








‘Learning in and out of lockdown’: A comparison of two groups of undergraduate occupational therapy students’ engagement in online-only and blended education approaches during the COVID-19 pandemic

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Abstract

Introduction: In many countries, the COVID-19 pandemic resulted in sudden changes to the delivery of health professions education in response to local and national lockdowns. Within occupational therapy, university education programs traditionally delivered in face-to-face classroom, and clinical settings, the transition to online learning presented unique issues and challenges for faculty and students. This study compared the experiences and perceptions of learning in two groups of occupational therapy students during the pandemic: one group converted to online learning only and the other had a blended approach that combined face-to-face on-campus learning with some online lecture content delivery.

Methods: Two hundred and eight ($n = 208$) undergraduate occupational therapy students from three Australian universities completed an online self-report demographic questionnaire and two standardised instruments: the *Student Engagement in the e-Learning Environment Scale* and the *Distance Education Learning Environment Scale*. An independent-samples t test with bootstrapping was completed to examine differences in students’ scores.

Results: Statistically significant differences were observed between the online and blended learning groups across a range of the SELES and DELES subscales. The strongest findings related to *psychological motivation* ($p = 0.001$), *personal relevance* ($p = 0.001$), *interactions with instructors* ($p = 0.002$), *instructor support* ($p = 0.001$), *student interaction & collaboration* ($p = 0.001$), and *cognitive problem solving* ($p = 0.001$).

Conclusion: Occupational therapy students who transitioned to online-only learning experienced higher levels of motivation, interactions with instructors and peers, and self-directed learning than students who experienced a blended education delivery approach of face-to-face and online learning. The findings extend educators’ understanding of the matrix of factors that have impacted students’ education during COVID-19 and support the development of contemporary and pedagogically sound online and traditional modes of

occupational therapy instruction. The results provide evidence of the importance of well-structured programs that facilitate active and flexible learning, provide meaningful and positive experiences, and promote initiatives safeguarding social and personal well-being. Further research in this area is recommended.

KEYWORDS

blended learning, COVID-19, education, occupational therapy students, online learning

1 | INTRODUCTION

The COVID-19 pandemic tested the limits of health-care systems and challenged conventional practices in health professions education (Naciri et al., 2021). Globally, the implementation of strategic public health measures to contain the spread of the virus posed challenges for health professions educators as traditional face-to-face teaching and learning activities (e.g., sit-in lectures, workshops, placements, and practical skills tutorials) were replaced with online technologies (Cairney-Hill et al., 2021). Academic staff needed to adapt quickly and understand distance learning approaches to delivering educational content (Pather et al., 2020). The literature cites wide use of digital platforms such as Zoom, Microsoft Teams, and SoundCloud to deliver theoretical and skills-based content via webinars, podcasts, and video sessions to students of health professions (Ferrel & Ryan, 2020; Wong, 2020). University students also had to adapt to a substantial shift to online delivery of educational content. For some students, there were benefits to e-learning, such as flexible learning across location and time, whereas others experienced significant stress from social isolation, technological issues, and limited opportunities for collaborative engagement with peers (Carolan et al., 2020).

Within health professions education, hybrid approaches to teaching and learning have been the preferred models for around 10 years, and curricula have actively incorporated online and traditional forms of learning (Allen & Seaman, 2013). The COVID-19 pandemic has been described as a catalyst for the modernisation of the way university units are taught and has hastened the inevitable transition to online delivery of training for students in the health disciplines (Haslam, 2021). Studies report that e-learning initiatives can be an effective enabler of students' learning. Gardner et al. (2016) described how physiotherapy students enjoyed the flexibility of online learning programs regarding cost and time and that easy access to resources facilitated their motivation to learn and complete assignments.

Key Points for Occupational Therapy

- This provides evidence that learning during COVID-19 was challenging for occupational therapy students.
- This study broadens faculty's understanding of factors that have impacted occupational therapy education during the pandemic.
- It is important that future education modalities of instruction foster student engagement and safeguard students' academic and personal well-being.

Additional reported benefits include online modules as drivers of self-directed and contextualised learning, appropriate assessments and feedback, and opportunities to interact remotely with teachers and peers (Hammarlund et al., 2015).

However, there is evidence that programs heavy in online learning, with minimal face-to-face contact time, can lead to feelings of social isolation, raised anxiety levels, lack of support, and sub-optimal peer-peer and student-educator collaborative relationships (Croft et al., 2010; God & Hongzhi, 2019; Lalor et al., 2019; Rogers et al., 2011). Further, reported barriers to effective online learning include diminished opportunities to practice clinical skills in real-life scenarios resulting in increased use of virtual patient simulation, an increased focus on skill development, and the time required to adapt to new learning environments (Gustafsson, 2020; Twogood et al., 2020).

