



## Article

# EFL Students' Experience in Distance Learning during COVID-19 from a Multidimensional Transactional Distance Perspective

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## A B S T R A C T

Emergence learning during the COVID-19 pandemic was a challenging experience for many learners possibly due to the physical and psychological distance. This distance conceptualized as a transactional distance according to Moore's theory is a critical issue in distance learning. Therefore, the present study attempted to (1) determine Saudi EFL students' levels of perceived transactional distance in distance learning, (2) measure the impact of the interaction of course structure, dialogue and learner autonomy on Saudi EFL students' perceived TD in distance learning during the COVID-19 pandemic (3) examine the effect of socio-demographic and environmental factors on their perceived transactional distance. By administering a multidimensional electronic (e-)survey to 189 students joining distance learning in a Saudi public university, the study provided evidence of learners' high levels of perceived dialogue, structure, and autonomy, along with low levels of perceived transactional distance. The correlation analyses showed that dialogue, structure, and learner autonomy significantly and inversely correlate with learners' transactional distance. The ANOVA analysis revealed that the interaction of dialogue and course structure significantly impacts the perceived transactional distance. Moreover, learners' levels of perceived transactional distance varied according to their socio-demographic and environmental factors, specifically age, gender, university discipline/major and number of online courses taken by them. The study provides useful pedagogical implications for technology use in sustaining learners' online learning experiences in terms of dialogue, structure and autonomy and in reducing their perceived transactional distance. Thus, the study is useful for promotion of the distance learning potentials in higher educational institutions.

## I. INTRODUCTION

Distance learning has emerged in responding to the need for students who would otherwise not be able to take part or join face-to-face (FTF) courses (Beldarrain, 2006). It has emerged in response to barriers, such as significant geographic barriers, time spent by students in traveling to campuses and limited learner-learner and learner-teacher interactions encountered by students prior to the development and integration of educational

learning technologies (Bolliger & Halupa, 2018). Online learning has overcome these barriers as recent educational technologies have provided students with an access to online learning courses regardless of geographical distance and time limits. Yet, students are challenged by their highly perceived disconnection to online courses and highly perceived lack of shared understanding and lack or limited interactions in online learning environments (Kehrwald, 2008; Muilenburg & Berge, 2005; Phirangee & Malec, 2017; Russo &

Campbell, 2004; Sher, 2009).

These challenges are often due to the physical and psychological distance experienced by students in online learning. This issue is known as transactional distance (TD) in Moore's (1993) TD theory. It is defined as "the psychological and communication space" between the learner and the teacher (Moore, 1993, p. 22). Based on Moore's (1993) theory, TD consists of three important interrelated dimensions: course structure, interaction and learner autonomy. Course structure refers to components, such as course design, including objectives, activities, assignments (Moore & Kearsley, 2005), instructional and evaluative procedures (Goel et al., 2012; Moore, 1991, 1993; Stein et al., 2005). Moreover, dialogue is defined to be inclusive of learner-learner and learner-teacher interaction (Benson & Samarawickrema, 2009; Chen & Willits, 1999; Huang et al., 2016; Kara, 2021; Moore & Kearsley, 2005). Learner autonomy refers to the degree to which learners manage and control their own learning in online environments (Huang et al., 2016; Moore, 1991, 1993). These previous studies have provided evidence on the inter-relationships among the three constructs of TD. A large volume of research had explored learners' perceived experience of TD in distance education from the TD theory (Benson & Samarawickrema, 2009) prior to the recent shift to online education during the COVID-19 outbreak. Yet, there are still some contradictions in the operationalization and findings of some earlier studies.

Given the complex nature of online learning, reducing the psychological gap requires effective course structures where learners are engaged in meaningful dialogue/interaction (Andrade & Bunker, 2009). However, due to the lack of preparedness, many well-resourced and under-resourced higher educational institutions were affected during the COVID-19 outbreak (Naidu, 2020, 2021a; 2021b). Specifically, this sudden shift to online education renewed the importance of the issue of the psychological separation among learners and even widened it. In other words, students' learning experience was severely affected by this sudden COVID-19-related transition to online worldwide (Naidu, 2021a), especially in fully online learning contexts as in the current study context of Kingdom of Saudi Arabia (KSA). During the COVID-19 outbreak, students were challenged

