

# Mediation Effect of Environment and Infrastructure on English Language Learning in the Saudi Students: A Structural Equation Modelling Approach

Short Title: Environment & Infrastructure and English Language Learning in Saudi Arabia

Badriah Alkhannani<sup>1</sup>

<sup>1</sup> Department of English, College of Arts, Ha'il University, Ha'il-2440, Saudi Arabia

Correspondence: Dr. Badriah Alkhannani, Department of English, College of Arts, University of Ha'il, Ha'il, 2440, Saudi Arabia. E-mail: b.alkhannani@uoh.edu.sa

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## Abstract

The study aims to determine the mediation effect (total, direct, and indirect effect) of the environment and infrastructure on the English language learning (ELL) of students in higher education in Saudi Arabia. A self-administered web-based structured questionnaire was employed for the collection. A cross-sectional descriptive research design was used to form the foundation of the research study. A test re-test and an inter-rater test were performed to check the inter-class correlation coefficient between the responses of two-time intervals and two experts. The pilot survey was conducted with a small sample of students. Cronbach's alpha and the Kaiser-Meyer-Olkin (KMO) values were utilized in order to examine the reliability and validity of the results. In addition to this, the discriminant validity of the Average Variance Extracted (AVE) and Composite Reliability (CR) measures was examined. The sample size of the study was 407, and a random sampling was used during the study. The Structural Equation Modeling (SEM) technique was used for mediation analysis for the evaluation of total, direct, and indirect effects. The study's findings concluded that the English language infrastructure (INF) has a greater mediating impact on the learning of the English language (ELL) than that of the environment for the English language (ENR). The SPSS-AMOS 23.0 program was used for all types of statistical calculations. Despite the above meaningful findings, the current study suffered from poor real-time data collection from the Saudi students. This study paves the way for moderation or group analysis between the environment, infrastructure, and English language learning among higher education students in Saudi Arabia.

**Keywords:** environment, infrastructure, English language learning, Structural equation modelling

## 1. Introduction

The education system in Saudi Arabia places a significant emphasis on the study of the English language because it is regarded as one of the most important subjects. Beginning in the sixth grade and continuing all the way through the university level of education, this topic is now required study for all students. The Saudi Ministry of Education intends to implement it not only at the level of the third grade, but also at the level of the fourth grade in order to obtain a more successful consequence (Alhaisoni & Rahman, 2013). because of the need in other regions of the world, as well as the fact that it is the language of international communication, business, and trade, in addition to being the language of science and technology (Alhaisoni & Rahman, 2013). The ambitious ambitions of Saudi Arabia's Vision 2030 for the complete transformation of the educational system in the country will be implemented gradually over the course of the next 15 years. This vision for 2030 includes a number of educational goals, two of which are the reduction of the gap between the outcomes of tertiary education and the actual needs of local labor markets and the improvement of the quality of tertiary education. Both of these educational goals are included in this vision. In addition to boosting the academic performance of Saudi students, one of the goals is to have at least five Saudi universities placed among the top-200 universities in the world, according to the Times Higher Education World University Rankings (Al-Shehri, 2020).

In 1925, in response to the growing demands of the monarchy, the Ministry of Education included English as a subject in the curriculum of all public schools. The expanding circle is a reference to the several nations, such as China, Japan, and Saudi Arabia, that employ English as a second language in their respective populations. In the context of Saudi Arabia, the English language is taught as a foreign language for specific purposes, such as academic and professional ones, or as a method of communication for trade, tourism, politics, and the media. These goals are accomplished by teaching English in its context as a foreign language. In Saudi Arabia, where the community and the Ministry of Education have showed a great deal of concern for the language, English is considered to be one of the primary scholastic focuses in the country. English is a mandatory language study that begins in the fourth grade (often when kids are ten years old) and continues all the way until the university level (which usually starts at the age of 18). At the college or university level in Saudi Arabia, the English language may be taught in a variety of science departments, as well as in some departments that focus on the humanities or the arts, depending on the requirements of the institution and the department. Earlier researchers have worked on the said theme and have identified some key findings, such as: The government of Saudi Arabia ought to have a plan for the implementation of

effective strategies for the acquisition of mass literacy in the English language based on research supported with evidence. (Barnawi & Al-Hawsawi, 2017).

All Saudi Arabian universities offer the Preparatory Year Programme (PYP) after formal schooling; it is a mandatory one-year program for students aspiring to a full-time bachelor's degree program at the university and follows the English for Specific Purpose (ESP) teaching approach. ESP is effective at improving students' macroskills, which include many things including listening, reading, speaking, and writing. The idea behind ESP, which satiates the learning requirements of students, was not fully articulated and warrants further research and debate on the said topic. (Gaffas, 2016). The study published by Gaffas (2016) reported significant findings that will aid in the future development of the English for Young Learners (EYL) teacher education program. The significance of the pedagogy, which was adopted throughout the course, mentioned that research was one of the most important findings. EYL teachers and educators must consider the preferences and integration of language skills of young learners when designing and developing English as a Foreign Language (EFL) books and other relevant materials for young learners.

According to Daif-Allah and Aljumah (2020), educators of children in the early years of life must use technology for broadening the scope of instruction and further enhancing the students' knowledge. So, it is still feasible to offer changes in the Saudi educational system that can assist in the teaching and learning of second languages in the kingdom. The Saudi Ministry of Education (MOE) has not established any program for students, which underscores the importance of verbal communication. However, the reading and writing parts of the curriculum have been focused, which probably results in resistance and anxiety among students, especially at the time of practicing public speaking. Surprisingly, the language of instruction doesn't even come up as a potential factor throughout the assessment process; in fact, the tests are generally available in written format. In addition, there is no encouragement for speaking English with each other among the Saudi students, neither inside nor outside of the classrooms; hence, the examination format is available only in the written form, and speaking English is in no way supported in the Saudi educational system. Moreover, the evaluations are only subjected to a written examination format (Alhmedi, 2014).

