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LEARNING ENVIRONMENTS IN A TABLET BASED ENGLISH LANGUAGE LAB

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Abstract:
Now days, ICT based language laboratories are being used in schools to teach children to communicate effectively. The language lab is a technological breakthrough for learning English and is a need of the hour to enhance English language skills in students**.** The present study attempts to study the learning environments in a tablet based English language lab and assess its effectiveness for use with 8th and 9th class students. A widely used questionnaire i.e. Technology-Rich Outcomes-Focused Learning Environment Inventory (TROFLEI) was used to study the learning environments in a tablet based English language lab and also to assess students' attitude towards English. The study is quantitative in nature and the sample consisted of 138 students taken from one private school of Jammu (India) where this facility was available. Apart from the study of learning environments the other objectives of the study were to compare the actual and preferred learning environments, to investigate associations between the attitudes towards English and learning environments in a tablet based language laboratory, to investigate whether gender differences exist in a tablet based English language lab and to assess the effectiveness of the tablet based English language lab for use with 8th and 9th class students. The results also show that students usually want more teaching to be done using the tablet based English language lab and it helped in the creating positive psychosocial learning environments. Results also show that there is no significant gender difference between the male and female students, which, means that both male and female students perceived their tablet based English language lab learning environment in a similar manner. Furthermore, the result of the effectiveness of the tablet based English language lab

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shows that 70 to 95% of the students in the group look forward to learning English in a tablet based English language lab rather than through conventional methods. They also perceived their tablet based English language lab to be more interesting, livelier, relaxed, and enjoyable.

Keywords: learning environments, tablets, English language laboratory, TROFLEI

1. Instruction

Language laboratory is defined as "*a room designed for learning foreign languages and equipped with tape recorders, videocassette recorders, or computers connected to monitoring devices enabling the instructor to listen and speak to the students individually or as a group*" (Perez-Paredes, 2002). Language laboratories have been practically used for foreign and second language teaching since around 1950. However, its origin dates back to Edison's invention of tin foil phonograph in 1877. As it has happened with all technological inventions, the phonograph was not invented to be used for language teaching. The first purpose of the phonograph was the preservation and reproduction of sound. (Kitao, 1995). Bedre (2008) defines a language laboratory as a room in a school, college, training institute, university or academy that contains special equipment to help students learn foreign languages by listening to tapes or CDs, watching videos and recording themselves. Thus, the language laboratory is an audio or audio-visual installation used as an aid in modern language teaching.

English language laboratory is very useful for enriching the communication skills as it provides the facility where a student can learn a language with the help and guidance of a teacher through a system, to improve his/her speaking and listening capacity. The language lab can receive inputs from recorded tapes, audios and videos, CDs, etc. A proficient teacher in English language is the only external requirement to monitor the students during the learning process. These labs have advanced remote monitoring facility, which enables the teacher to monitor all students through a master control. Language lab helps students to learn pronunciation, accent, stress and all other aspects of the phonetics of a language. Effective communicative training programmes for the general public, private and corporate sectors, junior and senior level officers can be given through the lab. Web-content creation, the setting up of in-house news magazines, corporate publicity and identity, and teaching materials can be generated through the language laboratory. Experts can utilize the laboratory for creating and editing scientific and technical materials for teaching language. The language laboratory enables one to conduct courses for various groups of people like students, faculties,

business people, etc. Online courses and paperless examinations can be conducted through the language laboratory as well (Deepika & Kalaiarasan 2012).

Review of Literature

Cakir (2011) investigated the reliability and validity of a Turkish adaptation of Technology-Rich Outcomes-Focused Learning Environment Inventory (TROFLEI), which was developed by Aldridge, Dorman, and Fraser. A sample of 985 students from 16 high schools (Grades 9-12) participated in the study. Translation process followed translation committee, back translation, and decentralizing methods by teacher educators. The construct validity of the scale was examined with exploratory factor analysis followed by the confirmatory factor analysis, which tested the original scale model. Cronbach alpha correlation coefficients, corrected item-total correlations, and t-tests between items' means of upper 27%-lower 27% points were also calculated. In contrast to original 80 items scale, Turkish form of TROFLEI consisted of 77 items after 3 items were dropped. Exploratory and confirmatory factor analysis results supported the original 10-factor structure. The Cronbach Alpha coefficients varied between 0.81 and 0.92. Corrected item-total correlations ranged from 0.33 to 0.67. According to t-test results, differences between each item's means of upper 27% and lower 27% points were significant. Goodness of fit indices of confirmatory factor analysis indicated a good fit between the original model and data. The results of this research provide strong evidence of the sound psychometric properties of Turkish form of TROFLEI.