Research also suggests the online delivery of foundational knowledge to students using discussion forums, video links, and web conferences has no negative impact on the effectiveness of students' learning and performance (Allen & Seaman, 2013; Jensen & Lally, 2018; McCutcheon et al., 2015; Mu et al., 2014; Scagnoli

et al., 2019). New forms of technology have emerged that circumvent the limitations of online learning, such as virtual simulations and virtual reality streaming that mimic the physical experience of conventional learning as a method to allow more hands-on learning (Radianti et al., 2020). Mu et al.'s (2014) study found comparable graduate outcomes of occupational students enrolled in traditional and hybrid programs. However, these new forms of learning are reported to challenge and disadvantage students who are unable to access the relevant technologies. For example, students may experience poor internet connections and lack the appropriate software and equipment to connect with online classes (Hammarlund et al., 2015; Kitching et al., 2015). Further reported challenges experienced include instructional design issues, low self-efficacy, poor time management skills, lack of motivation, and difficulties forming relationships with peers and instructors (Gustafsson, 2020; Rasheed et al., 2020).

In the health professions where students must undertake practical practice education placements, online learning may not always provide learners with opportunities for in-person interactions, hands-on learning, and real-world experiences. Various studies report difficulties in authentically replicating clinical environments using mainstream technologies and delivering skills-based content that considers health professions students' specific needs and required level of engagement (Cairney-Hill et al., 2021; Gardner et al., 2016; Hattar et al., 2021). Evidence from medical education suggests students' self-directed learning and their engagement with instructors is closely associated with the delivery of authentic content based on real patient scenarios during online sessions (Morton et al., 2016). The rapid move to online education also prompted the emergence of alternative practice education placement opportunities that involve telehealth and telerehabilitation (Mbada et al., 2021; Salter et al., 2020).

This study explores differences in the learning experiences and levels of engagement between one group of undergraduate occupational therapy students who switched to fully online learning during COVID-19 lockdown and another group who were not in lockdown and had a combination of face-to-face on-campus learning with some lecture content delivered online. The findings will contribute to the emerging evidence on online learning in health professions education during COVID-19 and improve educators' understanding of the challenges faced by students. The outcomes of this research will assist occupational therapy faculty in developing and delivering online and traditional instruction programs that facilitate high levels of student engagement while sustaining and safeguarding student well-being.

2 | METHODS

2.1 | Study design

A cross-sectional quantitative study was conducted to investigate differences in learning experiences and engagement between undergraduate occupational therapy students in lockdown who converted to online learning and those who could attend some of their classes in-person during the same time.

2.2 | Participants and procedure

This study was approved by the Monash University Human Research Ethics Committee (MUHREC) (Project number 25624; 22/07/2020), the University Canberra Human Ethics Committee (Project number 4756; 18/07/2020), and the Curtin University Human Research Ethics Office (Project number HRE2020-0657; 04/11/2020).

Participants enrolled in the first to fourth-year undergraduate occupational therapy programs at Monash University, Victoria, the University of Canberra, Australian Capital Territory, and Curtin University, Western Australia were alerted to the research study via a learning management system (LMS) announcement that included a project overview and participant information statement. Students were informed that participation was voluntary and anonymous with no negative consequences should they choose not to participate in the study. Students who wished to participate in the study were provided with a link to an online platform containing the survey. The survey took approximately 20 minutes to complete with consent implied by its completion and return. Data were de-identified and collected using Qualtrics.

During Semester 1 of 2020, with the advent of the COVID-19 pandemic in Australia, Monash University, the University of Canberra, and Curtin University moved the delivery of all teaching and learning activities for its occupational therapy students entirely online. During Semester 2 of 2020 at Curtin University, the delivery of tutorials and practical skills sessions moved back to a blended education approach of face-to-face delivery on-campus, with some lecture materials continuing to be provided online for students. Data collection at the three universities occurred mid-way through Semester 2 of 2020.

A total of 256 responses were received, but 48 participants' responses were removed prior to data analysis due to incomplete or missing data. The sample size for the current study was therefore 208, and the response rates were 31% (Monash University), 17.3% (University of

Canberra), and 9.5% (Curtin University), respectively. During Semester 2 of 2020, 151 students completed their learning in lockdown conditions online only, and 57 students completed their learning face-to-face on-campus supplemented by the online delivery of lecture contents (using a blended education delivery approach). The learning conditions for the students who completed their studies in the lockdown online learning context were that they attended all tutorials, case study groups, and group work activities online. This was the same for both onshore students in Australia and offshore students located in their home countries. The learning conditions for the second non-lockdown blended education delivery group were that they returned to campus for scheduled face-to-face learning activities that included tutorials, practical skills classes, and group work activities.