by their increasing feeling of the physical distance (Lassoued et al., 2020), lack of FTF interaction (Al-Mawee et al., 2021; Lassoued et al., 2020; Saeed, Alharbi & Yassin, 2021) and disconnection to online learning courses (Meulenbroeks, 2020). The issue of TD was exacerbated by other challenges and barriers, such as internet disconnection (Adedoyin & Soykan, 2020; Boardman et al., 2021), lack of adequate previous experience in online learning and facility support (Baggaley, 2020; Maphosa, 2021; Priyadarshini & Bhaumik, 2020) as well as lack of readiness and preparation to study online (Maphosa, 2021; Naidu, 2021a). This suggests a need for further investigation of TD issue in distance education from the TD theory during this critical period. Despite the more scholarly publications on distance learning during the COVID-19 pandemic, the largest proportion of these studies reported results elicited by means of surveys which are not designed on the TD theory (Mishra et al., 2021). Therefore, the present study aimed to: (1) determine Saudi EFL students' levels of perceived TD in distance learning, (2) measure the impact of the interaction of course structure, dialogue and learner autonomy on Saudi EFL students' perceived TD in distance learning during the COVID-19 pandemic, and (3) examine the effect of socio-demographic and environmental factors on their perceived TD. Specifically, the study attempted to address the following research questions:

1. What are the levels of perceived TD among Saudi EFL students in distance learning?
2. How do course structure, dialogue and learner autonomy impact Saudi EFL students' perceived TD in distance learning during the COVID-19 pandemic?
3. Does the TD experience of Saudi EFL students in distance learning vary according to their socio-demographic and environmental factors?

The current study is based on the TD theory introduced by Moore (1989, 1991) which emphasizes TD as a psychological and communication gap in teacher-learner relationships rather than a physical or geographical separation between teachers and learners (Goel et al., 2012, Xiao, 2024). The theory identifies three important constructs of the TD experience: structure, dialogue, and autonomy. Dialogue, in its initial definition, refers to teacher-learner interaction

(Moore, 1991, 1993), but later, it has been expanded to include learner-learner interactions (Benson & Samarawickrema, 2009; Chen & Willits, 1999; Huang et al., 2016; Kara, 2021; Moore & Kearsley, 1996). Structure, first known as “individualization”, is inclusive of the components that constitute up the course design, such as objectives, activities, assignments (Haslina & Lilimiwirdi, 2022; Moore & Kearsley, 1996; Xiao, 2024) as well as the instructional strategies in meeting learners’ needs and the relevant assessment methods (Goel et al., 2012; Moore, 1991, 1993; Stein et al., 2005). In other words, it is the extent to which the objectives, implementation and evaluation procedures appear flexible or rigid in accommodating individual learners’ needs in a particular online course (Moore, 1991, 1993; Stein et al., 2005). Moreover, learner autonomy refers to learners’ characteristics in controlling and managing their online learning (Moore, 1989). Unlike structure and dialogue that can be manipulated by teachers, learner autonomy is oriented towards learners’ self-directedness in learning (Huang et al., 2016; Moore, 1991, 1993). This construct includes planning of learning, finding learning resources and self-assessing of learning (Shearer & Park, 2019). Thus, the three constructs underlying the TD theory are learner-centred, and somehow indicate to the recent research shift from a behavioural and cognitive approach to a social-constructivist approach (Anderson & Dron, 2011; Stein et al., 2005).

Central to the TD theory is the dynamic interaction of the three above-mentioned constructs in determining learners’ perceived TD (Shearer & Park, 2019). The TD theory postulates that there is a relationship between structure and dialogue. The more rigid the course structure, the lower the dialogue and vice versa (Moore, 1993). This dialogue-structure interaction is important since it either increases or reduces learners’ perceived TD in distance learning (Saba & Shearer, 1994). In other words, as the course structure decreases, the dialogue increases, which consequently reduces learners’ levels of perceived TD (Huang et al., 2016; Moore, 1993; Saba & Shearer, 1994). However, this interaction is possibly to be affected by learners’ levels of autonomy since highly autonomous learners may not need increased dialogue in order to reduce their perceived TD (Huang et al., 2016; Moore, 1993; Saba & Shearer, 1994). In addition, dialogue and learner

autonomy are associated. The higher the TD, the higher the learner autonomy (Huang et al., 2016; Moore, 1993). Based on a recent comprehensive review of previous studies grounded on the TD theory, student-student interactions, student-teacher interactions, student-content interactions and student-interface interactions play a role in facilitating our comprehensive understanding of the TD theory and its significance in explaining TD in online learning (Achuthan et al., 2024).

Research on TD in distance learning has focused on learners’ perception of TD in relation to course structure, dialogue and learner autonomy. Some of these studies have determined learners’ levels of perceptions of TD (e.g., Huang et al., 2016; Kara, 2021). These studies reported contradictory results on learners’ perceived TD as the first study revealed high levels of TD whereas the latter study reported that students’ levels of TD were moderate.