Gupta and Fisher (2012) reported that the adoption of technology has created a major impact in the field of education at all levels. This study, which was the first of its kind in India, reports the use of a modified form of Technology-Rich Outcomes-Focused Learning Environment Inventory (TROFLEI) for assessing students. Analysis of data from 705 students from 15 classes provided evidences for the questionnaire in Indian Science Classroom settings. The same data were used for studying gender differences and associations between student's perceptions of their technology supported learning environments and learning outcomes (attitudes towards science, academic efficacy and academic achievement). Significant gender differences in technology-supported learning environments have also been reported in this study. This research study happens to be the first of its kind in this region and should provide a thrust towards the use of technology-supported classroom for effectively teaching other school subjects.

Kour (2013) conducted a study to assess the learning environments of technology supported mathematics class rooms of selected private schools of Jammu city at the secondary level. The study utilizes the Technology Rich Outcomes Focused Learning

Environment Inventory (TROFLEI), Developed by Gupta (2007) which has nine scales: student's cohesiveness, teacher support, involvement, task orientation, investigation, cooperation, equity, differentiation and technology teaching. Sample was collected from 250 students studying mathematics in 9^{th} & 10^{th} classes in five private co-educational schools within the age group of 13 to 16 years. The results of study reported that the TROFLEI was a reliable and valid instrument for assessing the learning environments in technology rich mathematics classrooms. The results also show that students usually want more of technology supported mathematics teaching in their classrooms and prefer learning mathematics using technology which they find interesting, lively and informative. Significant associations were also reported between the students' perceptions of their technology rich learning environments and their attitude towards mathematics and academic efficacy. No significant gender differences in technology-rich learning environments have been reported in the study.

Welch et al., (2014) explored the relationship of gender between actual and preferred classroom environment and use of technology in the science classroom of Turkish students. Data was collected from 985 school students from twelve districts. Stratified random sampling procedures were employed. The Technology-Rich Outcomes-Focused Learning Environment Inventory (TROFLEI) developed by Aldridge & Fraser (2003) was used in this study. The TROFLEI was translated into Turkish using a multistep process. Independent sample t-test was conducted on each of the scale items to evaluate the relationship between gender and the students' actual and preferred use of technology in the science classroom. Findings show that differences clearly exist between genders in their actual and preferred perceptions of classroom environment and their use of technology in the science classroom.

In a study conducted by Kumari, Goswami and Gupta (2015) the students' perceptions of the learning environments of technology supported teacher education classrooms in relation to three variables, i.e., previous qualification, gender and teaching subjects was studied. The tool used for the study was the modified form of Technology–Rich Outcomes-Focused Learning Environment Inventory (TROFLEI). Analysis of data of 317 teacher trainees from different Colleges of Education provides evidence for the reliability and validity of the Questionnaire. The same data was taken for studying the gender differences and teaching subjects. The results suggested that positive associations existed in students' perceptions in their technology supported learning environments. Analysis of gender and teaching subjects also suggests that there are some differences in technology-supported learning environments as assessed by the modified TROFLEI.

Objectives of the Study

The main objectives of this study were a) to assess the psychosocial learning environments in a tablet based English language lab b) to compare the actual and preferred learning environment in a tablet based English language lab c) to investigate associations between the attitude towards English and tablet based English language lab classroom learning environments d) to investigate whether gender differences exist in a tablet based English language lab and e) to assess the effectiveness of the tablet based English language lab for use with 8thand 9th class students.