In the Saudi Arabian kingdom, the education of students at the secondary and university levels includes the English language, which is surprisingly considered to be of equal importance. It would seem that awareness of the English language is highly important, if not compulsory, in this developing nation. The extent to which an individual is capable of picking up the English language is dependent on a variety of factors. In this regard, the thoughts that are indirectly associated with pedagogy are not vital compared with factors or difficulties that are directly linked with pedagogy (Khan, 2011). Keeping the above facts in mind, it is likely that, after taking into account all of the relevant elements, the English-level skills in the kingdom will continue to be at the same level in the coming years. It is indispensable to perform an assessment of needs that is both all-encompassing and in-depth. The objective behind such steps is to assist both students and teachers of English in becoming more efficient in their respective fields of study (Al-Seghayer, 2014). Lately, English language education has appeared in the Saudi Kingdom as a focus area of academic interest, and as a result, a good number of studies are being performed in this field of study. The Saudi students need to have a specific level of English proficiency to graduate from various academic programs, although despite a variety of efforts from the Saudi government to modernize and improve its educational system, the students' English proficiency has remained low. The language of instruction in Saudi Arabia's medical facilities is typically English, and a majority of international schools offering English-based instruction have been established by businesses and medical facilities for the purpose of serving the children and employees of such institutions (Aljohani, 2016).

Another study by Nather (2020) stated that both the instructors and the students reach the mutual conclusion that it is necessary for the students' future academic and professional growth to have the self-assurance and the ability necessary for interacting in the English language for communication purposes in real-world situations. The curriculum requires to maintain an optimistic view for the future. (Alamri, 2019). The study of Alrashidi and Phan (2015) examined the ways in which English is taught and learned in Saudi Arabia and, in addition, provided insight into Saudi culture. They concluded that it is indispensable to acquire strong English language skills in order to contribute to the growth of Saudi Arabia's economic and cultural organizations (Alrashidi & Phan, 2015). In English as a Foreign Language (EFL) classrooms, socio-cultural identity and representation are of the utmost importance, (Elyas & Badawood, 2018). The researchers recommend that English language instructors keep themselves up-to-date. (Khalil & Kholofelo Semono-Eke, 2020). Khalil and Kholofelo Semono-Eke (2020) relied solely on one method of instruction to teach their students. The findings of Khalil and Kholofelo Semono-Eke (2020) lend credence to the proposition that additional investigation into this dimension of English language instruction must be further explored in future research. Only limited or scanty work on the mediation effect of the environment and infrastructure on the learning of the English language among students in higher education in the Saudi Kingdom has been done; therefore, we have tried to explore their association in this study. The results of social empowerment (SEMP) and sustainable employment generation (SUEG) are significantly influenced directly by education, training, and e-learning (ETL). (Singh et al., 2022) The influence of behavioral intentions (BI) on the usage behaviors (UB) of mobile educational learning technology has not been modified by gender. (Arif et al., 2022) The process of integrating instruction in the English language into the educational systems of Arab countries. (Reddy, 2022)

### *1.1 Conceptual Models*

The research model (Figure 1 and Figure 2) was as follows (SPSS 23.0 output):

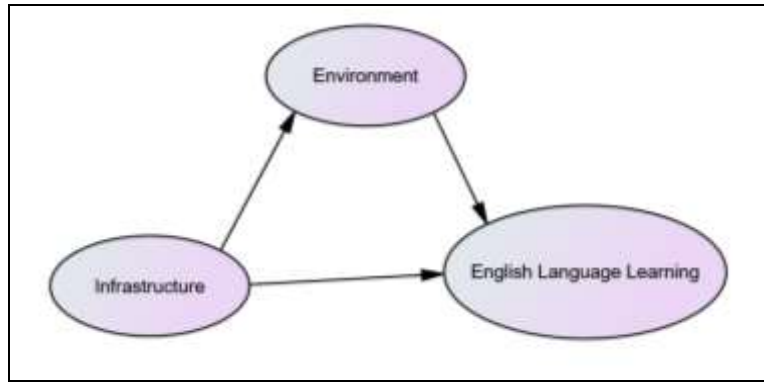


Figure 1. Mediation Effect of Environment between Infrastructure and English Language Learning

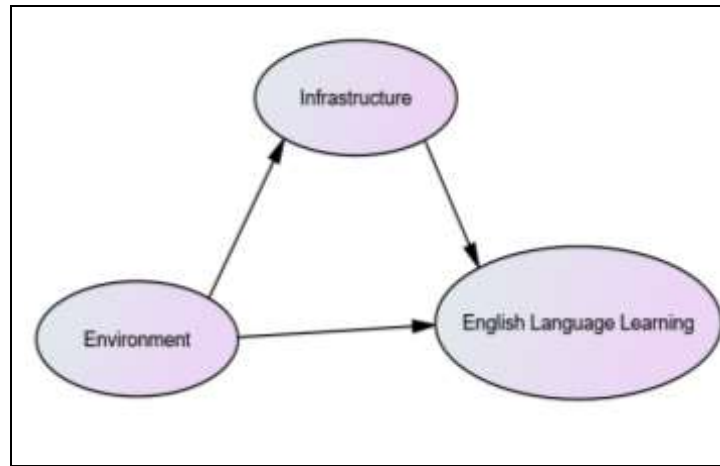


Figure 2. Mediation Effect of Infrastructure between Environment and English Language Learning

During the study, following objectives were undertaken to study among students in higher education in Saudi Arabia.

- To determine the mediation effect of the environment between infrastructure on the English language learning (ELL).
- To determine the mediation effect of the infrastructure between environment on the ELL.
- To compare the mediation effect of environment and infrastructure on the ELL.

Following hypothesis was followed during the study.

H01: The environment doesn't mediate between infrastructure and the ELL.

H02: The infrastructure doesn't mediate between environment and the ELL.

H03: There is no difference of the mediation effect of environment and infrastructure on the ELL.

## 2. Methodology

### 2.1 Population & Sampling

The sampling population for this research was 600 students studying in the Department of English, College of Arts, and University of Ha'il, Ha'il, Saudi Arabia. We have successfully received 407 responses using web based survey. Random sampling was used for collecting the primary data. The list of all the Bachelor of Arts students (with a major in English language) studying in the English Department, College of Arts, University of Ha'il, Ha'il, Saudi Arabia, was the sampling frame for this study. Each and every individual student studying in higher education was the sampling unit or element of this study, formally known as respondents.