There are other studies on the correlations of the TD constructs from the TD theory. According to Chen & Willits (1999), the highest correlation was found between the course structure and dialogue constructs. This result implies that the more rigid the course delivery is, the lower the dialogue will be. The second highest correlation was found between the dialogue and learner autonomy constructs. Moreover, Chen (2001) found a significant effect of dialogue on learners’ TD. This suggests that the higher the dialogue is, the lower learners’ perceived TD will be. Kuskis (2006) claimed learner-learner dialogue reduces TD. Furthermore, Stein et al. (2005) found that high levels of course structure and dialogue resulted into lower levels of TD. In some other studies (e.g., Demir Kaymak & Horzum, 2013; Horzum, 2017; Huang et al., 2016), dialogue was found to negatively correlate with the course structure. This result indicates that the higher the dialogue is, the lower the course structure will be. Similarly, dialogue and structure were found to have an inverse relationship (Dron et al., 2004).

According to Moore (2007), as learners’ autonomy increases, their perceived TD decreases. This means that these learners with high levels of autonomy may feel more comfortable in online learning courses and consequently, increase their TD (Reyes, 2013). Yet, in a few studies (Force, 2004; Vasiloudis et al., 2015), the relationship between learners’ perception of TD and autonomy was found very limited. Vasiloudis et al. (2015) attributed this limited relationship to some

probable reasons: (1) the psychometric autonomy (connectedness scale which was not designed for a specific educational and cultural context), (2) the alteration of the strength of TD and autonomy (relationship by the tutor) and (3) learners' learning styles.

Despite the interesting results of previous studies on learners' experience in distance learning from the TD perspective, in most of the above studies, TD has not been treated as a single continuum that ranges from low to high and that is influenced by the dialogue, structure and learner autonomy levels (Huang et al., 2016). Another gap in the literature is that some studies have focused on certain types of dialogue (e.g., learner-learner and learner-instructor) while ignoring learner-content and learner-interface dialogue. Regarding this, Hillman et al. (1994) argued that the efficiency of distance learning depends on learners' active involvement with technology itself. Otherwise, learners' failure to deal with a particular technology may hinder their active involvement in distance learning. In other words, it is through this type of dialogue that learners will be able to interact with peers, instructors and content. In the same manner, Xiao (2017) emphasized the role of learner-content dialogue in distance learning, especially in enhancing our understanding of how learners deal with and process the course materials so it should not be taken for granted when examining learners' TD in online learning. Although the author acknowledges the interdependent relationships and complimentary role of these interaction types in successful online learning experience, he emphasized the fundamental role of learner-content interaction in maintaining the other types of interaction. What is of more importance is the lack of research on how these four types of interaction are interdependent on each other.

Several studies have also examined the effect of socio-demographic and environmental factors on learners' perceived TD in online learning. Regarding the socio-demographic factors, such as age, gender, educational level and online learning experience have been the common factors in these studies. Results indicate that students' age was an important factor significantly affecting their perception of course structure and dialogue (Huang, 2002; Vasiloudis et al., 2015) as well as TD (Huang et al., 2016). As stated by Huang et al. (2016), significant differences in TD among the

age groups were attributable to the different levels of autonomy among these groups. In other words, learners aged 25 and older who appeared more autonomous demonstrated lower TD than those learners aging 24 and below. On the other hand, a few other studies reported insignificant impact of age on learners' perception of dialogue in online learning (Kara, 2021) and TD (Ekwunife-Orakwue & Teng, 2014).

Moreover, students' gender was found to be another socio-demographic factor with a significant influence on learners' perception of TD in distance education. For instance, Ekwunife-Orakwue and Teng (2014) found that learners' TD dialogue significantly differed between male and females as the male students reported lower scores on their perceived learner-interface dialogue than the females while the female students reported higher scores on their perceived learner-content dialogue than the males. Yet, some studies reported no significant differences in learners' perception of structure and dialogue according to their gender (Bolliger & Halupa, 2018; Horzum, 2015; Kara, 2021; Vasiloudis et al., 2015) and of TD (Huang et al., 2016).

For learners' previous experience, some studies identified significant differences in learners' perception of course structure and dialogue. For example, learners' previous of online learning experience and prior knowledge predicted their perceived TD since these two factors explained most of the variance of learners' TD (Huang, 2002). On the contrary, some studies found insignificant differences in learners' TD according to their previous experience in online learning (Chen, 2001; Kara, 2021; Vasiloudis et al., 2015). This result means that students' lack of or insufficient previous experience may not result into their psychological space in online learning courses (Chen, 2001).