Tool Used in the Study

The Technology-Rich, Outcomes-Focused Learning Environments Inventory (TROFLEI) was used to assess the effectiveness and learning environments in a tablet based English language lab for use with 8th and 9th class students. The original version of the TROFLEI consisted of 80 items assigned to 10 scales (eight items per scale). The questionnaire was available in two forms, the Actual and the Preferred. The Actual Form measured the classroom environment in its current form while the Preference Form measured perceptions of students' ideal or preferred classroom environments. The students respond to items using a five-point frequency response format (viz. Almost Never, Seldom, Sometimes, Often, Almost Always). Apart from the 9 scales, one more scale was available with the questionnaire to assess the attitude of students.

Gupta, (2012), for the first time used the Technology-Rich Outcomes-Focused Learning Environment Inventory (TROFLEI) in India in conjunction with attitude scale to assess the learning environments in a technology-supported science classroom. The Modified TROFLEI consisted of nine learning environment scales having 72 items (eight in each scale). The authors used one additional self-made questionnaire to assess the effectiveness of the Tablet based English Language Lab. The various scales of the TROFLEI along with their description are given in Table 1.

Table 1: Description for Each Scale and Example of Items in the modified Technology-Rich Outcomes-Focused Learning Environment Inventory (TROFLEI) Questionnaire

No.	Scale Name	Scale Description	Item
1.	Student Cohesiveness (SC)	The extent to which student know, help and are supportive of one another.	I make friendships among students in this class.
2.	Teacher Support (TS)	The extent, to which the teacher helps, befriends trusts and is interested in students.	The teacher takes a personal interest in me.
3.	Involvement (IV)	The extents, to which students have attentive interest, participate in discussions, do additional work and enjoy the class.	I discuss ideas in class.
4.	Investigation (IN)	The extent to which skills and processes of enquiry and their use in problem solving and investigation are emphasised.	I know the goals for this class.
5.	Task Orientation (TO)	The extent to which it is important to complete activities planned and stays on the subject matter.	I carry out investigations to test my ideas.
6.	Cooperation (CO)	The extent to which students cooperate rather than compete with one another on learning tasks.	I cooperate with other students when doing assignment work.
7	Equity (EQ)	The extent to which students are treated equally by the teacher.	I am treated the same as other students in this class.
8	Differentiation (DI)	The extent to which teachers cater for students differently on the basis of ability, rate of learning and interests.	I work at my own speed.
9	Technology Teaching (TT)	The extent to which students find learning English through the use of tablet interesting, lively and informative.	I look forward to learning English through tablet based language lab.

Responses of the items are scored 1, 2, 3, 4, 5 respectively, for the responses Almost Never, Seldom, Sometimes, Often, Very Often. Missing or invalid responses are scored 3, the mid- range value.

Findings and Results

The results and findings of the study are presented in the following sections:

Validation of the TROFLEI

The data for the modified TROFLEI were collected from a sample of 138 students in two classes i.e. 8th and 9th who studied English in a tablet based English language lab and were analysed for determining the reliability and validity of the TROFLEI questionnaire. Two indices for scale reliability and validity were generated for both the Actual and Preferred Forms separately. The results of the two statistical indices are reported in Table 2. The scale reliability estimates for the different scales of the TROFLEI using the individual student as the unit of analysis ranged from 0.52 for the Differentiation scale to 0.74 for the Task Orientation scale in the Actual Form and from 0.52 for the Differentiation scale to 0.70 for the Task Orientation scale in the Preferred Form. These indices of reliability are comparable to those in past studies that have used the TROFLEI (Gupta & Fisher, 2012). The reliability results of the TROFLEI were consistently above 0.50. This suggests that the TROFLEI can be considered a reliable tool for use in tablet based English language labs (De Vellis, 1991). The Discriminant validity results (mean correlation of a scale with other scales) for the nine scales of the TROFLEI were calculated by using the individual as a unit analysis. The Discriminant validity values range from 0.33 for the Differentiation scale to 0.48 for the Cooperation scale in the Actual form and from 0.39 for the Differentiation scale to 0.54 for the Cooperation scale in the Preferred form (Table 2).

