is important at the same time to consider what such an approach *cannot* do". We propose that ALL work should embrace an 'online pedagogy of hope' that sees students as transformers of, and participants in, their world and in their classroom (Giroux 2002 cited in McDougall, Holden, & Danaher, 2012).

Web-conferencing programs have the potential to offer video conferencing to students via the internet as one-to-many, one-to-one and many-to-many (Cornelius & Gordon, 2008, 2013). In relation to our research, the one-to-one individual consultations and the 'Virtual Drop-In' are of interest, as well as the one-to-many regarding online academic workshops. Most research in the field has predominately concerned the 'Virtual Classroom' or the 'Virtual Office', but rarely for virtual academic support. Nevertheless, research into web-conferencing programs is not new. There has been a plethora of research highlighting applications, uses, experiences and best practices over the last decade (Bower & Hellstén, 2010; Martin & Parker, 2014; Senecal & Gazda, 2010; Shah-Nelson, 2010; Skylar, 2009; Tagge, 2009). Similarly, research into 'Virtual Offices' or 'Open Offices' is not new (Edwards & Helvie-Mason, 2010; King & Cox, 2011; Lillie & Wygal, 2011). However, applications of the 'Virtual Offices' for one-to-one support in ALL has received little attention either as an ad-hoc one-to-one consultation or as a reoccurring 'Virtual Drop-In Centre'. For instance, research into Elluminate (now BC) nearly a decade ago highlighted the potential of using it as a "Virtual Office" for academic consultation times (Kohorst & Cox, 2007), but did not explore this further. Our research aims to focus on the "Academic Support Virtual Office" inside Moodle. Guided by PAR, it sees research and teaching as well as the participant and the researcher, intricately interrelated. Skylar (2009), argued that there has been limited research in comparing asynchronous online learning with synchronous web-conferencing tools. This research aims to fulfil this gap by demonstrating the practical applications of both strategies for developing ALL.

2. Background

The current study was undertaken in two different environments. The first was in the context of the Student Learning Centre (SLC) and the second was in the Master of Business Administration (MBA) program both at Flinders University. At the SLC, the usefulness and easiness of Office Mix as an asynchronous tool was evaluated, while in the business school the emphasis was on how collaborative synergies between academic units catalysed the development of online synchronous academic support. In early 2016, the SLC intended to develop a new academic orientation program that would be delivered completely online. The program (Academic Skills Kit or "ASK") aimed to provide commencing and current students with a complimentary online delivery method to replace the traditional face-to-face academic orientation program. Prior to 2015, the

SLC did not offer any synchronous online academic support for its students, nor did the technological support team provide formal support for Office Mix. The ASK program involved changing static PowerPoint presentations into interactive online resources. The proficiency of most staff members with PowerPoint made its ultimate adoption easier.

Academic staff teaching in the MBA program required training in both AC and BC software. Staff were first trained in AC in 2015-2016 when Flinders University launched its fully online MBA Program and, then in BC during 2017. The affiliation between the College of Business, Government and Law, The Centre for Innovation in Learning and Teaching and the SLC afforded many interdisciplinary benefits. The end goal of PAR is to offer practical solutions, and the aim here is to outline these outcomes. Three distinct research findings and benefits arose from the collaboration. These were 1) embedding academic skills development within the curricula and generic writing skills across the curricula 2) a new synchronous online academic support portal through AC and BC and 3) the interactive transformation of academic writing skills using Office Mix. While outcome 1) is not new, outcomes 2 and 3 offer ALL academics synchronous and asynchronous academic support solutions. Research into embedding ALL within the disciplines has shown many positive results (Chanock, 2013; Wingate & Dreiss 2009, p. 21; Gunn, Hearne, & Sibthorpe, 2011; McWilliams & Allan, 2014; Veitch et al., 2016). Wingate (2006) suggests that we should "do away with study skills" altogether, commenting that academic skills should not be separated from subject matter. However, we believe it still has its place. This follows Thies's (2012) advice that better distinctions need to be made from transferable generic academic skills across subjects to discipline specific academic skills curricula development within subjects. The findings from our research highlight how both forms of embedded academic-discipline support are possible (within and across subjects) using two different online strategies (asynchronous and synchronous). The findings from this research also support the notion that bridging discipline specific teaching in the work of ALL can be done with a no-cost and no-capacity loss collaboration (Chanock, 2013).