2.3 | Instrumentation

Data collection consisted of an online questionnaire comprising three parts: a demographic information form, the *Distance Education Learning Environment Scale* (DELES) (Walker, 2020), and the *Student Engagement in the e-Learning Environment Scale* (SELES) (Lee et al., 2019). The SELES and DELES are standardised self-report instruments that generate information about students' engagement and experiences with online learning (Lee et al., 2019; Walker & Fraser, 2005).

The SELES assists educators to maximise students' engagement in e-learning environments and improving retention rates. Using a 5-point Likert scale, participants rated their agreement with 24 statements with responses loading to six subscales: psychological motivation, peer collaboration, cognitive problem solving, interaction with instructors, community support, and learning management. Table 1 contains definitions of the SELES subscales. The SELES has proven reliability with Cronbach's alpha coefficients for the subscales ranging from 0.72 to 0.90, where 0.70 or above is considered adequate (Lee et al., 2019). Validity for the SELES is confirmed via exploratory and confirmatory factor analyses reported by its authors (Lee et al., 2019).

The DELES measures students' perceptions of distance learning environments and identifies areas of online learning that can be improved. Students rated the frequency of their engagement with 42 statements on a 5-point Likert scale and responses load to seven subscales: instructor support, student interaction & collaboration, personal relevance, authentic learning, active learning, student autonomy, and enjoyment (see Table 1 for definitions of the DELES subscales). The instrument has reported excellent internal consistency

with Cronbach alpha coefficients ranging from 0.75 to 0.94 (Walker, 2020). Validity evidence of the DELES includes factorial validity, structural validity, and convergent validity (Walker, 2020).

2.4 | Data management and analysis

The data, descriptive, and correlational statistics were analysed using SPSS version 27.0 (IBM Corp., 2020). Descriptive statistics such as mean and standard deviation were used to display demographic information and overall scores for each subscale. Potential significant differences between the two participant groups were investigated using a *t* test for independent samples. The resampling technique 'bootstrapping' was applied to improve the accuracy of the confidence intervals (CI) and provide more accurate interpretation of data (Choi, 2016). It is a statistical procedure that uses random sampling with replacement to create additional simulated samples and generates measures of accuracy to sample estimates. The level of statistical significance was set at $p < 0.05$.

3 | RESULTS

3.1 | Participant demographics

In both participant groups, the majority were full-time, female, English-speaking occupational therapy students, aged 20- to 24-years old, and evenly distributed across the 4-year programs. The online group engaged in 9.87 (SD = 6.82) hours of direct online study time per week. The blended learning group recorded 5.00 hours per week of direct face-to-face contact and 6.30 (SD = 4.52) hours of direct online study time per week. The online student group worked was engaged in 7.25 (SD = 8.36) hours of paid employment per week, whereas the blended learning group worked a larger number hours on a weekly basis at 11.56 (SD = 10.45). The full demographic findings for both participant groups are reported in Table 2.

3.2 | SELES and DELES scores

On measures of engagement in the learning environment (SELES), online students recorded their highest score on the *learning management* subscale ($M = 3.3$, $SD = 0.79$). Students in the blended education group scored highest on measures of *community support* ($M = 3.6$, $SD = 0.70$). Both groups returned their lowest scores on *interactions*

TABLE 1 SELES and DELES subscales (Lee et al., 2019; Walker & Fraser, 2005)

Definition	
SELES subscales	
Psychological motivation	Enjoying learning, stimulating interest, usefulness of the course, satisfaction with the course, learning expectations, and motivation.
Peer collaboration	Requesting help, collaborative problem solving, responding to questions, collaborative learning, and collaborative assignments.
Cognitive problem solving	Deriving an idea, applying knowledge, analysing knowledge, and judging the value of information and approach with new perspectives.
Interactions with instructors	Communicating with the instructor and asking questions.
Community support	Belonging to community, connection with peers, and interaction with peers.
Learning management	Self-directed study, managing own learning, and managing own learning schedule.
DELES subscales	
Instructor support	Consists of eight items relating to accessibility to and response quality from instructors (e.g., The instructor gives me valuable feedback on my assignments).
Student interaction and collaboration	Consists of six items relating to group work with other students (e.g., I collaborate with other students in the class).
Personal relevance	Consists of seven items relating to applicability of learning experiences (e.g., I can connect my studies to my activities outside of class).
Authentic learning	Consists of five items relating to the learning material being realistic (e.g., I work on assignments that deal with real-world information).
Active learning	Consists of three items relating to improving one's learning (e.g., I explore my own strategies for learning).
Student autonomy	Consists of five items relating to dictating one's learning (e.g., I make decisions about my learning).
Enjoyment	Consists of eight modified items relating to satisfaction of distance learning (e.g., distance education is exciting).