Table 2: Internal Consistency Reliability (Cronbach Alpha Coefficient), Discriminant Validity (Mean Correlation with Other Scales) for the Modified TROFLEI

Scale Name	No. of Items	Alpha Reliability		Mean Correlation with other scales	
		Act.	Pref.	Act.	Pref.
Student Cohesiveness (SC)	8	0.64	0.63	0.41	0.50
Teacher Support (TS)	8	0.59	0.60	0.40	0.41
Involvement (IN)	8	0.56	0.57	0.47	0.49
Task Orientation (TO)	8	0.74	0.70	0.47	0.51
Investigation (IV)	8	0.63	0.68	0.42	0.44
Cooperation (CO)	8	0.63	0.65	0.48	0.54
Equity (EQ)	8	0.60	0.67	0.39	0.48
Differentiation (DI)	8	0.52	0.52	0.33	0.39
Technology Teaching (TT)	8	0.60	0.59	0.37	0.46

* Significant at $p<0.001$ n = 138
Act. Means Actual and Pref. means Preferred

Validation of the Attitude Scale

To assess students' attitude towards English, data was collected on one scale, namely, the Attitude towards English scale. There were in all 8 items in the scale. The data on this scale was collected from a sample of 138 students from 8th and 9th classes. The internal consistency reliability (Cronbach alpha coefficient) for the scale was computed with the individual as the unit of analysis. The results are shown in Table 3.

Table 3: Internal Consistency Reliability (Cronbach Alpha Coefficient) for the Attitude towards English

Scale Name	No. of Items	Alpha Reliability
Attitude Towards English	8	0.63

* Significant at $p < 0.01$
n = 138

The scale reliability for the Attitude towards English scale is 0.63. The reliability result of the Attitude towards English scale was above 0.50. This suggested that this scale could be used as a reliable tool (De Vellis, 1991) in a tablet based English language lab to assess the attitude of students towards English.

Means and Standard Deviations on the TROFLEI

The data on the nine scales of the TROFLEI were collected from 138 students in two classes i.e. 8th and 9th who have been studying English through a tablet based English language lab. Item means and standard deviations were computed to determine the nature of classroom learning environments. The data obtained are presented in Table 3.

Table 3: Means Standard Deviations (SD) and Significance of Difference between Means (t) for the Modified TROFLEI

Scale Name	No. of Items	Mean		Standard Deviation(SD)	
		Act.	Pref.	Act.	Pref.
Student Cohesiveness (SC)	8	3.65	3.47	0.68	0.68
Teacher Support (TS)	8	3.22	3.21	0.61	0.60
Involvement (IN)	8	3.36	3.38	0.62	0.63
Task Orientation (TO)	8	3.55	3.42	0.75	0.79
Investigation (IV)	8	3.31	3.29	0.69	0.64
Cooperation (CO)	8	3.41	3.41	0.69	0.71
Equity (EQ)	8	3.25	3.31	0.67	0.66
Differentiation(DI)	8	3.26	3.24	0.62	0.62
Technology Teaching (TT)	8	3.25	3.30	0.70	0.66

* Significant at $p<0.001$ n = 138

From Table 3, it can be seen that the mean scores of the different scales of the TROFLEI ranged from 3.22 for the Teacher Support scale to 3.65 for the Student Cohesiveness scale in the Actual Form. The mean scores for the Involvement, Task Orientation, Investigation, Cooperation, Equity scale, Differentiation and Technology Teaching scales are 3.36, 3.55, 3.31, 3.41, 3.25, 3.26, and 3.25 respectively. This shows that students were generally able to perceive the tablet based English language lab as beneficial for them and was being used quite often in the day-to-day teaching of English in the schools.

An examination of the mean scores in the Preferred Form of the TROFLEI as given in Table 3 shows that the mean scores ranged from 3.21 for the Teacher Support scale to 3.47 for the Student Cohesiveness scale. The mean score for the, Involvement, Task Orientation, Investigation, Cooperation, Equity, Differentiation and Technology Teaching scales are 3.38, 3.42, 3.29, 3.41 3.24, and 3.30 respectively. This indicates that students usually want more usage of tablets in English language lab and though the existing learning environments are positive, the average item mean for students' score on the Preferred Form is high. This shows that the students would prefer enriched learning environments than the one they presently perceived. The values of the standard deviations in both the Actual and Preferred Form of the TROFLEI are less than 1, which suggests that there are no major deviations in students' perceptions of their learning environments in a tablet based English language lab.

