E-Learning Network Support Services: A Comparative Case Study of Australian and United States Universities

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Abstract—This research study examines the current state of support services for e-network practice in an Australian and an American university. It identifies information that will be of assistance to Australian and American universities to improve their existing online programs. The study investigated the two universities using a quantitative methodological approach. Participants were students, lecturers and admins of universities engaged with online courses and learning management systems. The support services for e-network practice variables, namely academic support services, administrative support and technical support, were investigated for e-practice. Evaluations of e-network support service and its sub factors were above average and excellent in both countries, although the American admins and lecturers tended to evaluate this factor higher than others did. Support practice was evaluated higher by all participants of an American university than by Australians. One explanation for the results may be that most suppliers of the Australian university e-learning system were from eastern Asian cultural backgrounds with a western networking support perspective about e-learning.

Keywords—Support services, e-network practice, Australian universities, United States universities.

I. INTRODUCTION

HIGHER education's embrace of e-learning as a vehicle to enhance teaching opportunities and improve learning outcomes is one of the strongest among developed countries in the globalization era. E-learning is defined as using ICT, computers and networks to support learners to improve their learning and educational processes [1]. Open universities and distance learning institutions offer students e-learning, using a diverse range of institutional policies to support the promised outcomes [2]. A large number of researchers have directed their attention to the field of e-learning practice and these studies provide a variety of frameworks put forward as best e-practice. The main aim of the frameworks is to improve the quality of online learning courses [3], [4].

The following comprehensive analytical framework for strategic practice at the level of university in order to support e-learning strategy development [5]:

➢ Six critical roles for leaders and managers of learning and teaching
1. Establishing a vision and direction for the development of learning and teaching;
2. Aligning stakeholders with this vision and direction;
3. Motivating and inspiring others to commit themselves to this vision and direction;
4. Planning and budgeting to support the changes required to realize the vision;
5. Organizing and administrating to ensure that the work required to effect the change can be efficiently and effectively transacted; and,
6. Monitoring and problem solving to ensure that efforts to realize the vision remain "on-track".

➢ Four specific contexts in which developments need to occur
1. Program/course/unit;
2. Faculty/school/department;
3. Institution; and,
4. Community/sector.

➢ Four critical domains of practice in which strategies must be developed and implemented
1. Curriculum development;
2. Admin development and support;
3. Student learning support; and,
4. Institutional enablers (infrastructure) for learning and teaching (organizational, physical and technological).

A help desk support service is an important practical strategy for more effective online programs and also it contributes to students' academic success. Offering a variety of student university support factors contributes to high course completion rates, and can include personalized access to administrative and program contacts, advisors and coaches; online and/ or on-campus orientations to online learning; a 24/7 technical support help desk; academic support and tutoring; as well as enabling students to support each other through online community websites, courses or student associations [6]-[9]. In fact, both learners and teachers need an academic or technical service and successful support in e-learning programs [7]. Academic, administrative and technical support services are the three main kinds of support, especially in the learning and teaching process and problem solving [10]-[16].

Technical support: An IT support service is an integral part of any successful online program for all learners, lecturers and providers [17]. In fact, for lecturer and student-related technical problems, a help desk, fast feedback and technical problem solving are the main items in this sub factor [5], [10]-[15], [18], [19].

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Administrative support: An understanding of e-learning program learners' needs in regard to administrative support was identified in the studies as important for student performance and retention [9]. In fact, the university system needs administrative services (such as financial, supplies, control, accountability system and resources) supporting all enquiries based on student priority.

Academic support services: The students of e-learning programs require academic and tutoring assistance to achieve effective and successful learning [9]. Academic support services with a special emphasis on e-Learning pedagogical and professional procedures are needed in the learning and teaching process rather than just technological support services [20]. According to studies, support is necessary for a successful learning and teaching process in an online environment.

II. METHOD

As shown in Table I, a total of 215 participants from an Australian and an American institute were recruited to take part in this research through an online invitation email asking for volunteers. Of the sample of 215, 99 participants were from an Australian institute and 116 participants were from an American institute [4].