### 2.2 Research Design

The exploratory research design was used to look for new information, new knowledge, and new facts that could help with hypothesis formulation. A cross-sectional descriptive design was employed. The structured questionnaire (web-based: Supplementary Information: Appendix I) was designed for fast and seamless data collection in a specified time period of April 2022–June 2022. The demographic variables like age, gender, education, etc., were calculated on the nominal scale, whereas the environmental, infrastructure, and ELL constructs were measured on a 5-point Likert scale. The statements' agreement and disagreement were graded on a scale of strongly agreeing (5 points) to strongly disagreeing (1 point), with scale 3 considered neutral.

2.3 Ethical Consideration

The study was approved by the Research Ethics Committee of the University of Ha'il, Ha'il, Saudi Arabia, under ethical approval H. 2022.259. The study methods used in this research were carried out in accordance with the university's approved guidelines.

2.4 Test Re-Test and Inter-Rater Test

Before the pilot study, the question was processed through test-and--test reliability, where the questionnaire was filled out by a respondent at two-time intervals to check the interclass correlation between two measurements. The same way, again, the same questionnaire was filled out by the two experts to check the interclass correlation coefficient between two measurements.

Table 1. Interclass Correlation Coefficient- Test Re-Test

	Intraclass Correlation	P value
Single Measures	.796	0.000
Average Measures	.886	0.000

Table 2. Interclass Correlation Coefficient- Inter-Rater Test

	Intraclass Correlationb	P value
Single Measures	.800	0.000
Average Measures	.889	0.000

According to Tables 1 and 2, the interclass correlation coefficients for the Test Re-Test and the Inter-Rater Test are .796 and .800 for single measures, respectively, indicating a high correlation; thus, the Test Re-Test and the Inter-Rater Test conditions were met during the preliminary questionnaire testing stage.

2.5 Pilot Study: Reliability and Validity

A preliminary study with a relatively small sample size—roughly ten percent of the whole sample size—was carried out as a pilot. The Cronbach's alpha was utilized in the performance of the reliability test. The value of Cronbach's alpha had to be at least 0.700 for it to be considered acceptable. The KMO test was utilized in order to carry out the testing for adequate sampling. For optimal outcomes, a KMO value of at least 0.60 is recommended as the bare minimum. The better something is, the higher the value of KMO that it has. A KMO value of 0.848 is considered to be excellent. The discriminant validity was determined by utilizing the AVE value, which stands for "average variance extracted."

Table 3. Reliability and Validity Summary

Construct	Cronbach's Alpha	Kaiser-Meyer-Olkin (KMO) Test	% of Variance	Average Variance Extracted (AVE)	Composite Reliability (CR)	Discriminant Value (DV)	Number of Items
Infrastructure for English language learning (INF)	0.851	0.824	53.5	0.536	0.889	0.732	7
Environment for English language learning (ENR)	0.701	0.742	42.8	0.529	0.815	0.755	6
English Language Learning (ELL)	0.876	0.861	58.7	0.587	0.908	0.766	7

Since all the parameters are within an acceptable range, the reliability and factor analysis conditions were satisfied. The convergent validity condition was also proved; the AVE value was above 0.500; and the discriminant value was above the correlation coefficient value, hence the discriminant validity was also satisfied (Table 3).

3. Results

3.1 Measurement & Structural Equation Model

The structural equation model is a technique by which we can test the hypothesis simultaneously among the different constructs. Through this technique, the mediation and moderation effects can also be checked simultaneously among the different constructs. Through this technique, the mediation and moderation effects can also be checked.