2.1. Office Mix

Office Mix is a plugin provided by Microsoft freely available at (www.mix.office.com). It adds another ribbon in the PowerPoint taskbar. Its usefulness is underpinned by the fact that many are familiar and proficient in the core software. The features include video and audio recording, question embedding, interactive stylus (digital-ink) writing, learning analytics, and desktop screen recording (see Figure 1). Inside the ribbon, academics can record over their slides by pressing the first button furthest to the left called "Slide Recording". The next button "Quizzes"' allows for a quiz to be inserted, which allows instructors to fill in the amount of questions and ticking which one is the correct answer. A screenshot of a multiple choice option inside Office Mix is also seen in Figure 1. Next, the "Screen Recording" button allows instructors to record a video as a full screen video or as an embedded smaller video which can be moved around the screen. If instructors would prefer just an audio on top of the slides, this can also be done using the "Audio" button. These features are available in the "Mix" ribbon tab highlighted in Figure 1. Alternatively, the audio feature can be used with the digital-ink pen which could guide students through the PowerPoint.
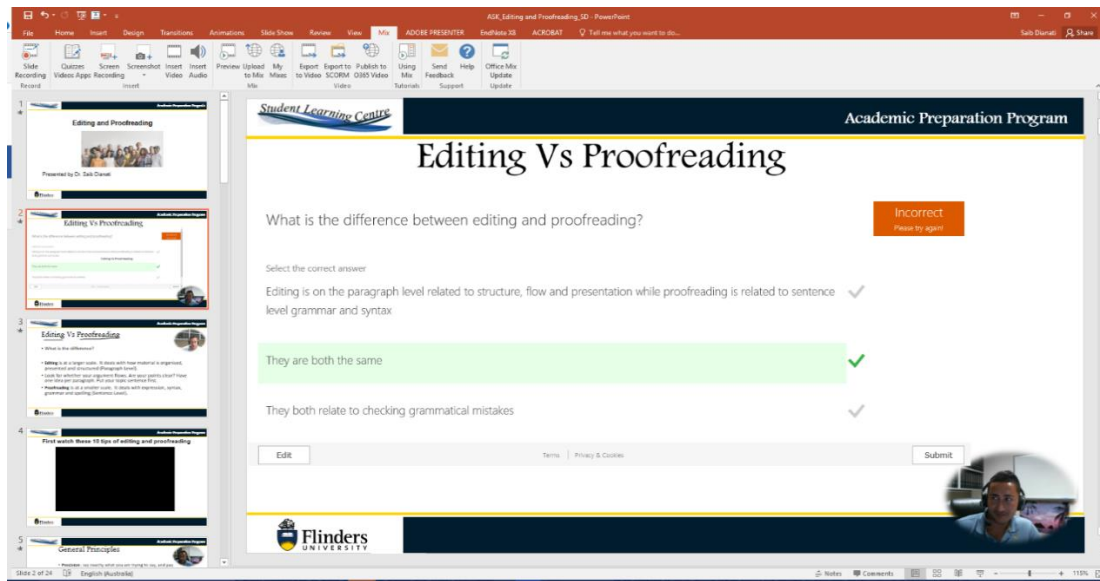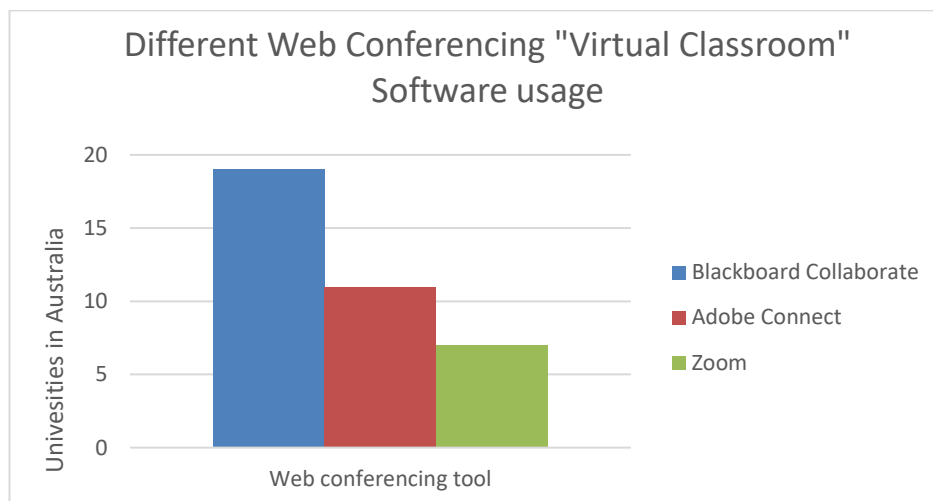
Figure 1. Office Mix Screenshot.

Figure 2. Different Web Conferencing "Virtual Classroom" Software usage by Australian Universities.

2.2. Blackboard Collaborate (BC)

An environmental scan of web-conferencing software in use at Australian universities indicated that BC is the most widely used program within higher education (see Figure 2). While both BC and AC offer similar features (see Appendix A), BC is more predominantly used in a learning environment. BC is a web-conferencing tool provided by Blackboard that uses synchronous video chat technology to offer virtual classrooms. Meetings can be organised in many ways that give scope for the range of services ALL lecturers provide. For instance, BC can be used to invite students directly through a link via email or through Moodle, which might be appropriate for an ad-hoc, once-off student consultation. Such a consult could also be 'scheduled' through a calendar-based system, or on a 'reoccurring' cycle, to suit a 'Virtual Drop-In' centre. The most relevant features of BC for an ALL adviser include the 'Share Blank Whiteboard' function, which can be used to, say, highlight omissions on an assignment. The 'Share Application' utility allows for desktop mirroring, which allows students to be shown how to use a particular bibliographic management software, for example. The 'Share Files' tab can be used to deliver academic PowerPoint presentations. All of these features can be accessed using the middle 'Share Content' button on the bottom right-hand corner of the screen (see Figure 3). The two other main buttons are used to