TABLE I
DEMOGRAPHIC INFORMATION BASED ON COUNTRY

Country	Gender	N	Age (yrs)	N	Position	N	Experience	N
AUS	Female	59	20 to 30	57	Student	71	Blended and online	62
	Male	40	30 to 40	20	Lecturers	20	Fully online	37
	---	---	40 to 50	22	Admins	8	---	---
	Total				99			
USA	Female	70	20 to 30	42	Student	78	Blended and online	93
	Male	46	30 to 40	48	Lecturers	25	Fully online	23
	---	---	40 to 50	26	Admins	13	---	---
	Total				116			
All Total					215			

TABLE II
SUB FACTORS, ITEMS AND QUESTIONS OF SUPPORT SERVICE E-NETWORK PRACTICE

Sub Factors		Questions
Administrative support services	Control and accountability system	34
Technical support services	Helpdesk support	29
Academic support services	Academic administration support	14

The primary independent variables in this research were the positions of participants. The dependent variable was e-network support services.

The instrument used was a questionnaire self-constructed by the researcher. Exploratory factor analysis was applied to test the validity of the constructed questionnaire. The results of the EFA showed that the Kaiser-Meyer-Olkin measure of sampling adequacy was equal to 0.84; this value is above the recommended value of 0.6. Also the results of Bartlett's Test of Sphericity were significant ($\chi 2$ (903) = 3955.92, p = 0.000). The communalities of items were above 0.4. Indeed, factor analysis was conducted with all items.

Participants answered each question using the Likert scale (1 = Extremely Poor, 2= Poor, 3= Average, 4= Good, 5= Excellent). It is worth mentioning that three versions of the instructional design e-practice questionnaire were presented to participants based on their positions. The factor of support services practice consists of three sub factors and is elicited by three questions: administrative support services, technical support services and academic support services [10]-[16], [4].

After obtaining ethical approval, the study was conducted by creating an e-questionnaire of support service of e-practice using Lime Survey software. The e-learning centers of each institute then sent the link of the survey to those lecturers, admins and students who were engaged with online courses. The participants responded to the questionnaire voluntarily.

III. RESULTS OF THE CURRENT STATUS OF E-NETWORK SUPPORT SERVICES

This factor was evaluated by three sub factors namely administrative support, technical support and academic support. The results based on participants' assessment are reported in this section. First, the result of the Australian sample and then the result of the American sample is presented, followed by the comparative results of the Australians and Americans.

Administrative Support: Table III reports the means and standard deviations of the administrative support sub factor based on answers by academic participants of one faculty in an Australian university and one faculty in a US university. As can be seen in this table, in Australia the highest mean of the administrative support sub factor belonged to admins (M = 4.00, SD = 0.53). After them, the students reported the administrative support sub factor (M = 3.46, SD = 0.50), while the next highest and the lowest score was reported by lecturers (M = 3.30, SD = 0.47). To investigate if there are any differences on evaluation of this sub factor between students, lecturers and admins, ANOVA was applied. The results

showed that there was no significant effect of academic position on evaluation of the administrative support sub factor on Australian participants [F (2, 98) = 5.68, p = 0.005]. An LSD test showed that admins evaluated this sub factor significantly higher than students and lecturers. However,

students and lecturers evaluated this sub factor the same, believing administrative support was above average. However, Australian admins believed administrative support was excellent.

TABLE III
MEAN, SD, AND F VALUE OF EVALUATION OF ADMINISTRATIVE SUPPORT

Country	Students		Lecturers		Admins		F	P
	M	SD	M	SD	M	SD		
AUS Participants	3.46	0.50	3.30	0.47	4.00	0.53	5.68	0.005**
USA Participants	3.55	0.57	3.39	0.47	4.15	0.37	9.06	0.00***