Means and Standard Deviations on the Attitude Towards English Scale

From the data collected for the attitude scale, the value of the mean is 3.17 (see Table 4). The high mean score points towards the fact that generally students exhibit a positive attitude towards English when taught in a tablet based English language lab. This shows that the students feel that they are successful when studying in a tablet based English language lab.

Table 4: Means and Standard Deviations for the Attitude towards English Scale

Scale Name	Mean	Standard Deviation
Attitude Towards English	3.17	0.62

n = 138

Comparison of the Actual and Preferred Learning Environments in a Tablet Based English Language Lab

To compare the Actual and Preferred learning environments in a tablet based English language lab, means, standard deviations and significance of the difference between means (t-test for independent samples) was computed.

The results of the comparison between the Actual and Preferred learning environments in a tablet based English language lab are given in Table 5. The results show that two out of nine Scales i.e. Student Cohesiveness and Task Orientation of the TROFLEI differ significantly ($p<0.01$ & $p<0.05$) in terms of their Actual learning environments in a tablet based English language lab. The t- value for the statistically significant scales ranges from 2.42 ($p<0.05$) for the Task Orientation scale to 3.15 ($p<0.01$) for the Student Cohesiveness scale. This suggests that the students are more tasks oriented and cohesive in the existing classroom when learning English through tablet based English language lab than in the preferred settings.

Table 5: Means, Standard Deviations and Significance of Difference between Means for Actual and Preferred form of Modified TROFLEI

Scale	Types of scale	Mean	Mean Difference (M-F)	Standard Deviation	*t*
Student Cohesiveness	Actual	3.65	0.18	0.68	3.51**
	Preferred	3.47		0.68	
Teacher Support	Actual	3.22	0.01	0.61	0.24
	Preferred	3.21		0.60	
Involvement	Actual	3.36	-0.02	0.62	0.42
	Preferred	3.38		0.63	
Task Orientation	Actual	3.55	0.13	0.75	2.42*
	Preferred	3.42		0.79	
Investigation	Actual	3.31	0.02	0.69	0.54
	Preferred	3.29		0.64	
Cooperation	Actual	3.41	0	0.69	0.14
	Preferred	3.41		0.71	
Equity	Actual	3.25	-0.06	0.67	1.29
	Preferred	3.31		0.66	
Differentiation	Actual	3.26	0.02	0.62	0.54
	Preferred	3.24		0.62	
Technology Teaching	Actual	3.25	-0.05	0.70	1.09
	Preferred	3.30		0.66	

** Significant at $p<0.01$ Males: n = 78; Females: n = 60

To Investigate Associations between the Attitude towards English and Tablet Based English Language Lab Classroom Learning Environments

Association of the Attitude towards English Scale and the Actual Form of the TROFLEI

To find associations between the attitudes towards English and the tablet based classroom learning environments for the Actual from of TROFLEI, simple and multiple correlation analysis, followed by computation of the regression coefficient was done. The results of these analyses are shown in Table 6.

The results from Table 6 indicates that for simple correlation (*r*), eight scales out of nine scales of TROFLEI are statistically significant and positively associated with students attitude towards their subject i.e. English ($p<0.01$) at the individual level of

analysis. The values of correlation range from -0.03 for the Differentiation scale to 0.39 for the Task Orientation scale in the Actual form. The multiple correlation (R) is 0.49 at the individual level of analysis, which is statistically significant (p<0.001). The R^2 value indicates that 24 percent of the variance in the students' attitude towards English can be attributed to the learning environments in a tablet based English language lab. Standardized regression values were calculated to provide information about the unique contribution of each learning environments scale to the Attitude towards English scale. Standardized regression values were calculated. The β values ranged from -0.03 for the Involvement scale to 0.19 for the Task Orientation scale in the Actual form. However, none of the scales are significantly associated with the Attitude towards English scale. Hence, no scale of TROFLEI is an independent predictor of individual student's attitude towards English in a tablet based English language lab.