3.1.1 Measurement Model

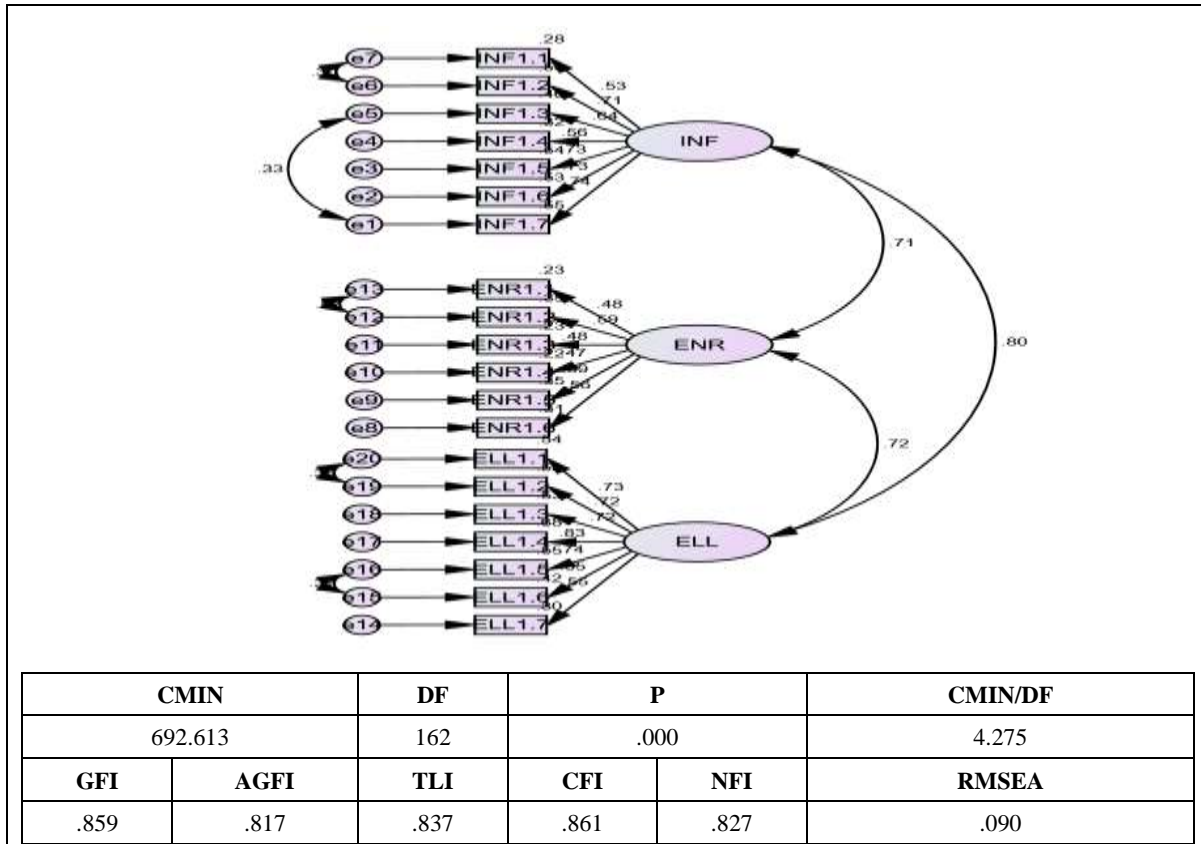


Figure 3. Measurement Model

The figure shows the measurement model having three constructs named Infrastructure (INF), Environment (ENR), and English Language Learning (ELL). The error variables are unexplained portions associated with those particular items. To get better model fit indices, the error variables e1–e5, e6–e7, e12–e13, e15–e16, and e19–e20 are correlated. All the model fit indices are within an acceptable range.

Table 4. Standardized Regression (Weights All Items)

Item	Direct Path	Estimate	
INF1.7	<---	INF	.742
INF1.6	<---	INF	.726
INF1.5	<---	INF	.732
INF1.4	<---	INF	.562
INF1.3	<---	INF	.636
INF1.2	<---	INF	.710
INF1.1	<---	INF	.530
ENR1.6	<---	ENR	.558
ENR1.5	<---	ENR	.589
ENR1.4	<---	ENR	.470
ENR1.3	<---	ENR	.476
ENR1.2	<---	ENR	.590
ENR1.1	<---	ENR	.479
ELL1.7	<---	ELL	.548
ELL1.6	<---	ELL	.651
ELL1.5	<---	ELL	.740
ELL1.4	<---	ELL	.826
ELL1.3	<---	ELL	.725
ELL1.2	<---	ELL	.722
ELL1.1	<---	ELL	.734

From Table 4, it is clear that there were seven items of infrastructure for ELL, six items of environment for ELL, and seven items of the ELL construct. All standard regression weights (estimates) are above the acceptable limit of 0.300, therefore all the factor loadings for each item

were acceptable.

Table 5. Correlations Matrix

Direct Path			Estimate	P value	Results
INF	<-->	ENR	.713	0.000	Significant
ENR	<-->	ELL	.720	0.000	Significant
INF	<-->	ELL	.798	0.000	Significant

The correlation matrix in Table 5 explains the correlation between the constructs. The results of the correlation matrix, such as the correlation coefficient and p-values, define whether the correlation is significant or not. The correlation matrix in Table 5 and the measurement model in Figure 3 show that there is a relationship between the three infrastructure constructs: INF, ENR, and ELL. The correlation coefficient is 0.713 between INF and ENR; 0.720 between ENR and ELL; and 0.798 between INF and ELL.

3.2 Structural Model

3.2.1 Case I: Mediation Effect: On the introduction of ENR in between INF and ELL (Baron & Kenny's Method)

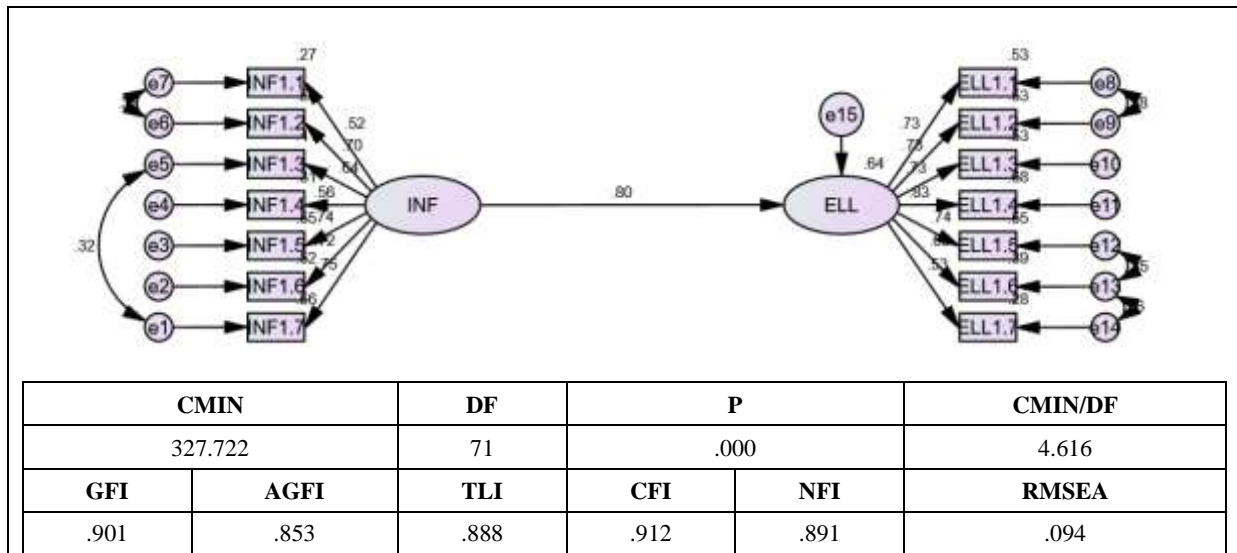


Figure 4. Direct Effect of INF on ELL (Structural Model)

The figure depicts the direct effect of the INF on the ELL. All the model fit Indices are within the acceptable range.

Table 6. Standardized Regression Weights: ELL <--- INF

Direct Path			Estimate	S.E.	C.R.	P	Results
ELL	<---	INF	.802	.068	11.941	***	Significant

According to Table 6, it is clear that the sig value (p-value = 0.000) is less than 0.05, and hence it can be said that there is an effect of the INF on the ELL.