see which participants are in the room, and to chat with students during a classroom session. To start a session, an adviser needs to do two main tasks. First, press the audio button for audio and second press on the video button for video, both located in the middle of the screen (see Figure 3).
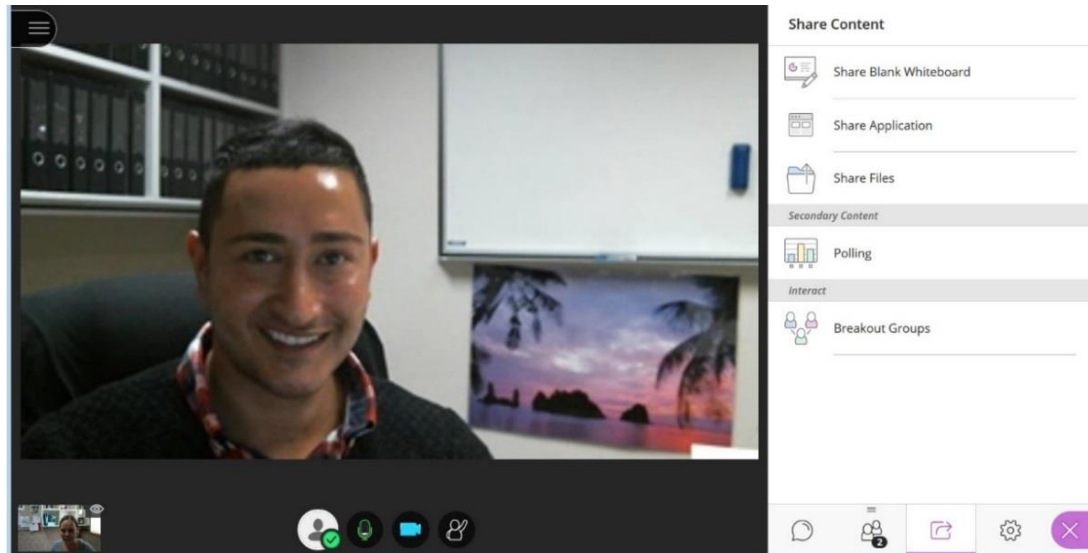

Figure 3. Snapshot of Blackboard Collaborate.

One study examined the use of BC in an instructor-to-instructor professional development environment at Swinburne University. In that study, four key principles of good practice were identified (Gregory & Salmon, 2013, p. 268), of which the two most relevant to this research are "adapt where possible" and "contextualize", which suggest that course material should be in the context of the institution. In the American context, Jones and Hansen (2014) recommend academic advisers should be 'intrusive', when providing web-conferencing support in BC. Intrusive advising involves a commitment to building and fostering positive relationships, while nurturing the specific needs of the student. According to Jones and Hansen (2014, p. 91) "Blackboard Collaborate appears to be an effective web-based collaboration tool that can be used to virtually provide intrusive advising support services to community college students, as well as a host of other support services that involve student engagement". While there are many differences between advisers in America and Australia, there are also synergies between the crossover of support and the potential BC might have in also offering a range of other online services (careers, health and counselling, mentoring etc.). According to Martin and Parker (2014, p. 264), BC considerably improved transactional engagement outside the classroom. Their findings indicated that the use of "Blackboard Collaborate allowed the teacher to be more accessible, supportive, expect and support high standards and provide challenging activities that generated rich and meaningful interactions and promoted higher order thinking skills" (Martin & Parker, 2014, p. 264). The benefit of BC over AC is that it provides a phone conferencing feature so if students experience internet issues, they can call the session phone number and enter a unique pin to still participate in class (Jones & Hansen 2014). This could prove especially helpful for students living in rural regions in Australia who might have the internet, but have limited internet bandwidth capabilities. Also, BC has the benefit of developing reoccurring appointments, beneficial for institutions considering a 'Virtual Drop-In Centre'.

2.3. Adobe Connect (AC)

AC is the second largest university web-conferencing provider in Australia (see Figure 2). The program is organized into "Pods", whereby each Pod provides an explicit function. The 'Sharing

Pod' reorganises the screen to allow for sharing content, while the "Collaborate Pod" reconfigures the screen to make the webcam the most predominant feature (see Figure 4). These pods can be customised to suit the particular needs of the participants, in contrast to BC, which has one standard viewing mode. Similar to BC, AC has a whiteboard, chat and sharing function, breakout rooms for smaller discussions and a polling feature to gauge learning outcomes. Earlier research into AC was quite optimistic about its scope and potential for distance students (Buckley & Smith, 2007). However, Bower (2011) outlined some of the common managerial, operational, design and interactional misuses and misunderstandings of AC. Appendix B offers several recommendations and barriers that address some of Bower's (2011) considerations. He noticed student's misunderstandings of the program were easier to solve than when students misused AC. Cappiccie and Desrosiers (2011) studied the use of the program within a social work curriculum and offered some 'lessons learnt' to professors using the program, with their implications guiding the barriers-suggestion(s) framework in Appendix B. Their recommendations are that academics should clearly state student expectations in the syllabus and advise that a guideline policy for its use, should be developed (Cappiccie & Desrosiers, 2011). Ellingson and Notbohm (2012) used AC in their MBA classroom and found that faculty investment and technology support is needed for it to be effective in the long-term. However, the ethical-critical concerns of web-based conferencing tools is also limited, especially concerning confidentiality, privacy, and consent of students to be recorded. While this paper presents a short term solution by means of a privacy disclaimer statement, broader ethical research is needed in this space so students can permit to being videoed. Another study, Carlson (2011), examined the benefits and pitfalls of AC with librarians teaching online research skills in the Registered Nursing program. According to Carlson (2011) instructors should mute student microphones both to minimise background noise and to promote the 'raise hand' feature so students don't talk over the top of one another. Wang et al. (2013) found a different solution for this common problem, and suggested to use that headsets with an in-built microphone as the best method to eliminate background noise. Nevertheless, not all students can have their webcams switched on at the same time. Kaufmann and Frisby (2013), indicated that due to bandwidth internet issues, AC worked best when 4-6 students were online.