**p<0.01, ***p<0.001

TABLE IV
MEAN, SD, AND F VALUE OF EVALUATION OF TECHNICAL SUPPORT

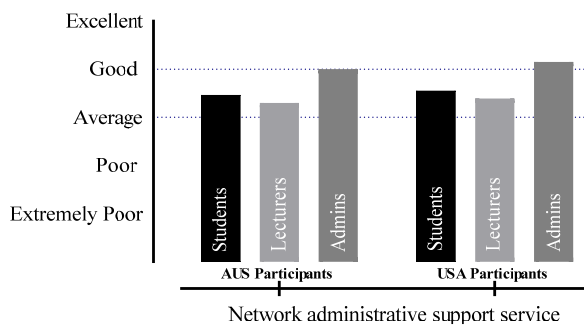| Country	Students		Lecturers		Admins		F	P
	M	SD	M	SD	M	SD		
AUS Participants	2.64	0.56	3.50	0.94	3.37	0.51	15.74	0.00***
USA Participants	3.15	0.62	4.13	0.72	4.07	0.64	27.92	0.00***

***p<0.001

Fig. 1 Mean level of Network administrative support service

In one faculty in a US university, as can be seen in this table, the highest mean of responses evaluating the administrative support sub factor belonged to admins (M = 4.15, SD = 0.37). After them, students assessed this factor next highest (M = 3.55, SD = 0.57) and the lowest score was reported by the lecturers (M = 3.39, SD = 0.47). To investigate if there are any differences in evaluation of this sub factor between American students, lecturers and admins, ANOVA was applied. The results showed that academic position had a significant effect on evaluation of the administrative support sub factor by participants of one faculty in a US university [F (2, 115) = 9.06, p = 0.00]. An LSD test showed that admins evaluated this sub factor significantly higher than students and lecturers. However, students and lecturers evaluated this sub factor the same, believing administrative support was above average, while American admins assessed administrative support as excellent.

Comparing the answers of participants of both countries showed that there were no significant differences in the evaluation of the administrative support sub factor between Australian and American admins [F (1, 20) = 0.60, p = 0.44]. The results of ANOVA also revealed that there was no significant difference in evaluation of this sub factor between Australian and American lecturers [F (1, 44) = 0.43, p = 0.51],

and no significant difference in evaluation of the sub factor between Australian and American students [F (1, 148) = 0.95, p = 0.33]. As shown Fig. 1, in both countries students and lecturers believed administrative support was above average, whereas both Australian and American admins believed administrative support was excellent.

Technical Support: Table 4 reports the means and standard deviations of the technical support sub factor based on evaluations by the academic participants of one faculty in an Australian university and one faculty in a US university. As can be seen in this table, in Australia, the highest mean of the technical support sub factor belonged to lecturers (M = 3.50, SD = 0.94). After them, the admins reported the sub factor (M = 3.37, SD = 0.51) as high and the lowest score was reported by students (M = 2.64, SD = 0.56). To investigate if there are any differences in evaluation of the technical support sub factor between students, lecturers and admins, ANOVA was applied. The results showed that academic position did have a significant effect on evaluation of it by Australian participants [F (2, 98) = 15.74, p = 0.00]. An LSD test revealed that students evaluated this sub factor significantly lower than lecturers and admins. But the admins and lecturers evaluated this sub factor the same. The results showed that Australian lecturers and admins believed technical support to be above average. However, Australian students believed technical support was only at an average level.

In one faculty in a US university, as can be seen in this table, the highest mean of answers to the technical support sub factor belonged to lecturers (M = 4.13, SD = 0.72). After them, admins reported this factor next highest (M = 4.07, SD = 0.64) and the lowest score was reported by the students (M = 3.15, SD = 0.62). To investigate if there are any differences in evaluation of the technical support sub factor between American students, lecturers and admins, ANOVA was applied. The results showed that academic position had a significant effect on evaluation of this sub factor by American participants [F (2, 115) = 27.92, p = 0.00]. An LSD test

showed that students evaluated the sub factor significantly lower than lecturers and admins. There were no differences between the evaluations of lecturers and admins of the technical support sub factor; they both believed research technical support was at an excellent level, while the American students assessed technical support as only above average.