Abbreviations: DELES, Distance Education Learning Environment Scale; SELES, Student Engagement in the e-Learning Environment Scale.

with instructors (online: $M = 2.7$, $SD = 0.90$; blended: $M = 2.0$, $SD = 0.78$) (see Table 3). Across the perceptions-based DELES subscales, both groups returned the highest scores on the *student autonomy* subscale (online: $M = 4.0$, $SD = 0.68$; blended: $M = 3.9$, $SD = 0.69$) and lowest scores on the *enjoyment* subscale (online: $M = 2.6$, $SD = 1.07$; blended: $M = 2.2$, $SD = 0.90$) (see Table 3).

3.3 | Comparison of 'lockdown online and non-lockdown blended' learning student groups

An independent-samples t test was conducted to compare students' scores on measures of engagement in the learning environment. Statistically significant differences were observed on measures of *psychological motivation* ($t(95.5) = 4.10$, $p = 0.001$), *cognitive problem solving* ($t(110.8) = 4.67$, $p = 0.001$), *interactions with instructors* ($t(95.8)$

$= 3.41$, $p = 0.002$), *community support* ($t(116.1) = 6.94$, $p = 0.001$), and *learning management* ($t(102.7) = 2.73$, $p = 0.009$), based on 1000 bootstrapped samples (see Table 4 for t test results).

Comparisons of the lockdown online and non-lockdown blended learning students' scores on perceptions of distance learning environments identified statistically significant differences in the following areas: *instructor support* ($t(103.0) = 4.21$, $p = 0.001$), *student interaction and collaboration* ($t(89.5) = 3.36$, $p = 0.001$), *personal relevance* ($t(107.0) = 3.89$, $p = 0.001$), *authentic learning* ($t(88.9) = 2.90$, $p = 0.004$), and *enjoyment* ($t(119.0) = 3.19$, $p = 0.002$), based on 1000 bootstrapped samples (see Table 4 for t test results).

4 | DISCUSSION

The COVID-19 pandemic disrupted traditional teaching methods for health professions students and brought

TABLE 2 Demographic data (lockdown online learning student group, $n = 151$; non-lockdown blended learning student group, $n = 57$)

	Lockdown online learning student group Frequency (%)	Non-lockdown blended learning student group Frequency (%)
Year level		
1st year undergraduate	39 (25.3)	22 (38.6)
2nd year undergraduate	35 (22.7)	15 (26.3)
3rd year undergraduate	51 (33.1)	16 (28.1)
4th year undergraduate	26 (16.9)	4 (7.0)
Enrolment status		
Full-time	145 (94.2)	54 (94.7)
Part-time	6 (3.9)	3 (5.3)
Age		
17–19 years	35 (22.7)	14 (24.6)
20–24 years	100 (64.9)	36 (63.2)
25–29 years	7 (4.5)	5 (8.8)
30–34 years	2 (1.3)	2 (3.5)
35–39 years	6 (3.9)	0 (0.0)
40 years or older	1 (0.6)	0 (0.0)
Gender Identity		
Female	122 (79.2)	47 (82.5)
Male	28 (18.2)	8 (14)
Prefer not to say	1 (6)	2 (3.5)
English as first language		
Yes	112 (72.7)	48 (84.2)
No	39 (25.3)	9 (15.8)
Student enrollment status		
International student	38 (24.7)	12 (21.1)
Domestic student	113 (73.4)	45 (78.9)
Time commitments (hours per week during semester)		
	Mean/SD	Mean/SD
Direct face-to-face time	4.75/7.62	5.00/3.58
Direct online study time	9.87/6.82	6.30/4.52
Indirect online study time	12.96/9.69	11.61/8.98
Indirect offline study time	5.11/6.51	6.37/7.11
Paid work	7.25/8.36	11.56/10.45

Abbreviation: SD, standard deviation.

about unprecedented changes in the delivery of education programs in universities globally. This study aimed to identify differences in learning experiences and engagement between two groups of undergraduate occupational therapy: (i) students who converted to fully online learning; and (ii) students who experienced a blended education approach that combined on-campus face-to-face learning and some online delivery of materials during the COVID-19 pandemic.

The mean scores recorded across the SELES and DELES instruments indicated that the period of learning during the pandemic was stressful and challenging for all students, irrespective of the learning mode. The indications are that the learning process was not especially enjoyable for either group, evidenced by the scores for measures of psychological motivation and stimulation and students' interactions with their instructors. This is consistent with other studies of online learning in the

TABLE 3 SELES and DELES comparative mean scores for lockdown online learning ($n = 151$) and non-lockdown blended learning ($n = 57$) student groups

