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Research Article

TPACK-SAMR digital literacy competence, technostress, and teaching performance: Correlational study among EFL lecturers

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ABSTRACT

This study aimed to scrutinize the correlation between English as a foreign language (EFL) lecturers' digital literacy competence (DLC) based on the TPACK-SAMR framework and their technostress. In addition, this study revealed how the variables correlated to the lecturers' EFL teaching performances. Therefore, a correlational design with a descriptive explanation model was conducted. The participants were six EFL lecturers from six different universities in various cities in East Java Province, Indonesia. The data were collected by administering TPACK-SAMR DLC and technostress questionnaires, conducting a semi-structured interview, and documenting the teaching scenarios. The results showed that most participants were more confident with their pedagogical knowledge and content knowledge. They claimed it was hard to mingle them into harmonious teaching performances with technology that challenged them to achieve the higher TPACK-SAMR DLC level. Relevant to this finding, their DLC had a negative 'very high' correlation with technostress, shown by -.824 Pearson correlation coefficient. Henceforth, their EFL teaching performances reflected the minimum operation of technology, according to SAMR stages, to mediate EFL teaching by substituting and augmenting the technology. Therefore, this study highlights the importance of DLC training to escalate the positive outcomes of EFL teaching with technology and minimize technostress.

Keywords: digital literacy competence, EFL, TPACK-SAMR, teaching performance, technostress

INTRODUCTION

Nowadays, the government and policymakers recognize the importance of technology in teaching and learning (Altinay et al., 2016), including in the English as a foreign language (EFL) teaching context. Technology can help lecturers speed up their educational process through faster access to educational resources, establish virtual teaching and learning, i.e., during the COVID-19 pandemic, and maintain communication and engagement during learning through various communication technologies (Keskin et al., 2015). Additionally, Hassan and Mirza (2021) state that the use of technology in teaching EFL generally positively impacts student learning outcomes, lecturer performance, and the development of students' affective domains. Moreover, digital literacy and competence have become needs for EFL lecturers to elevate their self-quality in the global competition in the industrial revolution 4.0 and 5.0 era (Ramadhan et al., 2019). Bahri et al. (2022) mention

that lecturers who possess digital technology literacy competence can affect their students' digital technology literacy and competence, which is required as capital for a future job competition. Therefore, digital technology literacy and competence, commonly understood as digital literacy competence (DLC), become pivotal aspects for EFL lecturers.

Some previous studies have discussed the role of lecturers' DLC in affecting the lecturers' teaching performance. Jalongo (2021) and Li and Yu (2022) explain that lecturers' professionalism has been influenced by their DLC level. Falloon (2020) mentions that EFL lecturers with sufficient DLC will easily prepare themselves for future teaching. They will have plans and strategies through digital technology to establish meaningful teaching for the students through the benefits of digital resources and information in safe and sustainable ways. Ting's (2015) study shows that the EFL lecturers' DLC is observable in the teaching scenario the lecturers managed. On the other hand, Sanchez-Cruzado (2021) explain that lecturers will hardly provide good online EFL teaching during a crisis or pandemic as they do not have enough DLC. From these studies, the EFL lecturers' DLC is comprehended to have a relationship with the lecturers' teaching performance in the classroom.

Scholars have introduced technology integration frameworks to support the EFL lecturers' DLC inhibition, i.e., TPACK, SAMR, RAT, Picrat, Wheels, and TIM. A comparative study by Cherner and Mitchell (2020) recommended TPACK and SAMR frameworks as guidance to integrate technology for teaching and evaluate it. They propose the two for some reasons: the aesthetic elements of frameworks, the compatibility with the lecturers' teaching needs, the popularity among technology integration researchers, and the widespread adoption to evaluate DLC. TPACK was developed by Mishra and Koehler (2006) as a framework to evaluate how three lecturers' teaching domains, namely technological knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK), interact with each other. The substitution, augmentation, modification, and redefinition (SAMR) framework evaluates the EFL lecturers' DLC hierarchically (Puentedura, 2014). So, the present study would employ the TPACK-SAMR frameworks to evaluate the EFL lecturers' DLC (Drugova et al., 2021).

The lecturers' DLC is not separable from integrating technology into EFL teaching. Nevertheless, teaching with technology can be challenging, especially for EFL lecturers who are not tech-savvy (Tang & Chaw, 2015). The EFL lecturers are diverse in teaching with technology experience, educational qualifications (Gabby et al., 2017), teaching context with different technology support (Ladyanna & Aslinda, 2020), and teaching focus where some concentrate more on content and pedagogy rather than attending technology to mediate teaching (Muslimin et al., 2022), and teaching habit, which hinders them from moving from their comfortable conventional teaching strategies (Smith et al., 2018). Therefore, some find themselves in a stressful situation because of the need to use technology for EFL teaching, popularly called technostress.