Several recommendations in the use of AC were provided by Wang, Jaeger, Liu, Guo, and Xie (2013) which included: 1) to schedule a practice run meeting for familiarity; 2) multiple channels to remind students of meeting date and time; 3) send meeting announcements and changes well ahead of time; 4) select the best layout depending on the number of students; 5) upload lecture material ahead of time to AC; and 6) have a plan B if communication breaks down. For Armstrong and Thornton (2012), to engage in democratic discussion in AC, ground rules were advocated to be adhered by all. These included, but were not limited to: 1) mutual respect 2) everyone contributes 3) no criticism of speaker while speaking 4) communicate clearly 5) no interruptions 6) only one person speaking at a time (Armstrong and Thornton 2012).
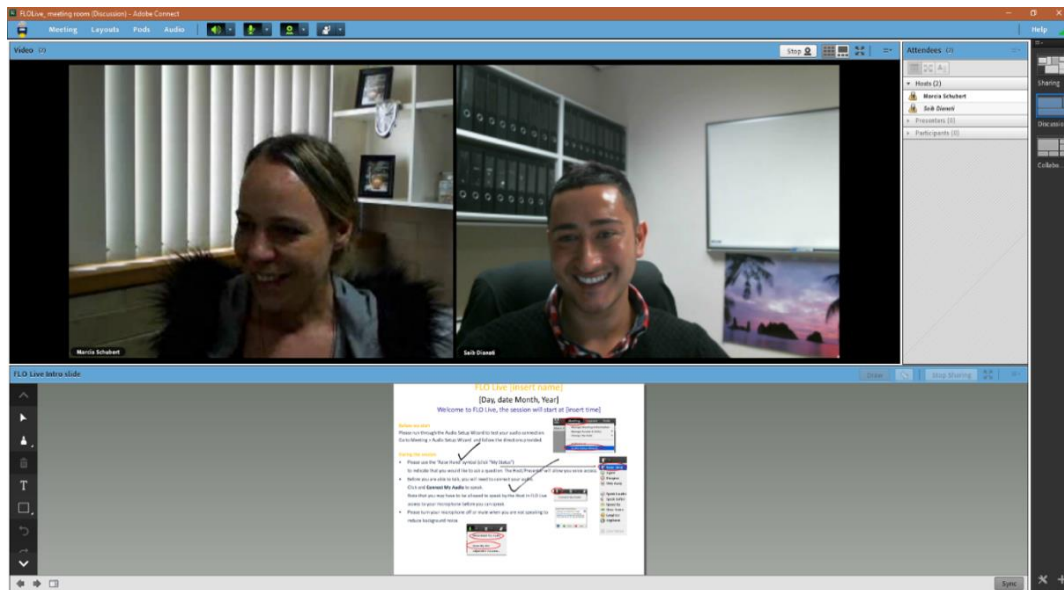
Figure 4. Screenshot of Adobe Connect

Buxton, Buxton, Burns, and De Muth (2012, p. 1) found that using the "polling" feature on AC provided an easy to use method to assess pharmacists' concepts in training webinars. In their study, pharmacists' understanding of different professional development concepts were assessed using the polling function (Buxton, Burns & De Muth 2012, p. 1). Similarly, Jaggars, Edgecombe, and Stacey (2013) provided a framework for an effective online instructor presence and noted that continually asking for and soliciting student feedback led to increased engagement (Jaggars, Edgecombe & Stacey, 2013). Equally, Everly (2013) suggests that, even though it was more time consuming, moving to AC increased the level of engaged 'active learning' and improved test scores with Nursing students. One particular study used AC and found no statistical difference in grades with the online group and traditional (control) group of students (Ng et al., 2014). Their results did indicate, though, that students enjoyed the online PBL and the chat feature more so than their traditional classroom. Another important aspect of online support in AC similar to BC is that it should incorporate student preferences in communication style. Their findings are consistent with Vu and Fadde (2013) who found that in AC, students were more likely, and preferred to chat more often, using the keyboard function, more so than video or audio discussion. While there are complex and conflicting findings in the online space, Hudson, Knight, and Collins (2012, p. 37) wisely suggest that "further studies are warranted to determine what features can enhance student participation, motivation, and achievement in real time, synchronous environments". While most of the literature has implicitly stated the need to support students, there has been limited research into how ALL can support the learner-to-support function in synchronous and asynchronous web-based environments.

3. Methodology

The research was carried out over a three-year period from 2014 to mid-2017. The research applied a broad critical-participatory ethnographic approach that incorporated Participatory Action research (PAR) as its research method. According to Madison (2011), Critical Ethnographic (CE) methodology questions and critically challenges the empirical forms of research that reproduce and perpetuate dominant forms of knowledge constructs. The paper draws from a broad Critical Ethnographic methodology that sees the researcher having an inseparable relationship between the researcher and the participant; and that 'research by doing' should not be discounted as any less than other forms of research inquiry. In this sense, the research 'interacts' and 'involves' themselves within the data, rather than measuring observations or 'results' (Buckley & Smith, 2007). Thomas (1993) offers various methodological frameworks to question the social, political,