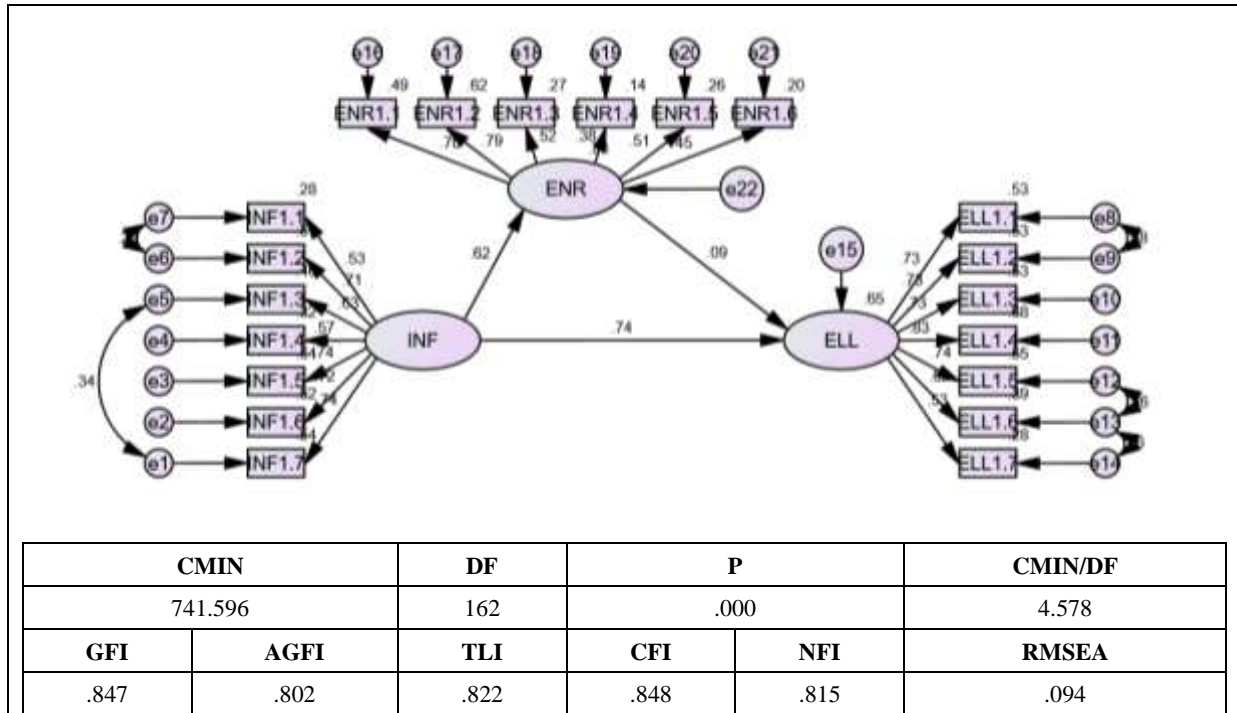


Figure 5. Structural Model:On the introduction of ENR in between INF and ELL

The figure depicts the effect of the INF on the ELL with the mediation of ENR. All the model fit Indices are within the acceptable range.

Table 7. Standardized Regression Weights (ENR<---INF, ELL <---INF, ELL <---ENR)

Direct Path		Estimate	S.E.	C.R.	P	Results
ENR	<--- INF	.620	.041	9.056	***	Significant
ELL	<--- INF	.744	.081	9.562	***	Significant
ELL	<--- ENR	.094	.108	1.514	.130	Insignificant

Table 8. Matrices: Standardized Total Effect, Direct Effect, Indirect Effect

Standardized Total Effects	INF	ENR	ELL
ENR	.620	.000	.000
ELL	.803	.094	.000
Standardized Direct Effects	INF	ENR	ELL
ENR	.620	.000	.000
ELL	.744	.094	.000
Standardized Indirect Effects	INF	ENR	ELL
ENR	.000	.000	.000
ELL	.058	.000	.000

Table 9. Standardized Total Effects, Direct Effects, Indirect Effects - Two Tailed Significance (BC)

Standardized Total Effects - Two Tailed Significance (BC)	INF	ENR	ELL
ENR	.003	...	...
ELL	.009	.303	...
Standardized Direct Effects - Two Tailed Significance (BC)	INF	ENR	ELL
ENR	.003	...	...
ELL	.005	.303	...
Standardized Indirect Effects - Two Tailed Significance (BC)	INF	ENR	ELL
ENR	...	...	...
ELL	.280	...	...

Table 10. Final Results I: Mediation Results on the introduction of ENR in between INF and ELL (Baron & Kenny's Method)

	Standardised Estimation	P-value	Results	Mediation Results
Total Effect	.803	0.009	Significant	Partial Mediation Reject H01
Direct Effect	0.744 ( reduced from 0.803 to 0.744)	0.005	Significant	
Indirect Effect	0.058 ( 0.803-0.744)	0.280	Insignificant	

The first null hypothesis was H01: The environment does not mediate between INF among students in higher education in Saudi Arabia. In the total, direct, and indirect effect table analysis, it is safe to reject H01, because the standard estimate is reduced from 0.803 to 0.744, and therefore there is a partial mediation by the introduction of ENR between INF and dard estimate is reduced from 0.803 to 0.744, and therefore there is a partial mediation by the introduction of ENR between INF and ELL; therefore, it can be concluded that the ENR mediates between INF and ELL (Table 10).