Kim and Lee (2021) define technostress as the inconvenient lecturers' psychology due to the obligation to employ technology for teaching. There are five triggering factors that the lecturers avoid teaching with technology: techno-overload or increasing workload due to the introduction of technology, techno-invasion or the blurred lines between social and professional life due to longer work hours and connectedness, techno-complexity or difficulties in following the rapid development of sophisticated technology, techno-insecurity or being afraid of human replacement by the machine, and techno-uncertainty or hesitating to keep which technologies are still relevant. Then, according to Hendartono and Widilestari (2022), techno-overload and techno-complexity become the most contributing factors to the EFL lecturers' technostress. Then, this stress negatively affects the EFL teaching performance. The lecturers tended to avoid using technology in teaching EFL (Setyadi et al., 2019) and rejected to join teachers' professional development (TPD) programs (Mailizar et al., 2022).

Reviewing the theories and studies in the preceding paragraphs, the study to correlate EFL lecturers' DLC and technostress, as well as discussing the correlations of DLC and technostress with their teaching performance, is scarce. Especially, to study the variables of the participants that are shared in different cities and institutional backgrounds. Therefore, the present study would scrutinize the following research problems:

1. Is there any correlation between EFL lecturers' DLC and their technostress?

2. What are the EFL lecturers' DLC and technostress correlations to their teaching performance in the classroom?

METHOD

Research Design

This study employed a quantitative approach with a correlational study design to investigate the correlations between two or more variables (Creswell, 2014). The purposes of this study were to scrutinize if there were significant correlations between EFL lecturers' DLC and their technostress, and to see the compatibility of the EFL lecturers' DLC and technostress with their EFL teaching performance in the classroom as being reflected by the EFL lecturers' applied teaching scenario in the classroom. The conceptual model of this study is depicted in **Figure 1**.

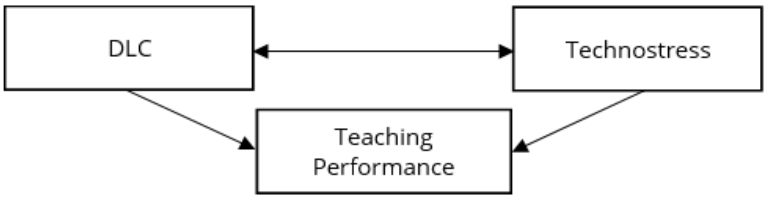

Figure 1. The conceptual model of the study (Source: Authors' own elaboration)

Participants

The participants of this study were six English lecturers (P1-P6) who are actively teaching at six different universities in Indonesia spread across six cities in East Java province, Indonesia, namely Malang (P1), Sidoarjo (P2), Surabaya (P3), Tulungagung (P4), Kediri (P5), and Jember (P6). The six universities consist of three public institutions and three private institutions. The selections of the research setting were based on some reasons. First, the cities are situated in East Java Province, Indonesia, where the province is the second biggest province with the second largest GDP in the country. According to Fauzan et al. (2022), this situation should correlate positively to the university's lecturers' DLC due to the knowledge transfer speed in modern areas. The higher the DLC, the study says, the lower the technostress. However, these assumptions should be investigated more as they were formulated in different research contexts. Then, to maintain the research ethics, the obtained data from the participants would be presented in verbatims, and the participants' identities would be stated in symbols (P1, P2, P3, P4, P5, and P6). According to the demographic data obtained, the participants had various English teaching experiences, as depicted in **Table 1**.

Table 1. Demographic of participants

Categories		Participants
Teaching experiences	4-6 years	1
	7-9 years	1
	10-13 years	1
	More than 13 years	3
Teaching subjects	ELT	4
	ESP	1
	Linguistics	1
Universities	Private	3 (P1-P3)
	Public	3 (P4-P6)

Data Collection and Analysis

The data collection techniques of this research were in the form of administering the lecturers' TPACK-SAMR DLC questionnaire, sharing the technostress questionnaire, and documenting participants' teaching scenarios, which the files were uploaded to researchers' Google Drive. The instruments used are DLC and technostress questionnaires, and documentation. The DLC questionnaire adopted from Drugova et al. (2021) comprised 20 items containing TK (three items), PK (two items), CK (two items), TPK (two items), TCK (two items), PCK (two items), TPACK (two items), and SAMR components (five items) statements. The technostress questionnaires. The technostress questionnaire was adapted from Tradaflar et al. (2019) by matching the

questionnaire items with the technostress' triggering factors (TTFs) theory by Kim and Lee (2021). The technostress questionnaire contained 20 items containing four statements in each TTFs.

The data analysis process was conducted through three steps:

(1) analyzing the participants' TPACK-SAMR DLC scores,

(2) analyzing the participants' technostress scores,

(3) doing statistical analysis using SPSS 23 to find the Pearson correlation score between lecturers' DLC and technostress,

(4) analyzing the lecturers' teaching performance seen from their applied EFL teaching scenario, and

(5) finding the correlations of the EFL lecturers' DLC and technostress with their teaching performance.

In order to comprehend the DLC and technostress levels, the average score obtained from DLC, and technostress questionnaire was converted with the leveling as presented in **Table 2**.