and historical forces shaping worldviews and material conditions. Weis and Fine (2004) suggest that Critical Ethnographic methodology has three main positions, drawing from the earlier neo-Marxian scholar, Habermas (1971). The first, is where the ethnographer merely transmits and collects data and sees themselves as an impartial, invisible, bystander, with no invested interests. The second, is where the ethnographer is the subject of inquiry, while responding to voices and positions of power. Lastly, the researcher acts as an ethnographic activist, aiming to disrupt hegemonic forces of power intertwined within the researcher (Weis and Fine, 2004). To this end, this research sits in the middle, whereby the researchers themselves are the subject of inquiry. One particular type of Critical Ethnographic methodology is Participatory Action research (Thomas, 1993). The main difference that makes Participatory Action research distinct from other research methodologies is its foci on community change (Buckley & Smith, 2007). The premise behind Participatory Action research is that the researcher identifies a problem (synchronous academic support), identifies research (trialing programs), interacts with and gets involved with subjects' activities (lived experiences of daily technological use), compiles the data (write-up) and reflects on particular solutions for the greater good (implementation of synchronous technologies for ALL work) (Hamm, 2015; Robinson-Pant, 2014). Due to the subjectivity and specificity of Participatory Action research, no overarching theory underpins it, even though it is informed by Critical Theory (McIntyre, 2008). However, common research techniques in PAR include "secondary data analysis" and "learning by doing" (Kindon, Pain, & Kesby, 2007, p. 23). A hybrid graphical representation drawing from earlier scholars of PAR is shown in Figure 5.
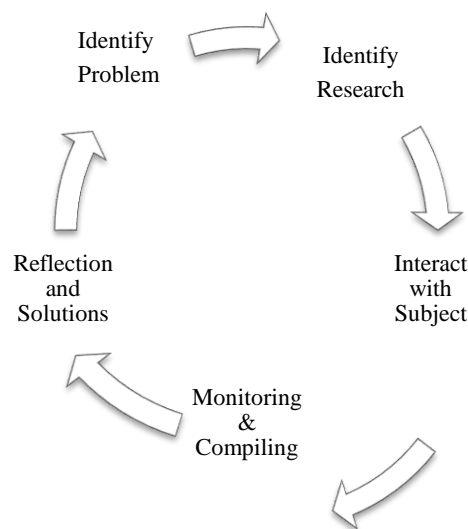
Figure 5. Methodological framework (Anne & Andrea, 2011; Kindon et al., 2007; McIntyre, 2008; Whyte, 1991)

3.1. Research Method: Technology Acceptance Model

In line with Participatory Action Research, the research methodology aims to provide the greatest benefit to the greatest number of ALL professionals. In 'identifying the problem' the researchers realised the potential of an effective in-sourcing solution to a current institutional, and to some extent, nation-wide need to support online students. By 'identifying the research', the researchers set out to conduct an environmental scan of the types of web-conferencing tools available at different universities in Australia. From here, over a three-year period, the academic adviser and the educational technologist interacted with the technology, the students, and each other, which blossomed into ALL applications. The 'Interacting with Subjects' involved applying TAM (adapted by Venkatesh and Davis, 2000) to find out anecdotally what academics felt to be the most useful and the easiest to use. The two most prominent programs BC and AC were analysed for their

benefits and shortcomings from the literature and from lived experience as a result of 'monitoring and compiling'. Ultimately, each tool was judged on its usefulness and ease of use for ALL professionals to implement as a 'Virtual Drop-In Centre'. The last step was to find 'solutions' for ALL centres who may choose not to outsource their services, opting for a freely available, easily accessible insourcing service, already available at most universities in Australia (see Appendix C for a list of Australian Universities using either AC, BC or Zoom).
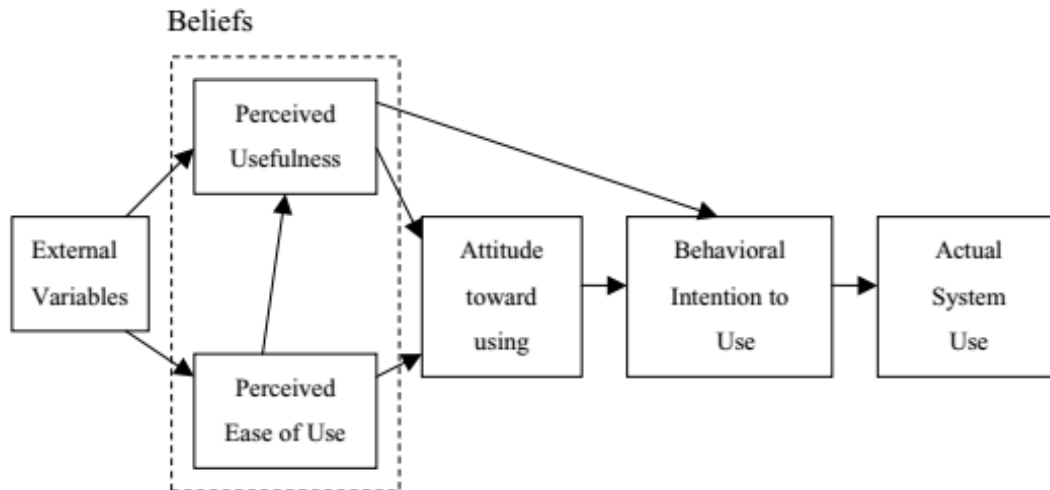

Figure 6. Overview of the Technology Acceptance Model developed by Venkatesh and Davis (2000). (Figure created by Pham (2016) and reproduced under the Creative Commons Attribution-Share Alike 4.0 International license.)