	Lockdown online learning students		Non-lockdown blended learning students	
	Mean	SD	Mean	SD
SELES subscales				
Psychological motivation	2.94	±0.88	2.34	±0.94
Peer collaboration	3.10	±0.87	2.90	±0.93
Cognitive problem solving	3.32	±0.71	2.82	±0.65
Interactions with instructors	2.66	±0.90	2.00	±0.78
Community support	2.86	±0.88	3.59	±0.70
Learning management	3.33	±0.79	2.98	±0.78
DELES subscales				
Instructor support	3.93	±0.70	3.48	±0.68
Student interaction & collaboration	3.51	±0.76	3.06	±0.88
Personal relevance	3.56	±0.74	3.14	±0.69
Authentic learning	3.67	±0.74	3.30	±0.86
Active learning	3.80	±0.64	3.59	±0.70
Student autonomy	4.04	±0.68	3.87	±0.69
Enjoyment	2.63	±1.07	2.16	±0.90

Abbreviations: DELES, Distance Education Learning Environment Scale; SD, standard deviation; SELES, Student Engagement in the e-Learning Environment Scale.

health professions during COVID-19 that reported challenges to students' mental health and morale concerning social and academic factors (Anderson et al., 2020; Bourke et al., 2021; Klasen et al., 2020).

Key findings from analysis of students' SELES scores measuring their engagement in the learning process were strong statistically significant differences between the lockdown online and non-lockdown blended learning student groups on the *psychological motivation* ($p = 0.001$), *cognitive problem solving* ($p = 0.001$), *interactions with instructors* ($p = 0.002$), *community support* ($p = 0.001$), and *learning management* ($p = 0.009$) subscales. On measures of perceptions of the learning environment (DELES), the noteworthy outcomes were statistically significant differences between the online and blended education student groups in the areas of *instructor support* ($p = 0.001$), *student interaction & collaboration* ($p = 0.001$), *personal relevance* ($p = 0.001$), *authentic learning* ($p = 0.004$), and *enjoyment* ($p = 0.002$).

4.1 | Instructor interactions and support

Significant statistical differences between the lockdown online and non-lockdown blended learning student

groups on measures of instructor support ($p = 0.001$) and interactions with educators ($p = 0.002$) during the pandemic are important findings. Results suggested that online students experienced better interactions with instructors than the blended group, although engagement scores in this domain were low for both groups. Online students in lockdown also perceived higher levels of support from their educators than students who continued in-person learning. For the students in complete lockdown, it may have been the case that the sudden shift to online learning presented initial challenges for students that led to a higher number of requests for assistance from instructors (Suliman et al., 2021).

In health professions training during COVID-19, the most frequent concerns related to technical difficulties regarding online learning platforms and delivery of theoretical components of content via online formats (Kuliukas et al., 2021). The findings are also contingent with those from studies that link levels of engagement and performance in online learning with students' perception of teaching presence through continuous interactions and communications with instructors (Garrison et al., 2010; Joo et al., 2011; Jung & Lee, 2018). This highlights the importance of faculty having open lines of communication with students during periods of online learning (de Tantillo & Christopher, 2020). The use of

T A B L E 4 SELES and DELES test of difference results between lockdown online learning ($n = 151$) and non-lockdown blended learning ($n = 57$) student groups

	Independent samples test														
	Levene's test for equality of variances							t test for equality of means							
	Pre-bootstrapping							Post-bootstrapping							
	F	Sig.	t	df	Sig. p-value*	Mean Dif	SE Dif	95% CI Lower	95% CI Upper	Mean Dif	Bias	SE	Sig. p-value*	95% CI Lower	95% CI Upper
SELES															
Psychological motivation	0.432	0.512	4.098	95.544	0.001	0.591	0.144	0.305	0.878	0.591	0.011	0.145	0.001	0.295	0.899
Peer collaboration	0.001	0.982	1.406	96.269	0.163	0.201	0.143	-0.083	0.484	0.201	0.008	0.146	0.169	-0.084	0.499
Cognitive problem solving	0.953	0.330	4.668	110.809	0.001	0.483	0.104	0.278	0.689	0.483	0.003	0.106	0.001	0.280	0.699
Interactions with instructors	0.126	0.723	3.408	95.817	0.001	0.501	0.147	0.209	0.793	0.501	-0.002	0.150	0.002	0.210	0.788
Community support	0.950	0.331	6.944	116.075	0.001	0.866	0.125	0.619	1.113	0.866	0.008	0.128	0.001	0.586	1.148
Learning management	0.035	0.851	2.732	102.709	0.007	0.334	0.122	0.091	0.576	0.334	-0.003	0.127	0.009	0.065	0.583
DELES															
Instructor support	0.0170	0.897	4.21	103	0.001	0.449	0.106	0.238	0.661	0.449	0.00266	0.100	0.001	0.244	0.663
Student interaction and collaboration	1.003	0.318	3.36	89.5	0.001	0.443	0.131	0.181	0.705	0.443	0.00092	0.130	0.001	0.183	0.705
Personal relevance	0.743	0.390	3.89	107	0.001	0.425	0.109	0.208	0.642	0.425	0.00026	0.107	0.001	0.220	0.652
Authentic learning	1.86	0.174	2.90	88.9	0.005	0.371	0.128	0.117	0.626	0.371	0.00161	0.125	0.004	0.113	0.627
Active learning	0.959	0.329	1.95	93.1	0.054	0.208	0.106	-0.00375	0.420	0.208	0.00059	0.107	0.060	-0.00134	0.415
Student autonomy	0.119	0.730	1.63	100	0.106	0.173	0.106	-0.376	0.384	0.173	-0.00095	0.101	0.106	-0.242	0.364
Enjoyment	1.68	0.197	3.19	119	0.002	0.470	0.146	0.179	0.761	0.470	0.00521	0.143	0.002	0.156	0.765