Table 2. The DLC and technostress categories

DLC Scores	DLC Categories
4.21-5.00	Very High
3.41-4.20	High
2.61-3.40	Moderate
1.81-2.60	Low
1.00-1.80	Very Low

Moreover, to see the strength of the correlation between the quantitative data, the correlational strength guidelines promoted by Meghanathan (2016) were applied, as seen in **Table 3**.

Table 3. The correlational strength guidelines (Meghanathan, 2016)

Value	Category
(+/-) 0.00-0.119	Very low
(+/-) 0.20-0.399	Low
(+/-) 0.40-0.599	Moderate
(+/-) 0.60-0.799	High
(+/-) 0.80-1.000	Very High

Then, the document analysis on the lectures' applied EFL teaching scenario was conducted to analyze the lecturers' teaching performance. The lecturers' technology integration practices were mapped based on the hierarchy of the SAMR framework. 'Substitution' was considered the lowest technology integration level, and 'Redefinition' was understood as the highest. The 'good' correlation was understood if the variables: lecturers' DLC, technostress, and teaching performance were in an 'appropriate' correlations according to scientific knowledge and understanding (Jalongo, 2021; Li & Yu, 2022; Setyadi et al., 2019). Then, the 'unique' correlation was comprehended if the variables violated the 'appropriate' correlation understanding, which meant further investigation to discuss it should be conducted.

FINDINGS

This study would like to scrutinize the correlation between EFL lecturers' DLC and their technostress and to see the compatibility of the EFL lecturers' DLC and technostress with their EFL teaching performance in the classroom. Therefore, the present study's findings would be exhibited following these objectives.

The Correlation Between EFL Lecturers' DLC and Their Technostress

The administration of DLC and technostress questionnaires to the participants gathered quantitative data as described in **Table 4**. **Table 4** shows that there were slightly different scores between the maximum scores of lecturers' DLC and technostress. However, the broader scores difference was shown by comparing the minimum scores of the variables. Then, the described scores indicated that some experience high technostress and high DLC, as seen from the DLC and technostress scale in **Table 3**.

Table 4. The description of the DLC and technostress data

	n	Minimum	Maximum	Mean	Standard deviation
Technostress	6	2.40	3.95	3.00	59.16080
DLC	6	2.85	3.90	3.46	45.01851
Valid n (listwise)	6				

The details of DLC questionnaire scores are presented in **Table 5**.

Table 5. The lecturers' TPACK-SAMR DLC

No	Items	Participants						AS
A	TK	P1	P2	P3	P4	P5	P6	
1	I know various technology to support EFL teaching.	4	3	4	2	4	3	3.33
2	I can apply various technology to support EFL teaching.	4	3	4	2	4	4	3.50
3	I can operate various technology tools (gadgets & any electronics) to support EFL teaching.	3	2	4	2	3	4	3.00
B	PK							
4	I know various teaching strategies for teaching EFL.	3	3	4	4	5	4	3.83
5	I can apply the teaching strategies to equip my EFL teaching.	4	3	3	4	4	4	3.67
C	CK							
6	I can comprehend materials before teaching.	5	3	4	4	5	4	4.17
7	I can be a good model for my students to exemplify teaching materials.	4	4	3	4	4	4	3.83
D	TPK							
8	I can select appropriate technology applications to support my teaching strategy.	4	4	3	3	4	4	3.67
9	I can apply appropriate technology tools to aid my teaching plan.	3	4	3	2	4	4	3.33
E	TCK							
10	I can select appropriate technology for teaching specific EFL teaching focus.	4	4	4	2	4	4	3.67
11	I can apply suitable technology tools to enhance students' understanding of EFL materials.	4	4	3	2	4	4	3.50
F	PCK							
12	I know how to integrate my content knowledge (teaching material comprehension) & teaching plan (pedagogical knowledge).	4	4	3	4	4	4	3.83
13	I can implement teaching plans, which are relevant to teaching materials.	4	3	3	4	4	4	3.67
G	TPACK							
14	I know technology applications (Mentimeter, Google Classroom, Wattpad, Kahoot, etc.) & convenient tools to support teaching strategies (jigsaw, discussion, etc.) for teaching EFL materials.	4	3	4	3	4	4	3.67
15	I can operate technology applications (Mentimeter, Google Classroom, Wattpad, Kahoot, etc.) & tools that are convenient to support a teaching strategy (jigsaw, discussion, etc.) for teaching EFL materials.	4	2	5	2	4	4	3.50
H	SAMR							
16	I know SAMR (substitution, augmentation, modification, & redefinition) technology integration in teaching framework.	4	3	3	3	3	3	3.17
17	I substitute conventional teaching materials with more digital/technology-based teaching materials (changing paper maps with e-map or mobile phone maps).	4	3	4	4	4	4	3.83
18	I augment technology used in teaching for more functional teaching practice in class (asking students to learn vocabulary from things in e-map or mobile phone maps).	4	3	3	3	3	4	3.33
19	I modify original function of digital tools or technologies into something or some practices that support my teaching (asking students to explain e-map or to describe any landmarks).	3	2	2	2	3	4	2.67
20	I redefine use of tools or technologies into more advanced functions & elaborate them with another means of technology or software (asking students to make a video presentation of an e-map & share it on YouTube).	3	1	1	1	4	3	2.17
Average scores		**3.80**	**3.05**	**3.35**	**2.85**	**3.90**	**3.85**	**3.47**

Note. AV: Average scores

Table 4 reveals that three participants admitted that they had a 'moderate' category of TPACK-SAMR DLC, and the other three were in the 'high' category. These findings explained that 50% of the participants doubted their digital literacy competence. The participants needed to be more confident in redefining technology for teaching EFL. It was shown by item number 20, the only item in the 'low' category. Finally, the overall lecturers' TPACK-SAMR DLC was in the 'high' category with an average score of 3.47.