As far as the environmental factors are concerned, previous studies have examined the effect of group/class size, number of online learning courses taken by students as well as communication modes on learners' perceived TD experience in online learning. For example, the increase in group size was found to be associated with an increase in learner-learner interaction and vice versa (Caspi et al., 2003). As reported by Huang (2002), the number of online courses taken by learners predicted their perceived TD since this factor explained most of

the variance of learners' TD. In addition, Huang et al. (2016) identified the communication mode (synchronous or asynchronous and text, audio or video) as an important environmental factor that influenced learners' TD in online learning courses. For instance, students who engaged in synchronous communication and live video and or audio chats reported lower TD than those counterparts who engaged in asynchronous communication and text chats in online courses. However, the same authors found insignificant differences in learners' TD in relation to class size.

In a recent study, Özbey and Kayri (2023) examined the factors affecting TD among university students in e-learning environments during the 2020–2021 academic year due to the Covid-19 pandemic. Using Artificial Neural Networks, specifically the Multilayer Perceptron (MLP) and Radial Based Functions (RBF) methods, this study modelled the factors influencing TD. Data were collected from 1,638 students (546 males, 1,092 females) using the TD Scale and the Social Anxiety Scale in E-Learning Environments. The MLP method was found to predict TD with higher accuracy than the RBF method. Key factors identified include the quickness of instructors' feedback, which was the most significant determinant of learners' TD in online learning. Additionally, students' social anxiety, level of student-teacher interaction, student-student interaction, and student-environment interaction were analysed. It was observed that higher social anxiety and lower interactions contributed to an increase in students' TD. The study revealed that TD is present in e-learning environments, similarly to traditional classroom settings, and that variables such as communication speed, anxiety levels, and various forms of interaction significantly influenced students' TD in e-learning. Since participants were drawn from diverse regions across Turkey, the results provided a generalizable insight into the factors affecting TD in online education.

## II. METHODS

### *Research Design*

The present study used a quantitative research design, specifically a descriptive and correlative research design. This design suits the purpose of the current study—measuring the levels of EFL students' TD and determining the effect of these three constructs: course structure, dialogue and

learner autonomy as well as socio-demographic and environmental factors on learners' TD in online learning during COVID-19.

### *Setting and Participants*

The current study's target population consists of university learners joining online learning courses at Qassim University (QU) in the KSA during the emergency COVID-19-related learning. Specifically, the study was conducted among university EFL students enrolled in the 2020-2021 academic year. The study used a convenience sampling strategy to collect the data from the sample. To achieve this, one of the researchers contacted a number of online instructors across the campus, explaining the purpose of the current study and seeking permission to administer the survey to the students joining their online courses at the end of the second semester of the 2020-2021 academic year. The online courses spanned a number of disciplines taught by a number of instructors falling under social sciences and humanities. The instructors distributed the link of the e-survey to their students who had to respond to its items electronically.

The survey was distributed to almost 312 EFL students joining these different courses. However, a total of 189 students completed the survey, resulting in a 60.58% return rate. As shown in Table 1, of the 189 participants, 74.6% (n = 141) were males and 25.4% (n = 48) were females. Approximately, 9% of the participating students (n. 17) were above 25 years old and 9.5% (n.18) of them were below 20 years old whereas the majority of them 81.5% (n = 154) were aged between 20 and 25 years old.

The methodology employed in this study was appropriate given the constraints imposed by the COVID-19 pandemic, which necessitated remote data collection due to restricted access to campus facilities. Convenience sampling enabled researchers to effectively reach the target population of QU EFL students involved in emergency online learning, providing valuable insights into their experiences during this unprecedented period. Although not fully representative of all students at the university, the sample captures a broad segment of the targeted group. Additionally, the high response rate (60.58%) enhances the reliability of the data, and the age demographics align with the study's focus on typical university EFL students. Overall, this approach meets both ethical and

practical standards, facilitating the collection of timely, relevant data under challenging pandemic-related conditions.

**Table 1. EFL Students' demographic information**

Variables	Grouping	N	%
Gender	Males	141	74.6%
	Females	48	25.4%
Age	Below 20	18	9.5%
	20-25	154	81.5%
	Above 25	17	9%
Discipline	English	81	43%
	Physics	34	18%
	Maths	33	17.4%
	Computers	41	21.6%
Course number	Less than five courses	20	10.6%
	Five courses	61	32.3%
	More than five courses	108	57.1%

### Data Collection

The data collection procedure of this study was carried out in several steps. The first step was constructing the research instrument. The research instrument was an online survey, the Learners' Transactional Distance Scale (LTDS), which was developed within the TD theory of the current study from (e.g., Huang et al. 2016). The LTDS was based on the operational definition of TD as inclusive of pedagogic distance, psychological distance, and communication distance, which may lead to misunderstandings between the teacher and the student in the online learning context (Moore, 1993). The survey is a 7-point Likert scale varying from strongly disagree to strongly agree. It consists of 103 items. Thus, the first dimension of the LTDS measure is the TD which consists of three sub-dimensions (Table 2), namely: closeness (13 items) shared understanding (eight items) and perceived learning (two items). The second dimension is dialogue which consists of learner-dialogue (12 items) and learner-instructor dialogue (13 items). The third dimension refers to the structure which consists of learner-content (25 items) and learner-interface (17 items). The last dimension of the LTDS is the learner autonomy which consists of independence of learning (seven items) and study habits (six items).