As shown in Fig. 2, comparing the answers of participants of both countries showed that there were significant differences in evaluation of the technical support sub factor between Australian and American admins [F (1, 20) = 6.82, p = 0.01] in that the Americans significantly evaluated this sub factor higher than Australians. Furthermore, the results of ANOVA revealed that there was significant difference in evaluation of this sub factor between Australian and American lecturers [F (1, 44) = 6.49, p = 0.01] in that the Americans evaluated this sub factor significantly higher than Australians. There was also significant difference in the evaluation of this sub factor between Australian and American students [F (1, 148) = 26.87, p = 0.00] in that American students evaluated the sub factor significantly higher than Australian students did. Looking at the results, Australian admins and lecturers as well as American students had the same assessment, namely that technical support practice was above average. However, Australian students believed technical support practice was only average, while American admins and lecturers believed that technical support practice was at an excellent level.

Academic Support: Table V reports the means and standard deviations of the academic support sub factor based on evaluation by the academic participants of one faculty in an

Australian university and one faculty in a US university. As can be seen in this table, in Australia the highest mean of the academic support sub factor belonged to admins (M = 4.00, SD = 0.53). After them, the students reported this sub factor (M = 3.09, SD = 0.58) as high and the lowest score was reported by lecturers (M = 3.00, SD = 0.72). To investigate if there are any differences in evaluation of the academic support sub factor between students, lecturers and admins, ANOVA was applied. The results showed that academic position had a significant effect on evaluation of this sub factor by Australian participants [F (2, 98) = 8.48, p = 0.00]. An LSD test showed that admins evaluated this sub factor significantly higher than students and lecturers. Lecturers and students both evaluated this sub factor as only above average. However, Australian admins believed academic support was excellent.
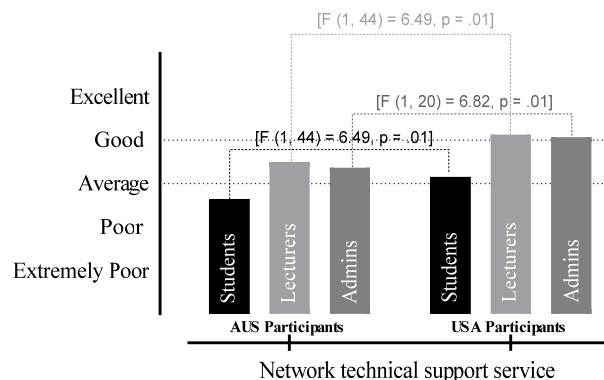

Fig. 2 Mean level of Network technical support service

TABLE V
MEAN, SD, AND F VALUE OF EVALUATION OF ACADEMIC SUPPORT

Country	Students		Lecturers		Admins		F	P
	M	SD	M	SD	M	SD		
AUS Participants	3.09	0.58	3.00	0.72	4.00	0.53	8.48	0.00***
USA Participants	3.25	0.54	3.44	0.56	4.30	0.48	20.93	0.00***

***p<0.001

In one faculty in a US university, as can be seen in this table, the highest mean of responses to the academic support sub factor belonged to admins (M = 4.30, SD = 0.48). After them, lecturers reported this factor next highest (M = 3.44, SD = 0.56) and the lowest score was reported by the students (M = 3.25, SD = 0.54). To investigate if there are any differences in evaluation of this sub factor between American students, lecturers and admins, ANOVA was applied. The results showed that academic position had a significant effect on evaluation of the academic support sub factor by American participants [F (2, 115) = 20.93, p = 0.00]. An LSD test showed that admins evaluated the sub factor significantly higher than lecturers and students who both believed academic support was only above average. On the other hand, the American admins assessed academic support to be at an excellent level.

Comparing the answers of participants in both countries showed that there were no significant differences in evaluation of the academic support sub factor between Australian and

American admins [F (1, 20) = 1.86, p = 0.18] but that there was significant difference in evaluation of this sub factor between Australian and American lecturers [F (1, 44) = 5.23, p = 0.02]; Americans evaluated this sub factor significantly higher than Australians. The ANOVA test showed that there was no significant difference in evaluation of this sub factor between Australian and American students [F (1, 148) = 2.88, p = 0.09]. As shown in Fig. 3, Australian participants and American participants in corresponding positions gave similar assessments, that is, students and lecturers in both countries believed academic support was above average, while admins in both countries believed academic support was excellent.