3.2.2 Case II: On the introduction of INF in between ENR and ELL (Baron & Kenny's Method)

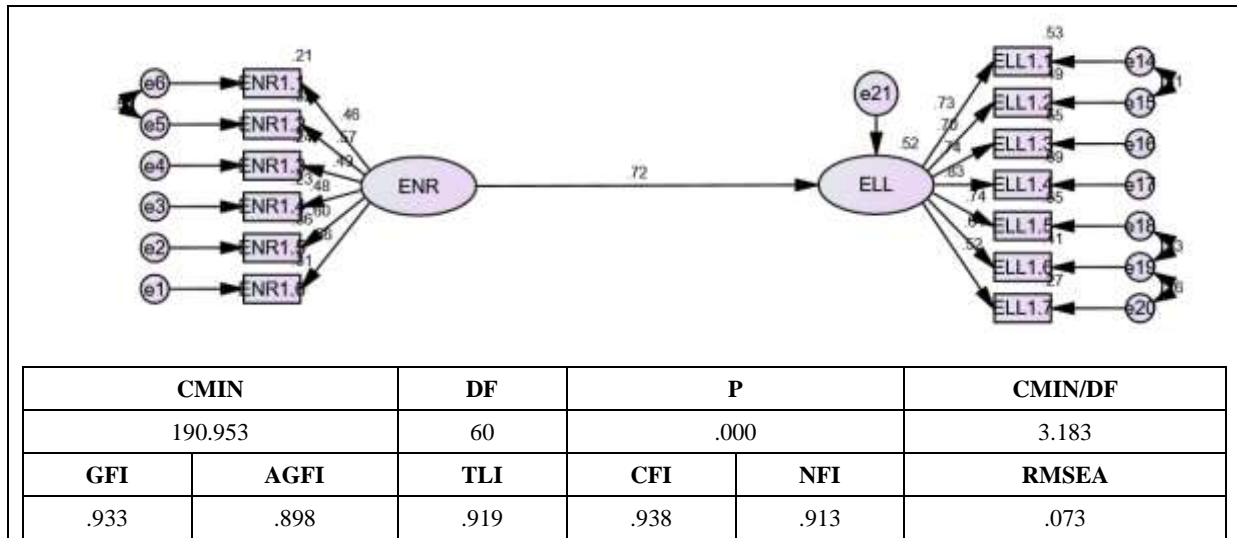


Figure 6. Direct Effect of ENR on ELL ( Structural Model)

The figure depicts the direct effect of the Environment for English Language Learning (INF) on the English Language Learning (ELL). All the model fit Indices are within acceptable range.

Table 11. Standardized Regression Weights: ELL <--- ENR

Direct Path			Estimate	S.E.	C.R.	P	Results
ELL	<---	ENR	.723	.131	8.056	***	Significant

According to the Table 11, it is clear that the sig value (p-value = 0.000) is less than 0.05, so it can be said that there is an effect of the environment for English language learning (ENR) on English language learning (ELL).



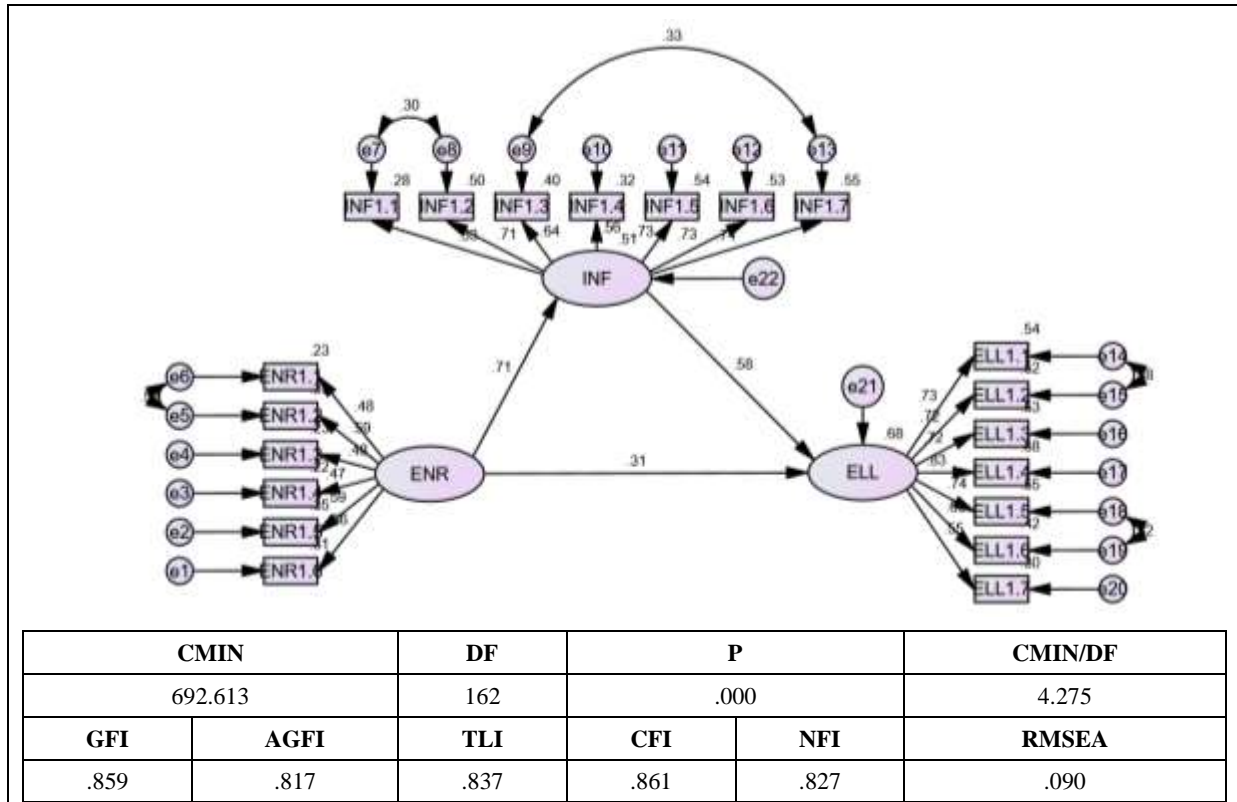


Figure 7. Structural Model: On the introduction of INF in between ENR and ELL

The figure depicts the effect of the environment for English language learning on English language learning with the mediation of infrastructure for English language learning. All the model fit indices are within an acceptable range.

Table 12. Standardized Regression Weights (INF <---ENR, ELL <---ENR, ELL <---INF)

Direct Path		Estimate	S.E.	C.R.	P	Results
INF	<--- ENR	.713	.114	6.993	***	Significant
ELL	<--- ENR	.307	.124	3.635	***	Significant
ELL	<--- INF	.580	.121	6.288	***	Significant

Table 13. Matrices: Standardized Total Effects, Direct Effects, Indirect Effect

Standardized Total Effects	ENR	INF	ELL
INF	.713	.000	.000
ELL	.720	.580	.000
Standardized Direct Effects	ENR	INF	ELL
INF	.713	.000	.000
ELL	.307	.580	.000
Standardized Indirect Effect	ENR	INF	ELL
INF	.000	.000	.000
ELL	.413	.000	.000

Table 14. Standardized Total Effects, Direct Effects, Indirect Effects - Two Tailed Significance (PC)

Standardized Total Effects - Two Tailed Significance (PC)	ENR	INF	ELL
INF	.010	...	...
ELL	.010	.010	...
Standardized Direct Effects - Two Tailed Significance (PC)	ENR	INF	ELL
INF	.010	...	...
ELL	.010	.010	...
Standardized Indirect Effects - Two Tailed Significance (PC)	ENR	INF	ELL
INF	...	...	...
ELL	.010	...	...
ELL1.7	.010	.010	...