Then, these DLC category results were not reflected similarly to the results of the technostress questionnaire administration (**Table 6**).

Table 6. The lecturers' technostress

No	Items	Participants						AS
A	Techno overhead	P1	P2	P3	P4	P5	P6	
1	Adopting novel technology takes so much time spent in context of teaching & learning aspect.	2	4	2	4	3	2	2.83
2	I felt stressed due to overload of e-resources in digital world. It leads to confusion about originality & genuineness of article.	2	3	1	4	2	2	2.33
3	I feel fatigued at the end of workday from using ICTs.	2	3	2	3	2	2	2.33
4	Technology makes busy time schedules in my academic life.	2	3	4	5	3	3	3.33
B	Techno invasion							
5	Technology may be main reason for reducing social interaction in the academic environment.	3	2	1	3	2	3	2.33
6	I feel isolated when I work with technological devices.	2	4	2	3	1	1	2.17
7	I am anxious that integrating digital tools may reduce students' research aptitude.	3	3	4	3	3	3	3.17
8	Academic profession is losing their values because technology integration promotes machinery's feelings.	2	4	3	4	2	3	3.00
C	Techno complexity							
9	Use of ICT tools makes teaching more complicated.	2	2	2	4	2	2	2.33
10	I had strained to adopt novel technological tools to my teaching & learning process.	2	4	1	5	3	3	3.00
11	I am uncomfortable utilizing advanced technology in my teaching and learning.	2	4	3	4	2	4	3.17
12	I am not confident about my technological competency.	2	5	3	5	4	4	3.83
D	Techno insecurity							
13	I fear because digital tools are more common in teaching & learning.	2	2	1	4	2	2	2.17
14	I am worried about safety & restiveness of my data in virtual environment.	3	3	3	4	2	4	3.17
15	I feel professional jealousy will arise by technological competency among colleagues.	5	5	4	5	5	4	4.67
16	I feel pressurized by my colleagues to work with new technology.	2	5	4	4	4	4	3.83
E	Techno uncertainty							
17	I think ICT development is too rapid, & some people in other countries have used something different.	3	4	4	5	3	4	3.83
18	I am afraid that technology I am learning will not be relevant tomorrow.	2	4	3	3	2	3	2.83
19	I am much dependent on the Internet in my educational process.	3	3	3	4	4	4	3.50
20	I am not sure technology should always be in class after COVID-19 pandemic.	2	2	2	3	2	2	2.17
Average scores		**2.40**	**3.45**	**2.60**	**3.95**	**2.65**	**2.95**	**3.00**

Note. AV: Average scores

Table 6 describes those two participants who experienced low technostress, the other two experienced moderate technostress, and the rest thought they had high technostress as they should integrate digital technology for teaching. Analyzing the questionnaire items, **Table 6** explains that four items (no. 12, 15, 16, 17, and 19) were in the 'high' category of technostress. The participants admitted that they were not confident with their technological competence, hardly followed the rapid development of digital technology, and their works lately were influenced a lot by the Internet. The participants' jealousy toward their colleague's better technology literacy competence also increased their technostress, and they felt pressurized when their colleagues were able to operate digital technology better. Considering the 'high' category of items in the questionnaire, the factors: techno-complexity, techno-insecurity, and techno-uncertainty contributed more to the participants' technostress.

To check whether the obtained data were normally distributed, a one-sample Kolmogorov-Smirnov test was conducted, with the results shown in **Table 7**. **Table 7** shows that the obtained data have been normally distributed. It indicated that further statistical calculation could be continued to find the correlation between lecturers' DLC and technostress. Hence, the statistical analysis to find the Pearson correlation scores from the lecturers' DLC and technostress were conducted, and the results were presented in **Table 8**.

Table 7. Test of normality result

		Technostress	DLC
n		6	6
Normal parameters[a,b]	Mean	3.000000	3.466667
	Standard deviation	0.591608	0.450185
Most extreme differences	Absolute	0.002230	0.002700
	Positive	0.002230	0.001680
	Negative	-0.001550	-0.002700
Test statistic		0.002230	0.002700
Asymptotic significance (2-tailed)		0.002000[c,d]	0.001940[c]

Note. [a]Test distribution is normal; [b]Calculated from data; [c]Lilliefors significance correction; & [d]Lower bound of true significance.