Table 6: Associations between the TROFLEI Scales and Attitude towards English in terms of Simple Correlation (r), Multiple Correlation (R) and Standardized Regression Coefficient (β)

Scale Name	Attitude Towards English	
	r	*β*
Student Cohesiveness (SC)	0.29**	0.12
Teacher Support (TS)	0.18**	0.09
Involvement (IN)	0.24**	-0.03
Task Orientation (TO)	0.39**	0.19
Investigation (IV)	0.31**	0.16
Cooperation(CO)	0.32**	0.11
Equity(EQ)	0.18**	-0.01
Differentiation(DI)	-0.03	-0.27
Technology Teaching (TT)	0.25**	0.10
Multiple Correlation	R = 0.49***	
	R^2 = 0.24	

*** Significant at p<0.001, ** Significant at p<0.01, * Significant at p<0.0,
n = 138 students

Association of the Attitude towards English Scale and the Preferred Form of the TROFLEI

Simple (r) and multiple correlations (R) along with computation of the regression coefficient (β) were used to study the associations between the attitude towards English and tablet based classroom learning environments in the Preferred Form of TROFLEI. Table 7 illustrates the results of the statistical analysis.

The results from Table 7 indicate that for simple correlation (r) eight scales out of nine scales of TROFLEI are statistically significant and positively associated with student's attitude towards their subject i.e. English (p<0.01) at the individual level of analysis. The values of correlation range from 0.05 for the Differentiation scale to 0.41 for the Task Orientation scale and cooperation scale in the Preferred Form. The multiple correlation (R) is 0.55 at the individual level of analysis, which is statistically significant (p<0.001). The R^2 value indicates that 30 percent of the variance in the students' attitude towards English can be attributed to the preferred learning environments in a tablet based English language lab. Standardized regression values were calculated to provide information about the unique contribution of each learning environments to the Attitude towards English scale. Standardized regression values were calculated. The β values ranged from 0.55 for the Involvement scale to 0.31 for the Technology teaching scale in the Preferred Form. However, none of the scales are significantly associated with the Attitude towards English scale. Hence, no scale of TROFLEI is an independent predictor of individual students' attitude towards English in a tablet based English language lab

Table 7: Associations between the TROFLEI Scales and Attitude Towards English in terms of Simple Correlation (r), Multiple Correlation (R) and Standardized Regression Coefficient (β)

Scale Name	Attitude Towards English	
	r	*β*
Student Cohesiveness (SC)	0.37**	0.08
Teacher Support(TS)	0.25**	0.17
Involvement(IN)	0.25**	-0.05
Task Orientation(TO)	0.41**	0.14
Investigation(IV)	0.29**	0.09
Cooperation(CO)	0.41**	0.16
Equity(EQ)	0.27**	-0.08
Differentiation (DI)	0.05	-0.30
Technology Teaching (TT)	0.39**	0.31
Multiple Correlation	R = 0.55***	
	R^2 = 0.30	

*** Significant at p<0.001, ** Significant at p<0.01, * Significant at p<0.05

n = 138 students

Gender Differences in a Tablet Based English Language Lab

To investigate whether gender differences exist in a tablet based English language lab, the data was collected from 138 students of only one private high school. In the present sample of 138 students, there were 78 (56.5%) male students and 60 (43.4%) female students, who studied in a tablet based English language lab.

Gender Differences in the Actual Form of the TROFLEI

The means and standard deviations for each of the male and female students were computed followed by a test of significance of difference between means (*t*-test for independent samples) on the nine scales of the TROFLEI. The data obtained are presented in Table 8.

The results of the gender differences between the male and female students in the Actual form of the TROFLEI are presented in Table 8. Data shows that out of nine scales of the TROFLEI only one scale i.e. Cooperation with a *t* value of 2.32 is statistically significant ($p<0.05$). In the Cooperation scale, males have a higher mean score than females. This shows that male students are more cooperative with other students when doing assignment work and also share books and resources with other students when doing assignments. Male students work with other students on projects in their class and cooperate with other students on class activities.