Table 15. Final Results II: Mediation Results on the introduction of INF in between ENR and ELL (Baron & Kenny's Method)

	Standardised Estimation	P-value	Results	Mediation Results
Total Effect	.720	0.010	Significant	Partial Mediation Reject H02
Direct Effect	.307( reduced from 0.720 to 0.307)	0.010	Significant	
Indirect Effect	.413 ( 0.720-0.307)	0.010	Significant	

The second null hypothesis was H02: The infrastructure does not mediate between the environment and English language learning among students in higher education in Saudi Arabia. In the total, direct, and indirect effect table analysis, it is safe to reject H02 because the standard estimate is reduced from 0.720 to 0.307; therefore, there exists the possibility of partial mediation by the introduction of infrastructure for English language learning between the environment for English language learning and the English language learning; therefore, it can be concluded that infrastructure for English language learning mediates between infrastructure for English language learning and the English language learning (Table 15).

### 3.2.3 Comparison between final results of Case I and Case II

The third null hypothesis was H03: There is no difference in the mediation effect of environment and infrastructure on the learning of the English language among students in higher education in Saudi Arabia. From the results of I and II, it is safe to reject H03; therefore, it can be concluded that there is a difference in the mediation effect of environment and infrastructure on the learning of the English language among students in higher education in Saudi Arabia. Based on both findings, it is possible to conclude that infrastructure for English language learning (INF) has a greater influence than the environment for English language learning (ENR) (Tables 10 and 15).

## 4. Discussion

Both the reliability and the factor analysis conditions have been successfully fulfilled as a direct result of the fact that all of the parameters are found to lie within the acceptable range. The value of the AVE was higher than 0.500, and the value of the discriminant was higher than the value of the correlation coefficient; hence, the convergent validity requirement was satisfied. Also, the discriminant validity criterion was satisfied due to the fact that the value of the discriminant variable was higher than the value of the correlation coefficient (Table 3). Every estimation made with the help of standard regression weights was greater than the maximum value of 0.300 that was allowed. The correlation matrix provides a description of the relationship that exists between the constructs (Table 5). The outcomes of the correlation matrix, which include the correlation coefficient and p-values, determine whether or not a correlation is significant. This conclusion is reached based on the correlation matrix. As can be seen in Table 5 of the correlation matrix and Figure 3 of the measurement model, there is a correlation that exists between three different constructs. These constructions are INF, ENR, and ELL. A correlation value of 0.713 was found between the INF and the ENR. A connection value of 0.720 was found between ENR and ELL, whilst a correlation coefficient of 0.798 was found between INF and ELL. It is clear from looking at Table 6 that the sig value is less than 0.05 because the p value is 0.000. It is possible to say that the INF has an effect on the process of learning English. Because the standardized regression weight is 0.802, it follows that an increase in the infrastructure for learning English as a second language by one standard deviation will result in an increase in learning English as a second language by 0.802 standard deviations. The sample size is adequate, and it provides an accurate representation of the population that was selected because the standard error (S.E.) is quite low at 0.068. As a consequence of this, the association between the infrastructure for English language learning (INF) and English language learning (ELL) is significant at the 5% level of significance. ELL stands for English language learning. The initial null hypothesis that was tested was denoted by the symbol H01 and stated that students in higher education in the kingdom do not act as a mediator between infrastructure and the acquisition of English language skills. It is possible to reject hypothesis H01 in the analysis of the total direct and indirect effect due to the fact that the standardized estimation has fallen from 0.803 to 0.744. Table 14. The provision of some form of mediation is thus made possible by the placement of the Environment for English Language Learning in between the Infrastructure for English Language Learning and English Language Learning. The conclusion that can be drawn from this is that the environment for English language learning acts as a mediator between the infrastructure for English language learning and the actual process of learning English. It is clear from looking at Table 8 that the sig value is less than 0.05 because the p value is 0.000. It is feasible to argue that the setting for learning English has an effect on English language learning. Due to the fact that the standardised regression weight is 0.723, if the environment for learning English rises by one standard deviation, then English language learning will also increase by one standard deviation. The sample size is sufficient, the margin of error is low (0.131), and it is representative of the population that was intended to be studied. At the 5% level of significance, the connection between English Language Learning and Infrastructure for English Language Learning is significant. This connection has a standardized regression weight of 0.723, and its critical ratio is 8.056. The second possibility, denoted by the symbol H02, was that the infrastructure in Saudi Arabian higher education institutions did not play any role in the students' acquisition of the English language. As a consequence of this, it is permissible to reject Hypothesis H02 in the analysis of the table that contains the total direct and indirect effects (Table 14), due to the fact that the standardized estimation fell from 0.720 to 0.307. The provision of infrastructure for English language learning results in a partial mediation between the environment for English language learning and English language learning. This helps to ensure that English language learning takes place. As a consequence of this, the Infrastructure for English Language Learning acts as a connection point between the English Language Learning and the Infrastructure for English Language Learning. There is no difference between the infrastructure-mediated effects on English language learning and the environment-mediated effects on English language acquisition among students in higher education in Saudi Arabia because H03 was the third null hypothesis. Based on the findings of studies I and II, it is reasonable to conclude

that the null hypothesis H03, which proposes that there is a difference in the mediating influence of environment and infrastructure on English language acquisition among students in higher education in Saudi Arabia, should be rejected. When these two data are considered together, it is feasible to reach the conclusion that environmental English language learning is less significant than English language infrastructure in terms of its influence. According to Basque and Dore (1998), a learning environment in this particular situation should incorporate the following six functions: inform, communicate, cooperate, produce, scaffold, and manage. According to the findings, it is absolutely necessary for teachers to project a positive and cheery attitude in the classroom as well as in any other location in which they educate kids (Sunday, 2012). Furthermore, earlier research studies conducted by Arul et al. (2012) supported the findings of this study and revealed that the environment that is provided to them in school not only influences their character but also has a significant influence on their academic achievements. The findings of this study were supported by the findings of these earlier research studies. According to the findings of this study, the infrastructure that is offered to students in schools not only has an effect on the students' personalities, but it also has a substantial impact on the students' academic accomplishments. In light of the data acquired from a recent study, it is advised that teachers understand and appreciate the different domestic infrastructures and settings of their pupils. This recommendation was made in light of the findings collected from the study. In spite of these heartening discoveries, the current research suffers from a lack of true or actual responses to the information connected to the English language acquisition constructs of environment, infrastructure, and infrastructure.