As reported by Huang et al. (2016), the Cronbach's alpha values for the different dimensions and components of the LTDS measure

range from 0.72 to 0.96, which indicates that there is a high internal consistency of the items within each component.

**Table 2. Dimensions and sub-dimensions of the LTDS measure**

Dimensions	Sub-dimensions	Number of items
TD	Closeness	13
	Shared understanding	8
	Perceived learning	2
Dialogue	Learner-learner	12
	Learner-instructor	13
Structure	Learner-content	25
	Learner-interface	17
Learner autonomy	Independence of learning	7
	Study habits	6

The second step was designing the LTDS survey in the form of a Google Form which was later shared with the course instructors to distribute it to their EFL students. The final step was contacting a number of online instructors, asking for permission to conduct a survey with their students. Then, those students were invited to participate in the study survey. An email invitation was sent to 312 students enrolled in online classes at the university. However, a total of 189 EFL students completed the survey.

### Data Analysis

Prior to the data analysis, negative items of the LTDS were reversed, and higher values corresponded to higher TD, higher dialogue, higher structure and higher learner autonomy. Moreover, we used an average of items to provide a measure of each construct. To address the first research question, we used a simple descriptive analysis including the mean values ( $M$ ) and standard deviations ( $SD$ ). To address the second research question, correlation analyses were employed in this study. In particular, a Pearson product-moment correlation coefficient analysis was performed for this purpose. We created a variable to indicate the four combinations of the dialogue and structure levels. For instance, an observation was classified as +D+S when both dialogue and structure scores were high. This was pursued to include the interactions of the LTDS measure variables/constructs. To address the third research question, analyses of variance were performed to test the perceived TD according to the various types of independent variables, especially gender, age, discipline, study level, previous

experience in online learning, course number, class size and access device.

### III. RESULTS

#### *What are the levels of perceived TD among Saudi EFL students in distance learning?*

EFL students' scores on the online learning experience scale were generally in the higher response range. As displayed in Table 3, the dialogue scores ranged from a low of 1.55 to a high of 5.00, with a mean value of 3.7787 (SD =.61283). In addition, the learners' perceptions of the course structure and autonomy are at high levels as indicated by the mean values. This result suggests that online learning seems highly dialogic and structured, and it is conducive to high learner autonomy. However, their perception of the TD is moderate, as the mean value of this construct falls in the moderate or neutral response range. This indicates that their perceived psychological gap in online learning is not high.

**Table 3. EFL students' perceptions of online learning experience**

Dimensions	Minimum	Maximum	M	SD
Dialogue	1.55	5.00	3.7787	.61283
Structure	1.44	5.00	3.8129	.85374
Learner autonomy	1.00	5.00	3.7781	.86817
TD	1.00	4.85	3.5951	.61894

#### *How do course structure, dialogue and learner autonomy impact Saudi EFL students' perceived TD in distance learning during the COVID-19 pandemic?*

Regarding the interaction of the dialogue, structure and learner autonomy and its impact on learners' perceptions of TD, Table 4 presents the results of the Pearson-moment correlation coefficients. As hypothesized in this study, dialogue and TD are negatively and significantly correlated. So this result supports the TD theory that the higher the dialogue is, the lower the TD will be. Furthermore, the results demonstrate a significant relationship between course structure and TD. This interesting result means that the higher the course structure is, the lower the perceived TD will be. A negative correlation was found between learner autonomy and TD, which implies that the more autonomous the online learners feel, the lower they perceive TD. Thus, this also strongly supported the TD theory.

**Table 4. Pearson-moment correlations among the TD constructs**

Hypothesized relationships	R	Sig. (2-tailed)
Dialogue-TD	-.447**	.000
Structure-TD	-.568**	.000
Learner autonomy-TD	-.539**	.000
Dialogue-structure	.640**	.000
Dialogue-autonomy	.532**	.000
Structure-autonomy	.758**	.000

\* $p < 0.001$ . \*. Correlation is significant at the 0.01 level (2-tailed).