Note: * significant p-values are in bold font. Abbreviations: CI, confidence interval; DELES, Distance Education Learning Environment Scale; Dif, difference; SE, standard error; SELES, Student Engagement in the e-Learning Environment Scale.

video response formats during the pandemic has been shown to be effective in facilitating students to remain cognitively and socially connected with their educators, whereby the ability to see and hear one another allows student and educator to engage in verbal and non-verbal communications (de Tantillo & Christopher, 2020).

It is interesting to speculate why students who experienced the blended learning approach recorded a mean lower score on engagement with instructors as previous evidence indicates that on-campus classroom settings actively encourage spontaneity and conversations that maintain motivation and exchanges between students and faculty (Keengwe & Wilsey, 2012; Pather et al., 2020). One factor may be the high proportion of first- and second-year students in the blended learning group who may lack the confidence to approach tutors and lecturers with questions, seek clarification, and request guidance. Senior students are more likely to have established rapport and effective student-lecturer relationships because of previous regular face-to-face interactions with academic staff and may have higher professional confidence and identity levels.

Despite reported low interactions with instructors in both groups, the encouraging scores recorded on instructor support represent a positive outcome. This indicates that the online learning student group, in particular, perceived academic and education staff as easily contactable, responding promptly to questions, providing feedback, and identifying areas of study that required further work. Interestingly, online students felt significantly more supported than blended education students who experienced face-to-face learning. This finding contrasts with previous studies of online programs in health professions education that associate minimal in-person contact time with difficulties forging supportive and collaborative relationships with instructors (Lalor et al., 2019; Rogers et al., 2011). However, it does align with research that advocates using innovative and flexible technologies such as video lectures, web conferences and discussion boards, and other online tools to maintain effective student learning and facilitate positive performance outcomes (Jensen & Lally, 2018; McCutcheon et al., 2015; Mu et al., 2014; Scagnoli et al., 2019).

The findings demonstrate the need for curricular innovation and transformation that support student-instructor interactions. One pedagogically sound technological platform that has improved connectivity between students and instructors is video tuition (Scagnoli et al., 2019). Further exploration of the effectiveness of formal and informal online platforms that foster active collaboration and build academic and emotional ties between students and faculty staff, which promote connectedness, supportiveness, and a sense of

belonging beyond the virtual classroom, is needed (Leigh et al., 2020).

4.2 | Cognitive problem solving and authenticity

The lockdown online learning group of students recorded statistically significant higher scores on measures of cognitive problem solving ($p = 0.001$) and authentic learning ($p = 0.004$) than blended learning student group who moved back to on-campus learning during Semester 2. The results indicate that students who switched to online-only tuition were more successful in deriving new interpretations and ideas from the knowledge they learned and applying greater levels of analysis, judgement, and new information. The online students also reported that they experienced a greater ability to apply real-world examples, case studies, and information in their assignments and learning. These are significant findings as they link with previous research on the role of interactive learning activities such as problem-based learning and active discussions in motivating and engaging students and enhancing learning outcomes (Redmond et al., 2020). They are also congruent with Dutta et al.'s (2021) research of nursing students during the pandemic and recommendations for the careful provision of relevant learning materials prior to and during online lectures to facilitate improved levels of content authenticity. For example, students describe using tests and multiple-choice questions, teaching at a steady pace, post-test discussions, and incorporating image and animation-based materials as effective strategies that lend authenticity during online learning (Dutta et al., 2021).

The findings support the view that virtual classrooms encourage student-centred pedagogies and suggest that virtual teaching can contribute effectively to undergraduate education in the health professions, leading to improved core competencies, professional knowledge, and overall learning (de Tantillo & Christopher, 2020; Guze, 2015; Pei & Wu, 2019). It also implies that students in the online group benefited from structuring learning where lectures were shorter and more direct and students could relisten to recorded lectures (Wallace et al., 2021). The findings align with evidence from medical education during the pandemic that found online formats provide students with the flexibility of learning and opportunities to focus on content without distractions (Dutta et al., 2021).