Support e-Practice: Table VI reports the means and standard deviations of the support e-practice factor based on the academic participants of one faculty in an Australian university and one faculty in a US university. As can be seen in this table, in Australia the highest mean of the support e-practice factor belonged to admins (M = 11.37, SD = 0.91). After them, the lecturers reported the support e-practice factor

(M = 9.80, SD = 1.47) as the highest and the lowest score was reported by students (M = 9.21, SD = 1.19). To investigate if there are any differences in evaluation of this factor between students, lecturers and admins, ANOVA was applied. The results showed (Fig. 4) that academic position had a significant effect on evaluation of the support e-practice factor by Australian participants [F (2, 98) = 11.71, p = 0.00]. An LSD test showed that admins evaluated this factor significantly higher than students and lecturers. However, students and lecturers evaluated this factor the same.
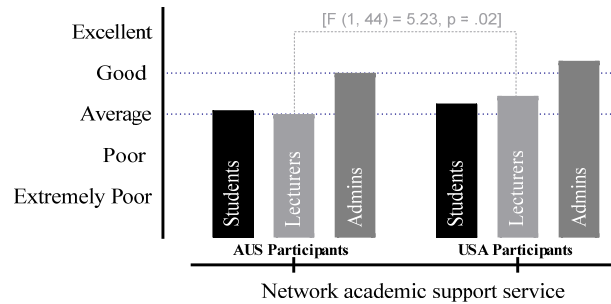

Fig. 3 Mean level of Network academic support service

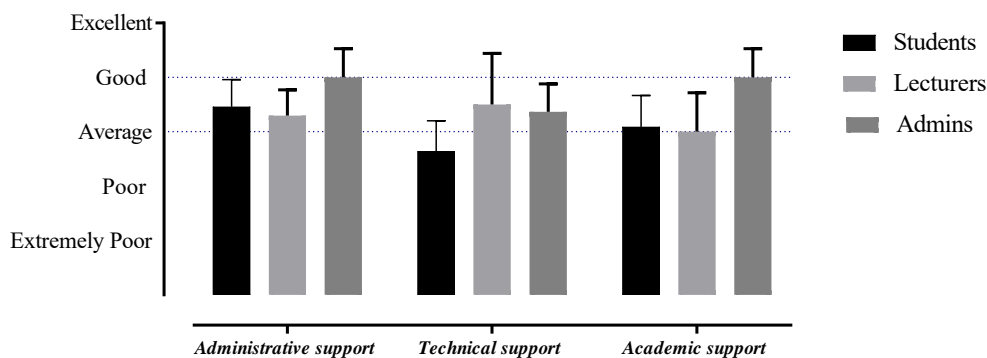**e-Network Support Services in an Australian Context**

Fig. 4 Mean level and SD of Network support service in an Australian context

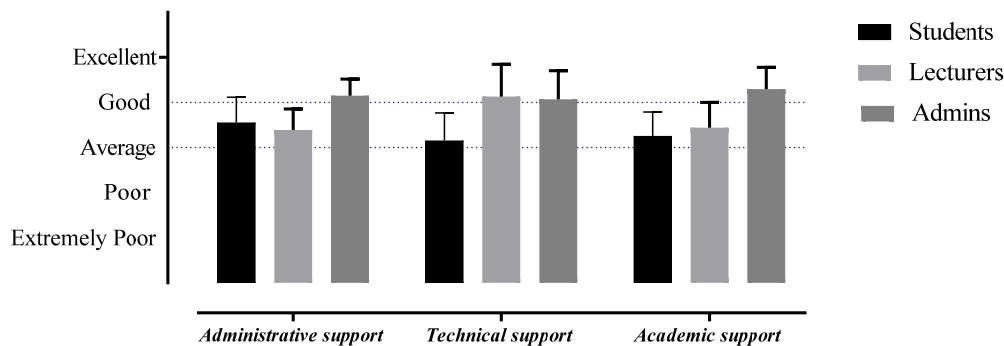**e-Network Support Services in a United States Context**

Fig. 5 Mean level and SD of Network support service in a United States context

In one faculty in a US university, as can be seen in Table VI, the highest mean of responses to the support e-practice factor belonged to admins (M = 12.53, SD = 0.77). After them, lecturers reported this factor next highest (M = 10.96, SD = 1.09) and the lowest score was reported by the students (M = 9.96, SD = 1.09). To investigate if there are any differences in evaluation of this factor between American students, lecturers and admins, ANOVA was applied. The results showed that academic position had a significant effect on evaluation of the support e-practice factor by American participants [F (2, 115) = 35. 82, p = 0.00]. An LSD test showed that admins evaluated it significantly higher than lecturers and students. Also, lecturers evaluated this factor significantly higher than students. The results showed (Fig. 5) that American students and lecturers believed support practice was above average. However, the admins believed support practice was excellent.