Table 8 describes the results of correlational statistical analysis to find the relationship between lecturers' DLC and technostress. The results proved that the lecturers' DLC was correlated negatively with the lecturers' technostress, as indicated by a Pearson correlation score of -.824. The score explains that the higher the lecturers' DLC score, the lower the lecturers' technostress, and vice versa. Reviewing the correlation strength, the correlation of the variables was in the 'very high' category (**Table 3**).

Table 8. Correlation between lecturers' DLC and technostress

		Technostress	DLC
Technostress	Pearson correlation	1	-.824*
	Significance (2-tailed)		.044
	n	6	6
DLC	Pearson correlation	-.824*	1
	Significance (2-tailed)	.044	
	n	6	6

Note. *Correlation is significant at the 0.05 level (2-tailed)

The Correlations of the EFL Lecturers' DLC and Technostress to Their Teaching Performance in the Classroom

To find the answer to the second study objective, the document analysis of the participants' teaching scenario was conducted. The analysis was done through the procedure explained in the research method. According to participants' documents, the participants' EFL teaching performances were mapped in **Table 9**.

Table 9. The implementation of lecturers' DLC in English classroom

P	Teaching Focus	Technologies	SAMR			
			Substitution	Augmentation	Modification	Redefinition
P1	Argumentative writing	Tutorial videos for argumentative essays	Substituting conventional argumentative sample with interactive argumentative video	Asking students to learn writing through an interactive video	Null	Null
P2	Speaking	Social media (Instagram), LMS, mobile recording applications	Substituting class with LMS	Asking students to record their speech using a mobile phone application (IG)	Using Instagram (IG) as a medium to showcase speech recording & share peer feedback	Null
P3	Recount & narrative writing	Nearpod, EduFlow, website, & Gform	Substituting class into "Nearpod, Eduflow Class" as LMS; substituting paper reflection with Gform format	Developing quiz in Nearpod; introducing narrative website in Nearpod	Creating an outline in Nearpod	Asking students to do peer feedback in EduFlow
P4	Syntax	WhatsApp, YouTube integration (WhY), Zoom, Google Meet, & Google Form	Substituting syntax explanation paper with audio & video explanation; substituting off-line class with virtual class through Zoom & Google Meet; substituting paperwork submission with e-file sent in WhatsApp	Directing students to learn syntax from audio & video shared in WhatsApp groups. Also, teacher shared a YouTube link containing a syntax explanation	Null	Null
P5	Feedback in writing	WA, LMS, GC, Screencast, & website	Substituting conventional feedback with tech-based one, replacing submission box with a GC box	Asking students to analyze sample of feedback delivery from teacher in GC	Creating feedback video 5-10 minutes using screencast	Null
P6	Writing	WhatsApp, online video, & Google Docs	Substituting paper quizzes with online quizzes; substituting class with WhatsApp group	Using videos shared on WhatsApp to make students learn vocabulary	Asking students to make compositions in Google Docs collaboratively	Null

Table 9 describes that only a participant had successfully redefined the technology for teaching. Three participants could achieve the 'modification' level, and the rest only step on the 'augmentation' level. Analyzing each of the participants' DLC, technostress, and EFL teaching performance correlations, the data from the three variables were presented in **Table 10**.

Table 10. The correlation of participants' data

Participants	University	DLC scores		Technostress scores		Teaching performance-based SAMR	Cities' GDP rank in East Java Province
P1	Private	3.80	3.40	2.40	2.82	Augmentation	Malang (6)
P2		3.05		3.45		Modification	Sidoarjo (2)
P3		3.35		2.60		Redefinition	Surabaya (1)
P4	Public	2.85	3.53	3.95	3.18	Augmentation	Tulungagung (16)
P5		3.90		2.65		Modification	Kediri (5)
P6		3.85		2.95		Modification	Jember (9)

Reviewing the data presented in **Table 10**, the data show that participants 3, 4, 5, and 6, or 67%, had 'good' correlations. The DLC scores, technostress scores, and the EFL teaching performance stage that the participants achieved were in good appropriateness (Jalongo, 2021; Li & Yu, 2022; Setyadi et al., 2019). For example, P4 obtained a 'low' DLC score with a 'high' technostress score. These scores led P4 to reach only augmenting the technology in EFL teaching. P4 was only able to add the function of digital technology, i.e., WhatsApp, as means of communication into a medium to share videos from an online resource. P4 had not yet been able to modify the function of WhatsApp to make the students produce something.

On the other hand, the 'unique' correlation appeared from participants number 1 and 2. P1 had 'high' DLC and 'low' technostress scores. However, P1's EFL teaching performance only reached the 'augmentation' level, while according to the correlation appropriateness (Jalongo, 2021; Li & Yu, 2022; Setyadi et al., 2019), P1 should perform better in teaching EFL by achieving better stage according to SAMR technology integration

framework. Another 'unique' data (**Table 10**), P2 had 'high' technostress and 'moderate' DLC. Nevertheless, P2 successfully modify digital technology to aid P2's EFL teaching performance. Reviewing the existing 'unique' results, further discussions by considering some possible factors should be conducted.