The Technology Acceptance Model by Venkatesh and Davis (2000) is one of the most widely cited research methods with respect to the acceptance of technology. While there has been extensions and modifications to TAM (see: Venkatesh, 2000; Venkatesh & Bala, 2008; Venkatesh, Morris, Davis, & Davis, 2003); the two prominent factors of the model, Perceived Usefulness (PU) and Perceived Ease of Use (PEU) are still key determining factors and were central to the current study (see Figure 6). Nevertheless, Chuttur (2009) argues that the theoretical assumptions of TAM are questionable, even though it is one of the most highly cited pieces of work with respect to technology adoption. Similarly, Bagozzi (2007) argued that intention to use and actual usage may not be representative enough due to the time lag between intention and actual usage. Furthermore, Salovaara and Tamminen (2009) insist that the acceptance model assumes a homogenous technological product with an overly simplistic understanding of 'acceptance' with assumptions that the user is a passive bystander to the technology. While TAM has its various shortcomings, PU and PEU guided questions raised when 'Interacting with Subjects'. Over the course of the three years, the 'monitoring and compiling of the data occurred organically, which led to the last part of the action research spiral, the reflections and solutions. Hence we now review asynchronous online academic support, specifically, the usefulness and ease of use of Office Mix.

4. Findings

4.1. Office Mix: Reflections and Solutions

In Participatory Ethnography, the researcher implicitly involves himself or herself in the research. In this instance, staff members were asked to download the Office Mix plugin to effectively upgrade their PowerPoint. Next, staff were asked to "play" with the technology to alleviate tension or anxiety that may arise when adopting new technology. Academic staff members had a diverse spread of computer and technological proficiency. The last stage was getting staff members to actually use the program, beyond just intention to use (see Figure 6). Staff members were given

the opportunity to discuss any concerns, while giving time and space to practice at their convenience. By late 2016, all staff had converted their presentations into interactive Office Mix resources. However, one shortcoming of its implementation was that different staff chose different interactive features, creating a lack of consistency across ASK. Hence, a recommendation for those adopting Office Mix beyond just personal use, is to ensure a consistency of interactive material. ALL professionals interested in using the program in their institutions could do so with minimal training and support and with no cost.

4.2. AC and BC as virtual academic support for online students

For ALL lecturers, 'breakout rooms' in AC and BC provide an avenue to foster greater peer-to-peer interaction. The purpose here is to decrease social isolation, which is often felt in online environments. The development of student-to-student rapport through these breakout rooms provided an avenue for students to engage with each other. The academic adviser could use this tool to offer writing workshops separated into groups inside the virtual classroom. However, from a TAM perspective, for one-to-one support, breakout rooms and the polling features are of little usefulness as there is only one other person in the room. In line with TAM, one of the most useful features is the ability to screen share documents so students and instructors can work simultaneously to construct, reconstruct or deconstruct academic text. This research supports the comments of Wijeyewardene, Patterson, and Collins (2013), regarding the possibilities for web-conferencing tools to teaching academic writing in the context of ALL and is noted as a possible 'solution' in the discussion section. Their findings indicated that "a range of other possibilities are also available, for example in the use of software such as Adobe Connect where students can come together in real time and take part in joint reconstruction of an academic text" (Wijeyewardene et al., 2013, p. 32).

AC and BC can be added as a plugin to Moodle. For academic advisers interested in applying this to their own institution, a conversation with an educational technologist is an ideal starting point. However, the plugin may already be installed. So an ALL adviser could simply press the "add activity/resource" button to test if BC or AC are preloaded on their LMS. What assisted the academic support module was the organization of scheduled, reoccurring appointment time so students could enter the "room". For one-to-one consultations, a web hyperlink through email can act as a reminder to students regarding their appointment. All AC and BC activities were also recorded and available to students for playback. However, as students had not formally given consent to be recorded, the educational technologist supported the teaching team in developing a privacy statement so students can have the option to not be recorded in the MBA program. Such issues are also an area of future research, particularly with the growth of learning analytics (Pardo & Siemens, 2014; Prinsloo & Slade, 2013). Unfortunately, it not always those that seek help that need the help the most, a fact which may be linked to students feeling embarrassed about needing assistance. For this reason, some might prefer the relative anonymity of online help. This is consistent Davies, Morriss, and Glazebrook's (2014) meta-analysis and systematic review of online support interventions. Their findings highlighted improved student outcomes and a greater amount of help seeking behaviours associated with students being given the opportunity to seek help online (Davies et al., 2014). While there is also an assumption that students are technologically literate, or are 'digital natives' (Prensky, 2001); the need for explicit teaching of digital literacies instruction in ALL should also be considered before implementing such technologies (Miller, 2015; Roche, 2017). Furthermore, the need for adequate promotion of these services by discipline coordinators, tutors, and learning advisers is also needed when academic literacy support is embedded within a given curriculum (Mort & Drury, 2012).

4.3. Recommendations

To run a successful web-conferencing session, it is vital that staff and students know how to use the program. It takes time and practice to learn how to run an effective web-conferencing session.