Table 8: Means, Standard Deviations and Significance of Difference between Means for Gender Differences in Students' Perceptions of Learning Environment as measured by the Actual form of the Modified TROFLEI

Scale	Gender	Mean	Mean Difference (M-F)	Standard Deviation	*t*
Student Cohesiveness	Males	3.68	0.06	0.68	0.50
	Females	3.62		0.69	
Teacher Support	Males	3.20	-0.05	0.64	0.52
	Females	3.25		0.57	
Involvement	Males	3.39	0.07	0.62	0.67
	Females	3.32		0.62	
Task Orientation	Males	3.55	0.01	0.70	0.10
	Females	3.54		0.81	
Investigation	Males	3.29	-0.04	0.74	0.37
	Females	3.33		0.62	

Cooperation	Males	3.53	0.27	0.69	2.32*
	Females	3.26		0.68	
Equity	Males	3.31	0.13	0.65	1.16
	Females	3.18		0.68	
Differentiation	Males	3.26	0.00	0.64	0.04
	Females	3.26		0.59	
Technology Teaching	Males	3.27	0.05	0.70	0.38
	Females	3.22		0.70	

** Significant at $p<0.01$ Males: n = 78; Females=60

Gender Differences in the Preferred Form of the TROFLEI

The means and standard deviation for each of the male and female students were computed followed by a test of significance of difference between means (*t*-test for independent samples) on the nine scales of the TROFLEI. The data obtained statistically are presented in Table 9.

The results of the gender differences between the male and female students in the preferred form of the TROFLEI are presented in table 9 and shows that the none of the scales of TROFLEI differ significantly ($p<0.01$, $p<0.05$). So, there are no significant gender differences between the male and female students. This means that both male and female students of 8th and 9th class perceive their tablet based English language lab learning environment in a similar manner.

Table 9: Means, Standard Deviations and Significance of Difference between Means for Gender Differences in Students' Perceptions of Learning Environment as measured by the Preferred Form of the Modified TROFLEI

Scale	Gender	Mean	Mean Difference (M-F)	Standard Deviation	*t*
Student Cohesiveness	Males	3.56	0.21	0.66	1.82
	Females	3.35		0.68	
Teacher Support	Males	3.16	-0.11	0.65	1.09
	Females	3.27		0.53	
Involvement	Males	3.46	0.18	0.62	1.63
	Females	3.28		0.65	
Task Orientation	Males	3.43	0.03	0.76	0.19
	Females	3.40		0.83	
Investigation	Males	3.29	0.01	0.71	0.15
	Females	3.28		0.54	
Cooperation	Males	3.47	0.15	0.70	1.18
	Females	3.32		0.71	
Equity	Males	3.39	0.18	0.65	1.57
	Females	3.21		0.67	
Differentiation	Males	3.26	0.05	0.65	0.48
	Females	3.21		0.58	
Technology Teaching	Males	3.33	0.06	0.67	0.44
	Females	3.27		0.65	

** Significant at $p<0.01$ Males: n = 78; Females: n = 60

Gender Difference on Attitude towards English

Gender differences on attitude towards English are also investigated. The means and standard deviations for each of the male and female groups were computed followed by a significance of the difference between means (*t*-test), to find out gender differences on the student outcomes. The data are shown in Table 10.

Table 10: Means, Standard Deviations and Significance of Difference between Means for Gender Differences in Attitude towards English

Scale	Gender	Mean	Mean Difference (M-F)	Standard Deviation	t
Attitude Towards	Males	3.22	0.10	0.65	0.91
English	Females	3.12		0.58	

** Significant at $p<0.01$

Males: n =78; Females: n = 60

It is evident from Table 10 that there are no gender differences between male and female students in their attitude towards English, which shows that males and females have a similar attitude towards English in a tablet based English language lab environment.

To Assess the Effectiveness of the Tablet Based English Language Lab for Use With 8th and 9th Class Students

Apart from the specific research objectives laid for the study, the last objective of this research was to demonstrate the effectiveness of the tablet based English language lab for teaching English. For this purpose, an evaluation survey questionnaire containing 20 items was administered to the students. This survey was administered to a sample of 138 students across two classes i.e. 8th and 9th who had studied English through the tablet based English language lab and earlier responded to the TROFLEI questionnaire. Each item in the survey could be responded in terms of 'Yes', 'No' and 'Doubtful' categories. After the administration of the survey, the responses given by the students were transferred to an Excel worksheet and the frequencies of responses to each item in terms of 'Yes', 'No' and 'Doubtful' responses were noted to arrive at an index of the students' reaction towards tablet based English language lab. This was mainly done to determine the effectiveness of tablet based English language lab for use with 8th and 9th classes. The obtained frequencies were converted into percentages for the purpose of interpretation. The results are shown in Table 11.