Due to the participants' demographic varieties, the present research's findings also tried to compare the participants' DLC, technostress, and teaching performance from the angles of university types and the cities' GDP ranks (**Table 10**). Half of the participants teach in private universities, and the other half in public universities. Considering these contexts, the findings highlight some points. First, the average score of participants' DLC working in private universities was lower than those in public universities. However, the difference was not too significant or only 0.13. Moreover, the participants working in private universities average score slightly closer to the 'high' level (**Table 3**), meaning that their DLC level was not significantly different from those teaching in public universities. Second, both the participants teaching in private or public universities achieved a 'moderate' level of technostress. Nevertheless, counting their technostress average score, the participants from private universities attained lower technostress scores. Third, one participant from the private university successfully achieved 'redefinition' level while no one was in the public university.

Describing data from the angle of GDP rank of the cities in East Java Province, Indonesia (BPS Jawa Timur, 2022), where the university of the participants are teaching, this research exposed some findings (**Table 10**).

First, P3, coming from the city in GDP rank 1, successfully achieved the highest level of DLC ('redefinition' level), and the participant who is teaching in rank 16 of GDP city reached the 'Augmentation' level. Second, the participants' DLC and technostress scores were in reverse between those teaching in the highest GDP rank city and those teaching in the city with rank 16. Third, the 'unique' findings were also found in P1 and P2. P1 teaches in Malang City (rank 6), but P1 could not maximize the teaching performance to a higher SAMR level. Surprisingly, according to P1's self-assessment on the DLC level, P1's DLC score was higher than P3, teaching in a city with the highest GDP rank. Then, P2, who are teaching in the city with a higher GDP rank than P1, performed better in teaching performance but possessed a lower DLC level. Seeing some 'unique' findings, henceforth, to discuss the present research variables not only from the correlational scores' angles but also from the views of university's types and cities' GDP rank was worth conducting.

DISCUSSION

The discussion of this study would be presented following the orders of the findings. Therefore, the correlation between lecturers' DLC and technostress would be discussed earlier than their correlation with the lecturers' EFL teaching performance.

The Correlation Between EFL Lecturers' DLC and Their Technostress

DLC deals with implementing digital technology to aid human life, including EFL teaching and learning (Bahri et al., 2022; Ramadhan et al., 2019). Due to the benefits that are served by the use of digital technology, educators in various institutions can apply it in order to develop more meaningful teaching (Drugova et al., 2021). At the university level, EFL lecturers with DLC could maintain students' learning engagement by developing interesting teaching media (Hassan & Mirza, 2021), attending realia through EFL learning interaction with artificial intelligence, providing numerous language sources samples online, and establishing EFL distance learning during the problematic situation, i.e., COVID-19 pandemic (Keskin et al., 2015). Therefore, digital technology literacy and competence can be positive capital for EFL lecturers to scaffold boundaries in future teaching (Falloon, 2020).

According to the lecturers' TPACK-SAMR DLC finding, the participants were situated in the 'high' category of DLC. However, reviewing the items of the DLC questionnaire, the participants had lower TK scores compared to their CK and PK. This finding was supported by Muslimin et al.'s (2022) study showing that most EFL pre-service teachers in Indonesia gain more CK and PK than TK. Similarly, their TPK and TCK, the two intersected domains, had lower average scores than the participants' PCK. Li et al.'s (2022) study stated that EFL teachers found it difficult to mingle technology with their PK and CK. Their study suggested that the institution should conduct an ICT training course for the lower TPACK score achievers. Moreover, the more sophisticated the digital technology functioning (according to SAMR stages), the lower the participants' DLC scores (Muktiarni, 2021). These data revealed that the total average participants' DLC score reached very close

to 'moderate' DLC score, meaning that the participant DLC was mainly supported by the participants' ability to comprehend the materials and apply manageable teaching strategies in an EFL classroom rather than empowered by the participants' digital technology literacy and competence.

Reviewing the previous studies regarding factors affecting the lecturers' DLC (Hendartono & Widilestari, 2022; Setyadi et al., 2019), the existence of technostress could contribute to lecturers' avoidance of employing digital technology for EFL teaching (Khlaif et al., 2022). The results of this study showcase that three technostress factors: techno-complexity, techno-insecurity, and techno-uncertainty, contributed more to the participants' technostress. The most influential technostress components were their lack of digital technology confidence, difficulties in following rapid digital technology changes, dependency on the internet, pressure on colleagues' digital technology ability, and professional jealousy. However, in other studies, Farmania et al. (2020) techno-overload became the most influential factor in technostress during work-from-home (WFH), Hendartono and Widilestari's (2022) study said that only techno-complexity that triggers the teachers' exhaustions, and Setyadi et al. (2019) found that techno-complexity and techno-uncertainty contributed more to the lecturers' technostress. So, the present study enriches ideas that different study contexts could provide different findings, which can be further investigated later. Comparing the technostress item score, the participants' professional jealousy became the most contributing technostress factor, with a score of 4.67. Some studies said professional jealousy could increase participants' motivation (Chung & Harris, 2018; Ven, 2022). However, the higher the jealousy, which triggers negative acts, i.e., being mad, insulting, or even aiming to make colleagues to be fired from the job, can influence the productivity of an institution.