## 5. Conclusion

The environment and the infrastructure are two extremely significant aspects for the training and learning of any subject as well as skill sets. The question of which of the three was more significant than the others has never ceased to be a source of contention, despite the fact that no prior research has specifically addressed the topic. The current investigation is predicated, in large part, on a comparison of the environments and the facilities available to students of higher education in the Kingdom of Saudi Arabia for the purpose of acquiring an English language proficiency. The vast majority of the previous authors who contributed to this review worked on the methodology of English language teaching; however, there is relatively little research on the topic of the environment and infrastructure that are necessary for English language teaching for students in higher education. It is reasonable to conclude that Hypothesis H03 is false; as a result, it is possible to draw the conclusion that there was a distinction in the mediating effect of environment and infrastructure on English language learning among students enrolled in higher education in Saudi Arabia. These findings are based on the findings of cases I and II. In light of the findings of both studies, it is possible to reach the ultimate conclusion that the infrastructure for the English language has a greater mediation effect on English language learning than that of the environment for English language learning. This is something that can be said because it is possible to draw a connection between the two sets of findings. As a concluding remark, the author makes the recommendation that, for the purpose of future research work, moderation or group analysis could be carried out based on the current study. This research is helpful to the students who are attending colleges and universities to acquire the English language, as well as to the administrators of those institutions, and to the teaching staff. An earlier statement made by Basque and Dore (1998) in support of the current study claimed that a learning environment ought to execute the following six functions: inform, communicate, cooperate, produce, scaffold, and manage. The findings of the current study were corroborated by the findings of an additional research study conducted by Arul et al. (2012), which demonstrated that the infrastructure assistance that is offered to students has a considerable influence on the academic achievements of those students.

## Conflict of interest: None

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**Supplementary Information:** Appendix I. Survey Questionnaire

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**SUPPELEMENTARY INFORMATION**

**Appendix I**

Dear Students,

This research study is a cross-sectional descriptive study titled on "**Mediation Effect of Environment and Infrastructure on English Language Learning in the Saudi Students: A Structural Equation Modelling Approach**". The methods employed in this study were carried out in accordance with the approved guidelines of the college/university. The purpose of this study is to determine the mediation impact of the environment and infrastructure on English language learning among students in higher education in Saudi Arabia.

I will be grateful to you for sparing and devoting your valuable time to sharing your views on the said subject. Please be assured that the information that you will provide in this questionnaire will be kept confidential and will not be used for any other purpose other than the research work.

Thank you

**Consent Form to Data Confidentiality**

This consent form informs you about the purpose of the research and the type of commitment made so that you can voluntarily choose to take part in the survey. You must provide your consent before participating in this research. The personal data collected will be processed anonymously. The presentation of the data collected for scientific purposes will take place in aggregate form to guarantee the impossibility of identifying the participants. The participants are free to ask for any clarifications on any aspect of the research as well as to refuse participation or abandon the investigation at any time.

I agree to take part in this study:

**Survey Questionnaire**

**Section I Demographic Profile**

**Q1 Age**

Below 21 Years    21 to 25 Years    26 to 30 Years    31 to 35 Years  
 36 to 40 Years    41 to 45 Years    Above 45

**Q2 Gender**            Male                                  Female

**Q3 Qualification**    Graduation                          Post Graduation

**Q4 Marital Status**    Married                                  Unmarried

**Instructions:** Rate your opinion concerning agreement and disagreement for the following statements

Strongly Disagree (1)    Disagree (2)    Neutral (3)    Agree (4)    Strongly Agree (5)

**Section II: Environment for English language learning (ENR)**

S. N	Statements	SD	D	N	A	SA
2.1	There is a healthy educational environment in the institution/college/university.	1	2	3	4	5
2.2	A supportive environment is essential for English language learning.	1	2	3	4	5
2.3	A family environment helps in the English language learning	1	2	3	4	5
2.4	A school environment having a key role in the learning	1	2	3	4	5
2.5	A society environment also supports in the acceptability of English language learning.	1	2	3	4	5
2.6	Harmonious environment in the classroom help in the development of the skill set of English communication.	1	2	3	4	5
2.7	Environment on the campus is very important in learning anything.	1	2	3	4	5

**Section III: Infrastructure for English language learning (INF)**

S. N	Statements	SD	D	N	A	SA
3.1	Use of modern technology helps in the English Language Learning.	1	2	3	4	5
3.2	E- Learning is gaining the interest among the students	1	2	3	4	5
3.3	Speak Recognition software helps in developing communication skill.	1	2	3	4	5
3.4	Language Lab should be available in every institution/college/university	1	2	3	4	5
3.5	English Language syllabus and course content is very effective.	1	2	3	4	5
3.6	English Language syllabus and course is updated in regular time interval.	1	2	3	4	5
3.7	Library and e- contents on English language are easily available.	1	2	3	4	5

## Section IV: English Language Learning (ELL)

S. N	Statements	SD	D	N	A	SA
4.1	There is lots of benefits of the supportive environment in the English Language Learning.	1	2	3	4	5
4.2	Infrastructure helps in the English Language Learning	1	2	3	4	5
4.3	English language accent of the students are improving during English Language learning.	1	2	3	4	5
4.4	Assessment and evaluation of the students helps in the English Language Learning.	1	2	3	4	5
4.5	I can easily understand and comprehend the big English paragraph.	1	2	3	4	5
4.6	I am confident in verbal and non-verbal communication with respect to English Language.	1	2	3	4	5
4.7	Learning Foreign Language is a necessity in the professional career.	1	2	3	4	5

**Thank You !**

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