Also, any adoption of technology should be critiqued for its motives in an effort to protect the scholastic intellectual property of staff. Over three years of observational research it was found that BC was the easiest and most useful synchronous web-conferencing software. Additionally, Office Mix was considered the easiest to use and the most useful asynchronous software after trialling various other editing tools (Adobe Presenter, Adobe Captivate and Camtasia). In an effort to offer 'Solutions and Reflections', while both web-conferencing tools had similar functions, academic staff reported, including the researchers, that they found BC more intuitive and user-friendly. A benefit of BC over AC is that participants can enable their own webcam and microphone, instead of relying on the host to enable the participant's microphone or webcam first. Not surprisingly, academic staff found that BC's most useful function was the phone conferencing feature which provided students with the option to phone in and join the session if they were having trouble with their microphone, webcam or internet connection. In comparison, AC has an audio phone-in feature. However, it is not as simple to dial in to join the session as it is with BC. Phone conferencing needs to be enabled within AC and the settings need to be configured in order to dial out and receive calls before the start of the session. Due to bandwidth saturation, both tools worked best when the number of webcams was limited to a maximum of five at a time. Another benefit of BC over AC is that students can use the subject 'course room' at any time to meet with other students or to test their equipment, without the need for the moderator or host to be present. To this end, the paper offers several recommendations for ALL adoption: 1) *Provide technical support*. It is helpful to have a technical person to sit in on the first session to support staff and students; 2) *Set protocols in the first session*. For example, if there is more than one participant, ask participants to mute their microphone when they are not talking to reduce background noise; 3) *Make the session interactive by using the various sharing functions*. For instance, using the whiteboard, the host and the participants "can create, manipulate, review, and update graphical information online in real time while participating in a lecture or discussion" (Anderson, 2008, p. 149); and 4) *Remind students of the upcoming session*. Post an announcement in the LMS or use an appointment-booking tool such as Moodle's Scheduler tool for students to book appointments for one-on-one academic support. These recommendations should assist in alleviating the technological anxiety potentially associated with a web-conferencing interaction.

5. Conclusion

Our research has contributed to the scholarly research in Virtual Learning Environments (VLE), concerning online academic support provision particularly through the use of web-conferencing technologies. The outcome of this research provided three main outputs that others may embrace at their respective institutions. The first was embedding academic skills *within* and *across* the discipline-specific subject. Secondly, it provided a method by which ALL professionals could develop their own "Academic Drop-In Virtual Office" through the synchronous applications of AC and BC. Lastly, it provided a method to transform static academic skills PowerPoint presentations into engaging asynchronous interactive resources. The consensus of feedback received from academic staff, after receiving training in both BC and AC, was that BC was easier to use and more useful due to its simplicity of design. The feedback received from the discipline coordinator was that BC was the most useful web-conferencing tool for synchronous online academic support. Office Mix was also considered the easiest and most useful software of those available at Flinders University. However, one of the limitations of this research was the lack of an underpinning theory for PAR. While PAR is informed by critical theory, it lacks a deeper theoretical and conceptual framework. A second limitation was the bias with the researcher acting as both the observer and the participant, even though it may be commonplace in PAR. A third limitation was that any practical solutions offered can only be applied to Moodle and future work could examine a practical guide for commercially based LMS's such as Blackboard Learn. While there has been a rapid move to introduce commercial outsourcing services, two effective, no-cost, in-house asynchronous and synchronous solutions that involve minimal training have been offered in this paper as practical solutions to compliment the important work of ALL in academia.

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Appendix A. Similarities of features of Adobe Connect and Blackboard Collaborate

Features	Blackboard Collaborate	Adobe Connect
Ad-Hoc Instant meetings	✓	✓
Schedule meetings	✓	✗
Schedule recurring meetings	✓	✗
Calendar for meetings	✓	✓
Video/webcam	✓	✓
Audio	✓	✓
Meeting recording/playback	✓	✓
Surveys and polls	✓	✓
Whiteboards	✓	✓
Annotation / drawing tools	✓	✓
Break out rooms	✓	✓
Screen sharing	✓	✓
Instant messaging	✓	✓
File transfer	✓	✓
Slide show	✓	✓
Inactivity time-outs	✓	✗
Encryption	✓	✗
Remove attendee	✓	✗
Web tours	✓	✗
Always on conferencing	✓	✗

(Graphiq Inc., *Software Insider,* 2017).

Appendix B. Barriers and suggestions for synchronous online academic support[1]

Barriers to online academic support	Suggestions to overcome barriers
Learners require the necessary technological skills and may lack access to technical information and support	Provide learners with information on technical requirements and refer learners to the helpdesk for technical support
Learners require access to the hardware, software and internet connectivity for online learning	Get to know learners to determine what supports are most critical. Dedicate time aside to increase student comfortableness
Learners may lack the institutional, digital and academic literacies needed for online instruction	Provide digital, academic and institutional literacies and resources via web-conferencing synchronous
Learners may not be aware of online protocols or how to enter a virtual classroom	Provide online administrative supports and services, a good practice guide that includes online pedagogical considerations
Learners may lack access to other support services such as careers, health and counselling services	Provide 'Virtual Counsellor' or 'Virtual Adovcacy'' synchronous support inside Moodle Activity Resources
Learners may lack, or may need to be made aware of their ethical, privacy, data and confidentiality rights online	Provide learners with information on what is recorded, shared, stored and analysed in the Virtual Classroom.
Learners need to self assess whether they have the skills to be successful in their chosen program	Provide learners with advice for making specific program and career related decisions
Learners require access to individualized disability-specific support services or suitable assistive technology	Provide learners with flexible, continously available, easily accessible support services
Learners may require additional academic resources to assist in their academic writing skills	Provide online resources in referencing, academic writing and other resources linked from Moodle course page
Learners may lack a peer support group online	Provide opportunities for students to develop peer to peer relations through breakout rooms, or social spaces online

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[1] Some considerations adapted from Bower (2011) and Anderson (2008).