Comparing the lecturers' DLC and technostress scores, the overall score of lecturers' DLC (3.47 or 0.07 higher than the 'moderate' category scores=2.60-3.40) (**Table 5**) had very close result with the participants' technostress score (3.00). These scores indicated that both variables had a very close relationship where both had not gone to very different categories (i.e., 'moderate' vs. 'very high,' 'low' vs. 'high'). This fact supports the research findings on the correlations of lecturers' DLC and technostress, as shown by a 'very high' correlation with a -.824 Pearson correlation score. Lee (2021) stated that technostress is negatively related to digital technology literacy and competence, including fintech.

This study synthesizes some points by discussing the strong relationship between lecturers' DLC and technostress. First, the technostress can be a factor that influences lecturers' DLC, which also connects to the EFL teaching professionalism in the classroom (Kim & Lee, 2021; Tarafdar et al., 2015). Minimizing the lecturers' technostress can trigger their intention to develop their DLC (Golz et al., 2021; Mailizar et al., 2022), which has been a prerequisite to being educators in the industrial revolution era and 21st-century education trend (Iskandar et al., 2022; Ramadhan et al., 2019). Second, the role of the university to establish a professional development program can be an alternative to increasing lecturers' DLC, can help the lecturers to follow the latest digital technology to support their teaching, and can educate lecturers to know better the digital technology, which is appropriate for their specific teaching purpose to avoid their digital technology learning uncertainty (Drugova et al., 2021). Moreover, this institution's attempt can elevate the lecturers' digital technology literacy competence and educate the lecturers about digital technology security (Fouad, 2021). Third, the EFL lecturers' professional knowledge (TK, PK, and CK) and technology teaching practices that appeared in SAMR are tuned by the lecturers' psychological factor (i.e., technostress) (Kim & Lee, 2021). However, further investigations on factors affecting EFL lecturers' DLC can contribute more to this understanding theoretically and practically.

The Correlations of the EFL Lecturers' DLC and Technostress to Their Teaching Performance in the Classroom

Discussing the second research problem, the findings unveiled two interesting points. First, the relationship of variables: the EFL lecturers' DLC, technostress, and teaching performance were appropriate (Jalongo, 2021; Li & Yu, 2022; Setyadi et al., 2019). Second, two participants showed 'unique' results since the participants' DLC, technostress, and teaching performance data needed to be in an appropriate relationship. Then, these findings led to a more interesting discussion, which triggered researchers to conduct a semi-structured interview to confirm them (P1 and P2).

Most participants (67%) successfully reflected their DLC and technostress appropriately to their EFL teaching performance (Jalongo, 2021; Li & Yu, 2022). The participant with 'low' DLC could teach only EFL with technology until the 'augmentation' stage (**Table 10**). This participant's technostress was 'high,' which psychologically could contribute to the lower EFL teaching performance. On the other hand, the participants with higher DLC categories could modify or even redefine the digital technology to support their EFL teaching. According to the findings, they also had 'low' and 'moderate' technostress categories. Manageable stress can help EFL lecturers gain better academic and performance potential (Khan et al., 2012; Mailizar et al., 2022; Tarafdar et al., 2015). The EFL lecturers do not have barriers to stop them from learning and keep practicing. Moreover, their motivation to gain better DLC can increase if they know the benefits of integrating digital technology into their professional teaching (Antonietti et al., 2022).

The 'unique' results were shown by participants 1 and 2, where the findings on DLC and technostress investigations did not truly match the stages of their EFL teaching performance according to the SAMR technology integration framework. Therefore, the semi-structured interview to confirm these findings was conducted with P1 and P2. The interview did not aim to confirm all aspects questioned in TPACK-SAMR DLC and technostress questionnaires. Nevertheless, the interview focused on participants' self-reflection after observing the results of this study's findings. Then, the answers as confirmation were obtained.

P1 admitted that he could not achieve higher SAMR stages due to the limited facilities provided by the university at the time he developed his EFL teaching scenario (**Table 10**) (Baharuddin, 2021; Ladyanna & Aslinda, 2020). The university's internet connection was unstable, which made P1 found difficult to 'modify' the technology for maintaining interactive discussion and feedback sharing between him with the students or between students and students. The university also did not have a specific learning management system (LMS) applied, which could be a medium to establish digital teaching. Moreover, some of his students were not tech-savvy and needed compatible gadgets to access more sophisticated digital resources (Gaby et al., 2017; Tang & Chaw, 2015). If he forced his students to use more sophisticated digital technology, he was afraid that the insufficient technological facilities and students' DLC would come to be teaching obstacles. Nevertheless, P1 considered himself as 'good' in DLC and had 'low' technostress. It was because he joined many seminars and workshops on using digital technology for EFL teaching (Apriliyanti, 2020; Mailizar et al., 2022), and he was interested in any technology sophistication (Tang & Chaw, 2015). So, this information confirmed that P1's 'unique' variables relationship appeared because the participant realized the difference between his DLC and technostress with the actual situation of his teaching environment. He adjusted his capacities to meet the students' and the university's conditions to avoid problems in achieving his teaching objectives (Nadia, 2020).