Comparing the answers of participants of one faculty in an Australian university and one faculty in a US university showed that there were significant differences in evaluation of the support e-practice factor between Australian and American admins [F (1, 20) = 9.71, p = 0.006]; Americans significantly evaluated it higher than Australians. Moreover, the results of ANOVA revealed that there was significant difference in

evaluation of this factor between Australian and American lecturers [F (1, 44) = 9.29, p = 0.004]; Americans significantly evaluated it higher than Australians. To continue, ANOVA test showed that there was significant difference in evaluation of this factor between Australian and American students [F (1, 148) = 16.01, p = 0.00]; American students evaluated it significantly higher than Australian students. Overall, comparing the results showed that students, lecturers and administrators of one faculty in an Australian university and students and lecturers of one faculty of an American university all had the same perspective, believing that support practice was above average. However, American admins believed support practice was excellent (see Fig. 5).

TABLE VI
MEAN, SD, AND F VALUE OF EVALUATION OF SUPPORT E-PRACTICE

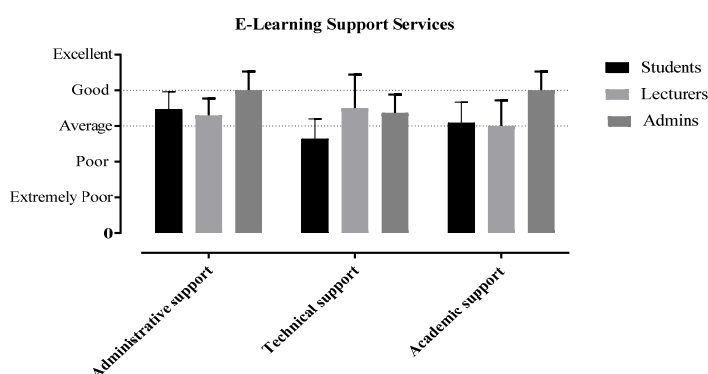| Country	Students		Lecturers		Admins		F	P
	M	SD	M	SD	M	SD		
AUS Participants	9.21	1.19	9.80	1.47	11.37	0.91	11.71	0.00***
USA Participants	9.96	1.09	10.96	1.09	12.53	0.77	35.82	0.00***

***p<0.001

Fig. 6 Mean level and SD of E-Learning Support Services

IV. CONCLUSION

The main aim of this study was to provide an understanding of support e-network practice in an Australian university and an American university. The support services of e-network practice variables explored were academic support, administrative support and technical support were investigated for practice. One possible explanation for the results may be that most suppliers of the Australian university e-learning system were from Asian cultural background with a western networking support perspective about e-learning. Evaluations of e-network support service and its sub factors were either above average or excellent in both countries, although the American admins and lecturers tended to evaluate this factor higher than others. Support practice was generally evaluated higher by all American participants than by Australians. The technical support sub factor was evaluated higher by American students, lecturers and admins. This sub factor is related to the factor of technological e-practice which was evaluated higher by Americans as well, so possibly this explains why this sub factor was evaluated higher by all American participants [4]. In addition, the academic support sub factor was also evaluated higher by American lecturers. These results imply that the level of support services for e-learning is higher in America. According to the Australian e-learning strategic plans 2016, the e-support goal, through a planned sequence of ICT projects, S-eLearning, is to achieve a single, integrated, enterprise-level virtual learning environment including the development of a 'virtual extended classroom' for every unit of study. The Open Learning Environment is planned to support self-directed on-demand access to a pool of learning resources for all students, as well as access to workshop-supported modular courses on topics of interest to students.

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