In this study, since the interactions of both dialogue and course structure are hypothesized to be necessary for reducing learners' perceived TD, four categories of dialogue-structure interactions were tested in relation to TD using mean comparisons and ANOVA: higher dialogue-higher structure (+D+S), lower dialogue-lower structure (-D-S), lower dialogue-higher structure (-D+S) and higher dialogue-lower structure (+D-S). As shown in Table 5, the four groups of interactions insignificantly differed  $F(1,162) = .247$ ). Despite these insignificant differences, the mean values support the hypothesized interactions of dialogue and structure with TD. Specifically, the higher dialogue is, the higher the structure will be, which consequently leads to a low level of perceived TD. The reverse of this positive interaction is the negative interaction. In other words, the lower the dialogue is, the lower the course structure will be, thus leading to the highest level of perceived TD among learners. Moreover, when the dialogue is lower and the course structure is higher, the level of TD is even lower than in the first case. However, when the online dialogue is high and the course structure is low, the EFL students' level of TD the lowest among these groups of construct interactions. This suggests that the most efficient way of reducing students' feelings of TD is to increase the opportunities for dialogues while reducing the course structure degree in online learning.

**Table 5. ANOVA results of the dialogue-structure interaction with TD**

Dialogue-structure groups	Mean	SD	F	Sig.
+D+S	3.2152	.49611	1.162	.247
-D-S	3.8502	.61061		
-D+S	3.5782	.49189		
+D-S	3.3873	.47612		

### ***Does the TD experience of Saudi EFL students in distance learning vary according to their socio-demographic and environmental factors?***

In examining how the learners' perceived TD varies according to their socio-demographic and environmental factors, one-way-ANOVA (post hoc) and also a series of sample t-tests (only for gender) were performed for this purpose. Table 6 demonstrates the variances between and within groups for each variable. In relation to the TD variances between groups, learners' perception of TD significantly varied according to their age ( $F=3.715$ ,  $P=.026 < 0.001$ ), gender ( $F=2.966$ ,  $P=.087 < 0.001$ ), university discipline ( $F=3.808$ ,  $P=.003 < 0.001$ ) and course number ( $F=6.271$ ,  $P=.002 < 0.001$ ). This means that age, gender, university discipline, and the number of online courses taken by EFL students played a crucial role in the varied levels of TD in online learning. On the other hand, the TD variances according to learners' study level ( $F=.584$ ,  $P=.768 > 0.001$ ), previous experience ( $F=.097$ ,  $P=.907 > 0.001$ ), class size ( $F=.897$ ,  $P=.444 < 0.001$ ), access device ( $F=1.776$ ,  $P=.153 > 0.001$ ) and communication mode ( $F=.402$ ,  $P=.670 > 0.001$ ) were found insignificant. This suggests that these factors did not significantly influence students' perceived TD levels.

**Table 6. Results of the variance of TD according to socio-demographics and environmental factors**

Variables	Mean Square		F	Sig.
	Between groups	Within groups		
Age	1.261	.340	3.715	.026
Gender	1.025	.346	2.966	.087
Discipline	1.238	.325	3.808	.003
Learners' study level	.207	.355	.584	.768
Previous experience	.034	.353	.097	.907
Course number	2.075	.331	6.271	.002
Class size	.314	.350	.897	.444
Access device	.613	.345	1.776	.153
Communication mode	.141	.352	.402	.670

In determining where the significant variances in TD according to the age, university discipline and course number exists, a Scheffe Test was performed in this study. Table 7 shows only these groups found with significantly different TD for each variable. For the age variable, the significant variances of TD exist between those learners whose age is below 20 and above 25, between the 20-25 age group and the above-25 age group. As

illustrated by these age groups' mean values of TD, the above 25-year-old group reported lower TD in comparison to the other two age groups. This means that age was an important factor affecting EFL learners' levels of TD in online learning.

**Table 7. Results of the Scheffe Test**

Variables	Grouping	Mean Difference (I-J)	Sig.
Age	Below 20 and above 25	-.52459*	.031
	20-25 and above 25	-.33367	.084
Discipline	English and physics	-.45952	.099
	Math and physics	-.68793	.089
	Computers and physics	-.80427*	.007
Course number	Five courses and less than five courses	-.48222*	.006
	More than five courses and less than five courses	-.23414*	.040

In addition, the university discipline/major was another independent factor affecting learners' TD in online learning. In this regard, the learners' perceived TD significantly varied according to their university discipline. Specifically, such significant variances occurred between those learners majoring in English and physics, between those learners majoring in math and physics, and between those majoring in computer sciences and physics. In each of these three discipline-based clusters, learners joining physics reported significantly lower TD than those joining English, math and computer sciences. Finally, EFL students taking a smaller number of courses (below 5) reported significantly lower TD than those taking below 5 courses and above 5 courses.