Previous research has identified that when a choice in self-directed learning environments are given, students take responsibility for their studies and rely less on instructors for prompting and motivation

(George-Walker & Keeffe, 2010). It is reported that students learning online have the advantages of controlling the pace of learning and having time to concentrate on challenging content, thereby enabling them to manage other personal commitments, develop effective learning styles, and apply higher order cognitive processes to their learning (de Tantillo & Christopher, 2020; George-Walker & Keeffe, 2010).

4.3 | Student interaction and peer collaboration

A strong statistically significant difference ($p = 0.001$) was observed on measures of students' interactions and collaboration. The online group reported higher levels of sharing, discussion, and collaboration with classmates, including active participation in group work. This is consistent with findings from elsewhere that support associations between well-structured synchronous real-time online lectures and the building of learning networks among students (Khalili, 2020).

In their study of nursing education during the COVID-19 pandemic, de Tantillo and Christopher (2020) reported that students formed their own study groups via social media platforms where opportunities for enhanced student interactions fostered camaraderie and increased engagement during periods of social distancing. Strategies such as the use of study buddies for written assignment co-reviews are known to maintain a sense of connection during online learning, providing social support and assisting the co-construction of professional knowledge (de Tantillo & Christopher, 2020; Khalili, 2020).

It is important to acknowledge that although some students have embraced the shift to online learning, for others, the experience has been characterised by time management issues, lack of motivation, discomfort in the absence of in-person human engagement, and challenges to interacting with peers and mentors (Carolan et al., 2020; Singal et al., 2021). Carolan et al. (2020) suggested many students are likely to experience uncertainties about course progression and completion in the months and years ahead. Therefore, it is imperative that faculty work towards achieving an optimum balance of individual student-centred learning versus collaborative learning to promote student interactions and engagement, with the aim of fostering a virtual community of practice that mitigates the effects of isolation (Regmi & Jones, 2020). The findings suggest that the considered implementation of technological innovations via online platforms, alongside traditional forms of face-to-face

learning, may afford students greater opportunities for more meaningful interactions with peers.

4.4 | Psychological motivation, personal relevance, enjoyment, and community support

Both sets of students recorded low scores on measures of psychological motivation and enjoyment. This is consistent with findings from studies of health professions students undertaking online learning during the pandemic and descriptions of suboptimal levels of mental health and morale in students' academic and social relationships (Bourke et al., 2021; Klasen et al., 2020). The rapid implementation of distance learning has also resulted in diminished student engagement with students describing themselves as unmotivated, disconnected, anxious, isolated, bored, and depressed (Bezerra, 2020; Gustafsson, 2020; Longhurst et al., 2020). In the current study, levels of psychological motivation ($p = 0.001$) and enjoyment ($p = 0.002$) were significantly higher in the online learning group. This suggests that the online learning environment was more effective in providing high levels of support and engagement than on-campus classroom learning. The finding aligns with the contention that online modalities encourage student-centredness and facilitate self-directed learning capabilities (Mukhtar et al., 2020). This finding could also suggest that the students in the online lockdown group did not have much else to do except study, whereas students in the non-lockdown blended learning group were able to engage in other activities outside their university studies that may have resulted in lower levels of engagement.

Despite the reported low levels of psychological motivation and enjoyment in the current study, blended learning students experienced significantly greater community support ($p = 0.001$). Having opportunities to talk to, interact, and socialise directly with friends possibly sustained students' sense of belonging and connection to the academic community. This highlights the importance of initiatives that consolidate community and group binding and maintain adequate levels of transactional presence between students engaged in e-learning (Croft et al., 2010; Longhurst et al., 2020). Group assignments, private- and team-chat messaging, and two- and multi-participant video 'hook-ups' have been cited as effective strategies for fostering camaraderie and engagement during periods of social distancing (de Tantillo & Christopher, 2020; Favale et al., 2020). Further recommendations include providing students with regularly updated information on the continuance of the academic

schedule and exams to offset anxieties about what lies ahead and minimising changes to teaching schedules to maintain a stable educational framework (Savitsky et al., 2020). Educators' monitoring of students' well-being and implementing emotion regulation strategies will also be key to fostering emotional resilience in students of the health professions (Carolan et al., 2020; Zhu et al., 2021).

Findings on measures of personal relevance and students' experiences of relating knowledge to life outside of the university setting provide valuable insights on the impact of the pandemic on occupational therapy students. The scores indicate that both groups of students experienced difficulties applying theoretical content outside of the classroom environment, pursuing areas of interest and relating program content to activities beyond the online or campus setting. Analysis found that students in the blended education group found this more difficult ($p = 0.001$). For both groups, the results reflect the cancellation of placements and changes to community activities during the pandemic that severely restricted opportunities for students to apply and test their theoretical knowledge and practical skills in real work contexts and clinical settings (Bourke et al., 2021). Therefore, online and on-campus students have been restricted in active participation in formal and informal academic, clinical, and social activities that in usual circumstances augment classroom teaching and university life. The findings stress the importance of providing learning activities and opportunities where students can apply the knowledge they have learned to real-life situations within hybrid or fully online programs in the health professions. Engaging students in investigations of personally and professionally relevant problems and scenarios have been shown to facilitate students' sense of personal relevance and real-world application of knowledge through enhancing critical thinking skills and engagement in learning activities (Martin & Bolliger, 2018).