The obtained results give a fairly good idea of the overall positive reactions of the students regarding the effectiveness of tablet based English language lab. Nonetheless, the entire gamut of responses can be summed up by saying that almost 70 to 95% of the students in the group look forward to learning English in a tablet based English language lab rather than through more conventional methods. They also perceive their tablet based English language lab to be more interesting, livelier, relaxed, and enjoyable. The students were more attentive, they found answering questions easier and the atmosphere more relaxed in a tablet based English language lab. Students

also felt that remembering facts in English is easier after studying in a tablet based English language lab and the teacher paid individual attention to them in such classes. In these response, lies the success of the present experiment in particular and of the general superiority and hence desirability of introducing a tablet based English language lab for teaching of English.

Table 11: Responses to Tablet Based English Language Lab Evaluation Survey

No.	Item	Yes	%	No	%	Doubtful	%
1	I found learning English in a tablet based English language lab interesting.	88	64%	20	14%	30	22%
2	I was able to learn faster through tablet based English language lab.	90	65%	27	20%	21	15%
3	I was more attentive while learning in tablet based English language lab that what I am in the classroom.	126	91%	12	9%	0	0%
4	I felt that I was getting better individual attention in the tablet based English language lab.	99	72%	10	7%	29	21%
5	I could follow the subject matter on the tablet screen easily than the text book.	105	76%	28	20%	5	4%
6	I found remembering facts in English easier after studying in the tablet based English language lab.	121	88%	4	3%	13	9%
7	I found teaching of English by the teacher to be livelier in tablet based English language lab.	110	80%	10	7%	18	13%
8	Responses to questions were scored quickly in the tablet based English language lab.	125	91%	13	9%	0	0%
9	The knowledge of results was very motivating for me to study English in the tablet based English language lab.	130	94%	8	6%	0	0%
10	The teacher was able to correct my mistakes in an effective manner.	98	71%	10	7%	30	22%
11	Learning through tablet was an enjoyable activity as compared to regular class room teaching.	105	76%	30	22%	3	2%
12	The atmosphere while studying English through the tablet based English language lab was more relaxed than in the regular classroom.	112	81%	12	9%	14	10%
13	There was a feeling of group learning in the tablet based English language lab than in the regular classroom.	98	71%	22	16%	18	13%
14	The teacher was more helpful in the tablet based English language lab.	90	65%	34	25%	14	10%
15	I could revise my lesson better in a tablet based English language lab.	125	91%	13	9%	0	0%

16	I found the questions asked at the end of the topic easy to answer	99	72%	32	23%	7	5%
17	Learning English through tablet based English language lab was very boring.	20	15%	100	72%	18	13%
18	I was not afraid of answering questions asked on tablet screen as compared to when teacher asks questions.	90	65%	25	18%	23	17%
19	I found learning English through the tablet based English language lab to be a waste of time and effort.	30	22%	90	65%	18	13%
20	I would look forward to learning English through tablet based English language lab.	98	71%	40	29%	0	0%

Conclusion

A major contribution of the present study is the validation of a widely-applicable and distinctive questionnaire (TROFLEI) to study the learning environments in tablet based English language lab and assess its effectiveness for use with 8th and 9th class students. The instrument used wad modified TROFLEI. The results show that students were generally able to perceive the tablet based English language lab as beneficial for them and was being used quite often in the day-to-day teaching of English in the schools. Results on comparison of actual and preferred learning environments in a tablet based English language lab shows that the students were more tasks oriented and cohesive in the existing classroom when learning English through tablet based English language lab than in the preferred setting. The result on gender differences shows that male students were more cooperative with other students when doing assignment work and also share books and resources with other students when doing assignments. Male students work with other students on projects in their class and cooperate with other students on class activities. The results of the survey showed that tablets based language laboratory settings are really liked by students as it allows them the freedom to learn at their own pace and time. Moreover, the classroom becomes interesting and interactive which enhances learning.

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