## **IV. DISCUSSION**

The current study examined learners' distance learning experience from the TD perspective in a KSA university. In addressing the first research question regarding learners' perception of their TD in online learning, the findings revealed that the response scores on the TD scales are high in general. This result indicates that learners' perception of their online learning experience is high. Specifically, the learners' perceived dialogue, course structure and autonomy were found at high levels. This finding indicates that the Blackboard Collaborate Ultra as an interactive online learning environment seemed to engage learners in active dialogue with their teachers and peers and is conducive to highly structured delivery of courses

and learner autonomy during COVID 19. The result also supports results of Huang et al. (2016) but contradicts the result of Kara (2021) who reported that learners' dialogue perceptions were at moderate levels. Although synchronous communication tools are used for online learning where learners can simultaneously interact and discuss their lessons with both instructors and classmates in this study (Handoko & Ayumi, 2022) and Kara's study (2021), this result could be explained from learner-teacher interaction. In other words, in these earlier studies, learner- teacher interaction as an integral sub-dimension of the TD dialogue was found to be negatively affected by learners' low attendance, the class size and the instructor's inability to create an interactive online learning environment for learners.

Learners' perceived TD, which refers to one construct of the online learning experience scale, was found to be at the low level in the present study. When examined in correlation with dialogue, course structure and learner autonomy (RQ2), TD was found to be inversely associated with each of these three dimensions. This result confirms the fundamental assumption of the TD theory (Moore, 1991) and supports some previous studies on the inverse relationships between dialogue and TD (Chen, 2001; Huang et al., 2016; Stein et al., 2005), course structure and TD (Huang et al., 2016; Stein et al., 2005) and autonomy and TD (Huang et al., 2016). This result suggests that higher dialogue in both directions (learner-learner and learner-teacher) is necessary for lowering students' TD in online learning environments (Chen, 2001; Chen and Willits, 1999; Huang et al., 2016; Reyes, 2013). While learner-learner dialogue is necessary for establishing a friendly and cohesive atmosphere where learners communicate and share knowledge and ideas (Kuskis, 2006), learner-teacher interaction is also necessary for establishing cohesion and shared understanding in online learning (Huang et al., 2016). Otherwise, lack of learner-teacher interaction may widen students' feeling of the gap or distance and consequently have a negative effect on their online learning experience (Kara, 2021).

Moreover, the EFL students' high levels of perceived dialogue in the present study appeared to be facilitated by interaction with the course content and technology, both of which constitute course structure. They are often conceptualized as part of online dialogue in several previous studies (e.g.,

Kara, 2021). Nevertheless, learner-content and learner-interface/technology interactions appeared of equal importance in reducing learners' perceived TD because while online learners need to interact and process the course content and materials (Xiao, 2017), they also need to interact and deal with the technology in processing and comprehending the course content (Hillman et al., 1994). In this study, the online learning platform, as part of the course structure appeared to play a role in facilitating the online dialogue through its voice and text chats.

The current study also re-confirms the inverse relationship between learner autonomy and TD. According to Moore (2007), "the level of autonomy required of the learner increases as the TD decreases" (p. 96). It is also assumed that highly autonomous learners tend to feel comfortable in online courses with higher TD (Huang et al., 2016). This hypothesized inverse relationship between learner autonomy and TD confirmed by the current study findings supports the result of a previous study (Huang et al., 2016).

What is intriguing about the finding of the present study is the interaction of dialogue and course structure in impacting learners' TD. In this study, the hypothesized interaction (+D+S will lead to the lowest TD) was supported by the study finding. Such finding supports the TD theory in that TD is a function of the dialogue-structure interaction. In other words, "as dialogue increases, TD decreases and as structure increases, TD also increases" (Moore, 2007, p. 94). The present study also confirms results of other previous studies (Demir Kaymak & Horzum, 2013; Horzum, 2017; Huang et al., 2016; Stein et al., 2005). However, the lower the dialogue is, the lower the structure, and consequently, the higher the TD will be (-D-S will lead to the highest TD). This hypothesized interaction, which was confirmed in the present study is in line with the results of a few previous studies (Huang et al., 2016; Moore, 2007). This particular finding has implications for the instructional design of online courses that use interactive learning tools, such as *Blackboard Collaborate Ultra*. Specifically, attention should be paid to high dialogue and high course structure in order to reduce learners' TD and enable them to enjoy their online learning. Instructors can promote learners' dialogue through various instructional strategies, such as asking questions, engaging learners in peer discussions, encouraging

learners to ask and respond to questions and other activities that promote learner-learner and learner-teacher interactions in online learning. Moreover, instructors should foster learners' perceptions of the course structure. Since this dimension is related to learner interactions with the course content and technology, it can be promoted by considering elements of structure such as clear course objectives, clear delivery of the content and communication tools in online learning environments.