Appendix C. Tabulated web conferencing tools used at universities in Australia (August 2017)[2]

University	Product	Reference
ACU	Adobe Connect	http://www.acu.edu.au/staff/our_university/learning_and_teaching/technology_enhanced_learning/leo_guides/tools/live_classrooms
Adelaide	Blackboard Collaborate	http://www.adelaide.edu.au/myuni/staff/resources/tutorials/content/Blackboard-Collaborate-Overview-for-staff.html
ANU	Adobe Connect	https://services.anu.edu.au/news-events/adobe-connect-webconferencing
Bond	Skype	https://bond.service-now.com/kb_view.do?sysparm_article=KB0000167
Carnegie Mellon University		Data not available
CDU	Blackboard Collaborate	https://learnline.cdu.edu.au/
CQU	Zoom	https://www.cqu.edu.au/eresearch/collaborative-technologies/video-collaboration
Charles Sturt	Adobe Connect	http://www.csu.edu.au/division/landt/interact/help/adobeconnect.htm
Curtin	Blackboard Collaborate	http://clt.curtin.edu.au/teaching_learning_services/bb_collaborate.cfm
Deakin	Blackboard Collaborate	http://www.deakin.edu.au/students/help/about-clouddeakin/help-guides/communication/blackboard-collaborate
Edith Cowan	Adobe Connect	https://intranet.ecu.edu.au/learning/technologies/adobe-connect
Federation	Adobe Connect	https://federation.edu.au/staff/learning-and-teaching/clipp/elearning-hub/adobe-connect
Flinders	Adobe Connect/ Blackboard Collaborate	https://flo.flinders.edu.au/mod/glossary/show-entry.php?courseid=151&eid=43074&displayformat=dictionary
Griffith	Blackboard Collaborate	https://intranet.secure.griffith.edu.au/computing/using-learning-at-griffith/students/communication-and-collaboration/collaborate
James Cook	Blackboard Collaborate	https://www.jcu.edu.au/learning-and-teaching-systems/learnjcu/teaching-with-learnjcu/collaborate-ultra
La Trobe	Blackboard Collaborate	http://www.latrobe.edu.au/students/it/teaching/collaborate
Macquarie	Zoom	http://mq.edu.au/iLearn/zoom.htm
Melbourne	Zoom	https://le.unimelb.edu.au/video-and-media-production/zoom-web-conferencing/
Monash	Zoom	https://www.monash.edu/esolutions/learning-meeting-spaces/zoom-conferencing
Murdoch	Blackboard Collaborate	http://our.murdoch.edu.au/CUTL/Educational-Technologies-at-Murdoch/
QUT	Zoom	https://ask.qut.edu.au/app/answers/detail/a_id/6366/~/how-do-i-get-assistance-with-using-zoom%3F
RMIT	Blackboard Collaborate	http://www1.rmit.edu.au/teaching/technology/collaborate
SCU	Blackboard Collaborate	http://scu.edu.au/teachingwithtechnology/index.php/57
Swinburne	Blackboard Collaborate	https://www.swinburne.edu.au/library/study-spaces-computers/book/software/

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[2] The idea of presenting the data in this way was adapted from a previous in-house review at Flinders University, however, all research was conducted by the authors.

Torrens Universitiy		Data not available
UC (Canberra)	Blackboard Collaborate	http://www.canberra.edu.au/about-uc/tl/learning-environments
University College London (SA)		Data not available
UNE	Adobe Connect	http://moodle.une.edu.au/mod/page/view.php?id=864133
University of Divinity		Data not available
University of Notre Dame	Blackboard Collaborate	https://www.nd.edu.au/__data/assets/pdf_file/0004/138937/Collaborate-System-Requirements.pdf
UniSA	Adobe Connect	http://w3.unisa.edu.au/tel/learnonline/virtual-classroom.asp
University of Newcastle		Data not available
UNSW	Blackboard Collaborate	https://teaching.unsw.edu.au/moodle-blackboard-collaborate-classroom
University of Sydney	Adobe Connect	http://staff.ask.sydney.edu.au/app/answers/detail/a_id/380/~/what-is-web-conferencing-%28adobe-connect%29%3F
University of Technology Sydney		Data not available
UOW	Adobe Connect	http://www.uow.edu.au/its/collaboration/connect- lounge/index.html
UQ	Adobe Connect	https://www.elearning.uq.edu.au/content/virtual-classroom
USC	Acano	http://www.usc.edu.au/explore/structure/divisions/information-technology-services/video-conferencing-services
USQ	Blackboard Collaborate	https://www.usq.edu.au/learningcentre/usqstudydesk-skills/blackboard
UTAS	Blackboard Collaborate	http://www.utas.edu.au/mylo/blackboard-collaborate
UWS	Blackboard Collaborate/Zoom	https://www.westernsydney.edu.au/eresearch/home/connect/tools
VU	WebEx	https://blendedlearning.vu.edu.au/student_help/help/communication-tools/webex-virtual-classrooms/643-downloading-and-using-cisco-webex-meetings-app.html
Western Sydney University	Blackboard Collaborate/Zoom	https://www.westernsydney.edu.au/eresearch/home/connect/tools