P2, who focused on teaching speaking, found it easier to 'modify' the digital technology function due to the development of social media (i.e., Instagram). She believed that employing social media, which had been popular among her students, could increase the students' learning interest and maintain students' interaction (Hassan & Mirza, 2021) by giving reactions and feedback towards friends' speaking products. To see the 'unique' study results, she admitted that she adapted the flows of her teaching scenario to the teaching plan that she learned from her colleagues. She heard that her colleague's teaching speaking practice was successful, and she would try similar steps but with different digital technology to her class. However, according to her self-assessment responses on DLC and technostress, she agreed that she knew some digital technologies but sometimes hesitated to the suitable functions to equip her teachings. Therefore, she felt pressured when she knew her colleagues could teach with technology because she needed more confidence with her DLC (**Table 6**). Hence, P2's responses unveil the suggestion that peer discussion (between colleagues) after teaching practices in an EFL classroom can be a medium to increase the lecturers' professionalism (Sadeghi & Richards, 2021).

Discussing the correlations from the angles of the participants' university types, the research variables: the participants' DLC, technostress, and teaching performance, were not affected differently. Reflecting on the interview results of P1, the influential factors from the university were the availability of the technological facilities (Ladyanna & Aslinda, 2020), interest in the use of technology (Tang & Chaw, 2015), and the students' capability to follow their lecturer's instructional plan to employ technology in EFL classroom (Nadia, 2020). Similarly, P2 mentioned that a supportive working environment through the openness of colleagues to share best teaching practices and any other problem-solving sharing medium could enhance the participants'

professionalism (Baharuddin, 2021). So, the participants' self-motivation to elevate their self-qualification (including DLC), to minimize teaching obstacles (i.e., encountering technostress), and to solve the teaching problems in the classroom were more contributive to their professionalism than their affiliation types.

The GDP rank of the cities where the participants are teaching reflected the success of some participants in performing better EFL teaching by achieving a better DLC score and a higher level of teaching performance according to the SAMR framework (**Table 10**). The supportive economic condition of the city could leverage the educational quality, including affecting the lecturers' professionalism and maintaining the availability of educational facilities. The funding support from the city governments could support the establishment of more TPD programs (Apostu et al., 2022) and could attend more beneficial educational technologies to support the teaching-learning process (Jamison & Jansen, 2001). However, the cities' GDP impacts would be tangible to the participants if they could benefit from the betterment due to the funding support for education and possessed self-willingness to leverage their professionalism (Apriliyanti, 2020; Tang & Chaw, 2015). Therefore, the 'unique' correlation among the variables in this research could be a lesson learned that the lecturers should always be adaptive and open to the development of science and technology.

Reviewing the discussions on correlations results confirmed by the participants' responses in the interview, this study promotes some ideas. First, to see the empirical evidence of the EFL lecturers' DLC and technostress' reflection on the lecturers' teaching performance, the collection of more data from many teaching performances is needed. However, the EFL lecturers commonly develop their teaching scenario according to their literacy and competence (Pratiwi et al., 2020). Second, the use of digital technology for EFL teaching should be measured not only from the psychological point of view but also from the existing facilities (Arifin, 2017). Therefore, combining technostress analysis with the intention to teach with technology analysis would complete the understanding of the EFL teaching performance with technology. Third, the EFL lecturers' DLC sometimes reconsidered applying their whole DLC due to their teaching context deficiencies (Nadia, 2020). Fourth, the university types and the city's GDP rank do not directly impact the lecturers' DLC, technostress, and teaching performance. However, to get a deeper understanding of the two factors influencing the studied research variables, a more comprehensive analysis, including how the university manages their lecturers' professionalism as the results of the cities' GDP and more participants with more data gathering techniques, are required. So, the present study opens expansive views to discuss a similar topic from different angles for future research.

CONCLUSION

The present study draws two conclusions following the objectives of the study. First, the EFL lecturers' DLC was correlated negatively with the lecturers' technostress. Both had 'very high' correlation strength, as shown by a -.824 Pearson correlation score. Second, most participants performed EFL teaching with 'good' appropriateness to their DLC and technostress scores. However, the 'unique' correlations among EFL lecturers' DLC, technostress, and teaching performance appeared due to participants' initiatives to adjust themselves to the teaching context and their attempt to gain better EFL teaching outcomes through adapting the teaching scenario from colleagues. Therefore, this study provides both theoretical and practical implications.

This study enriches the academician's comprehension of TPACK-SAMR DLC and technostress knowledge and their understanding of correlational study design. Practically, the present study allows adopting the EFL teaching scenario with digital technology integration. Also, it depicts practical flows of conducting similar research designs. However, this study proposes further investigation with more research participants and variables to comprehensively understand the factors affecting DLC, technostress, and EFL teaching performance. Also, inserting the individual participants' teaching contexts to scrutinize the obtained data would open a better understanding of the reasons behind them.

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