The present study also examined the effect of socio-demographic and environmental factors on learners' levels of perceived TD in online learning. The results demonstrated that only four factors, namely: age, gender, university discipline or major and number of courses taken each semester significantly affected learners' TD. This study also illustrated that EFL students aged above 25 reported lower TD in comparison to the other two age groups. This finding contradicts some previous studies (Ekwunife-Orakwue & Teng, 2014; Kara, 2021; Vasiloudis et al., 2015), but it is consistent with the finding of Huang (2002). This could be due to adult learners' higher levels of autonomy that reduced their TD in the online courses. For learners' university discipline, the present study revealed that learners majoring in physics reported significantly lower TD than those majoring in English, math and computer sciences. In addition, the number of courses taken by learners appeared to significantly affect their perceived TD as those learners joining less than five courses reported lower TD than those groups joining five and above five courses. This result confirms the results of two previous studies (Huang, 2002; Huang et al., 2016).

On the other hand, other socio-demographic and environmental factors such as gender, study level, previous experience, class size, access device and communication mode were found to have an insignificant effect on learners' perceived TD in online learning. This finding corroborates some previous studies on the insignificant impact of gender (Bolliger & Halupa, 2018; Horzum, 2015; Huang et al., 2016; Vasiloudis et al., 2015), previous experience (Chen, 2001; Ekwunife-Orakwue & Teng, 2014; Huang et al., 2016; Vasiloudis et al., 2015) and class size (Huang et al., 2016) on learners' TD.

## V. CONCLUSION

The present study aimed to investigate EFL

learners' experience from the TD theory with a focus on the levels of learners' perceived experience in online learning, the interaction between the TD constructs, and the effect of socio-demographic and environmental factors on learners' perceived TD. The study provided empirical evidence that contributes to the TD theory and its subsequent research. The findings offer interesting pedagogical implications for online course instructors. Online learning should be enhanced by creating an interactive learning environment where learners are able to interact with each other, with the instructor and with the content itself. This suggests that not only the type of technology is important but also the instructional design, including the way lessons are presented and designs of learning activities in online courses. Pedagogically, the study supports the role of highly structured courses and high dialogue enhanced by the Blackboard Collaborate Ultra through its interactive and rich communication affordances. These affordances include the lively screencast delivery of online lectures, synchronous voice and text chats as well as video conferencing rooms in reducing learners' psychological gaps. Interestingly, course instructors should pay attention to synchronous technological tools in creating an interactive learning environment for learners. Effective technological tools should facilitate the connection of geographically dispersed students, especially in the midst of a pandemic that requires physical and social distance (as in the context of our study). However, online course instructors should be aware of several factors affecting learners' perceived TD, including their socio-demographic and environmental factors. These factors may widen this psychological gap, thereby leading to disconnection among students and negatively affecting their online learning experience.

Despite the contribution of the current study in its investigation of the TD theory, there are several limitations that should be addressed for future research. The first limitation is the relatively homogenous study sample joining one KSA university who self-selected and volunteered to take part in the study. Therefore, future research should investigate online learning experiences among learners joining different universities in order to obtain insight into whether and how different university settings will lead to variation in their perceived TD. In addition, the findings reported in this study were merely drawn from quantitative data,

which should have been supported by qualitative analyses of learners' follow-up interviews. Future research needs to examine learners' perceived TD based on the TD scale used in this study in order to further verify the TD theory and the current study results in different contexts. By so doing, future studies may expand current research investigation to cultural and contextual factors affecting learners' TD in online learning.

### ETHICS STATEMENTS

The authors have read and complied with the ethical requirements for publication in *Jurnal Arbitrer*, and confirm that the current work does not involve human subjects, animal experiments, or any data

collected from social media platforms.

### CREDIT AUTHOR STATEMENT

**Murad Abdu Saeed:** Collected data, conducted the questionnaire survey, developed the methodology, analyzed the data, drafted the manuscript, wrote and revised the content; **Lau Su Kia:** Wrote, reviewed and edited the manuscript. **Ahmed Ali Mahdi:** Reviewed and edited the manuscript. **Ahmed Ali Almaamari:** Reviewed and edited the manuscript.

### DECLARATION OF COMPETING INTERESTS

The authors declare no known competing financial interests or personal relationships that could have influenced the work reported in this paper.

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