4.5 | Learning management, active learning, and student autonomy

The statistically significant difference observed between groups on measures of learning management indicates that the online group were more proficient self-directed learners ($p = 0.009$). This is a useful finding as it suggests that online platforms may facilitate students' independent learning skills, improve their focus on content by removing environmental distractions, develop proficiencies in locating resources online, and enable time management. The outcomes are consistent with studies

of nursing students during COVID-19, in which the transition to remote learning prompted many students to enhance their resourcefulness and creativity by developing self-direction and forming independent study groups (Leigh et al., 2020; Wallace et al., 2021). Research indicates that online platforms encourage students to take an active and self-directed role in their learning by providing meaningful learning opportunities and controlling the direction and pace of learning (Belarmino & Bahle-Lampe, 2019; Doyle & Jacobs, 2013). For example, where program content is delivered via video links students value the space of independent learning and the facility to review lessons at their own pace (Scagnoli et al., 2019).

No statistically significant differences were observed between the online and blended learning groups on active learning and student autonomy measures. However, the scores recorded by both groups suggest that although students may not have enjoyed learning during the pandemic, autonomous learning capabilities were strengthened. For example, students were taking positive and active control of their learning by exploring their own strategies for learning, seeking their own answers, solving their own problems, and developing their personal learning style. This is consistent with evidence that associates flexible modes of educational instruction and ease of access to content with higher active learning and academic performance (Doyle & Jacobs, 2013; Scagnoli et al., 2019).

4.6 | Further research

Longitudinal research based on larger samples and a wider range of health professions students is recommended to improve the generalisability of the findings and generate new insights into students' learning experiences during the pandemic. Identifying further strengths and deficits in students' learning will also facilitate the provision of appropriate academic and social support initiatives. Research on students' mental health during the period of learning during the pandemic is also warranted to inform the provision of welfare initiatives that sustain and safeguard students' well-being. It is recommended that a mixed methods study be undertaken that combines quantitative data with qualitative focus group data examining students' attitudes to online learning environments. Finally, the role and influence of the educators when creating, delivering, facilitating, instructing, and moderating the learning experiences and activities to the online and on-campus blended learning student groups could be explored.

4.7 | Limitations

There are several acknowledged limitations associated with this study. The convenience sampling approach used for participant recruitment may have contributed to respondent bias and impacts the study findings' generalisability. Students' perceptions of online and on-campus blended learning were not assessed before the lockdown period for comparative purposes because the onset of the COVID-19 was unanticipated. It is also acknowledged that self-report instruments in research carry potential for biased reporting by participants. However, the SELES and DELES' documented validity and reliability data minimise the potential impact of self-report bias. Another limitation to take note of is the difference in the sample sizes of the two comparison groups of participants. There were 151 students in the online group and 57 in the blended education group.

5 | CONCLUSION

The COVID-19 crisis had a significant impact on the delivery of health professions education and is likely to be a catalyst for developing hybrid learning curricula in occupational therapy that blends online modes of instruction with traditional forms of education. Our study identified statistically significant differences across a range of scales measuring students' engagement with and experiences of learning between two groups of undergraduate students: one group who transitioned to online-only learning and another who returned to a blended education approach involving on-campus face-to-face learning sessions supplemented by online recorded lecture content. Determining significant differences between the groups extends our understanding of instructor support, student interactions and collaboration, problem-solving, personal relevance, and learning management. However, it is important to note that the scores registered by both groups indicate that the majority students, irrespective of learning mode, grappled with facets of the learning environment and did not find the learning process during COVID-19 enjoyable. Looking forwards, occupational therapy academic staff have the opportunity to incorporate insights on students' experience of learning during the pandemic in developing future online and on-campus modes of instruction.

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CONFLICT OF INTERESTS

Stephen Isbel is a member of AOTJ Editorial Board and co-author of this article.

AUTHOR CONTRIBUTIONS

T. B. researched the literature, applied for ethical approval, contributed to the development of the study design, and carried out the statistical analysis. All authors contributed to the methodology of the project, the statistical analysis plan, interpreted the data analysis results, and contributed to writing the manuscript as well as reviewing and editing the manuscript and approving the final version.

DATA AVAILABILITY STATEMENT

Data for this study is not available for distribution to third parties since institutional ethics committee approval was not received to be able to do this.

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