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Learning Environments Of Technology-supported Teacher Education Classrooms In Relation To Gender, Previous Qualifications And Teaching Subjects

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The students of 21st century have very high learning expectations. Concept of teaching and learning has changed tremendously due to globalization and explosion of knowledge. New tools of Information and Communication Technologies (ICTs) may contribute considerably towards all phases of educational process including the area of teacher education. The need for teacher training is widely acknowledged in the light of this development. The aim of this study was to assess 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. A sample of 317 students from six classes was taken. The tool used for the study was the modified form of Technology–Rich Outcomes-Focused Learning Environment Inventory (TROFLEI). In these classrooms, different information and communication technology tools like laptops, computers, and multimedia projectors, interactive boards etc. are regularly used to communicate, disseminate, store, and manage curriculum information for the benefit of the students. Results of the study strongly support the reliability and validity of the questionnaire in these classroom settings. The results show that the students perceive their technology-supported learning environment in a positive manner. Results on investigation of previous qualification, gender differences and teaching subjects suggest that there exist some differences in technology-supported learning environments as measured by the TROFLEI.

Keywords: Learning Environments, TROFLEI, Teacher Education, Technology Supported Classrooms

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INTRODUCTION

An educational institution performs a significant function of providing learning experiences to lead their students from the darkness of ignorance to the light of knowledge. The key personnel in the institutions who play an important role to bring about this transformation are teachers. The teaching fraternity has constituted an important segment at every level of education. Common sense suggests that a good teachers matter, as they are invaluable assets for nation building. In our country, teachers are being prepared and trained by teacher education institutions through a structured teacher education programme.

Today, nations across the globe are networked more closely than ever before. This has a deep and profound effect upon the functioning of higher education sector and has literally transformed the way we look at all aspects of quality in higher education, particularly teacher education. Institutions of teacher education play vital roles in the global education community; they have the potential to bring changes within educational systems that will shape the knowledge and skills of future generations. The Teacher education programme has to ensure that teachers fulfil the requirements of at least a minimum of knowledge base as a pre-requisite for certifying the individuals' competence to teach. By integrating ICT as an integral teaching and learning tool into pre-service teacher training courses it was found that exposure to ICT during their training is expected to increase graduating teachers' willingness to integrate it into their own classroom curricula (Steketee, 2005).

Integration of technology to support teaching and learning is necessary for improving learning outcomes and preparing students for the demanding job market. ICT being latest, it can be used both at school and higher education levels in the many areas like teaching, evaluation, diagnostic testing, remedial teaching, psychological testing, development of virtual laboratory, online tutoring etc. Technology has the potential to enhance the way learning takes place in educational institutions. By providing access to information and learning resources as well as an array of useful informational, instructional, and communication tools, technology can strengthen the teaching and learning environments. Technology resources can help differentiate instruction by providing rich environments for learning.

Research on the relationship between students' achievement and the quality of the classroom learning environments (Goh, 2002) are abundant and findings from these studies justified that there is a strong relationship between these two concepts (Fraser, 1991; Köse & Küçükoğlu, 2009). Unfortunately, a great attention is given to student achievement whereas only little attention is paid to the learning environments (Fraser, 2002). Undoubtedly, assessment of

the classroom environment provides clues about how classrooms should be organized. Studies have revealed strong ties between the learning environment variables and students 'cognitive and affective learning products and related students' perceptions of their learning environments with their learning (den Brok, Brekelmans, & Wubbels, 2004; Fraser, Aldridge, & Adolphe, 2010). Instruction and learning can be improved with a systematic review and evaluation of learning environments (Hofstein, Nahum, & Shore, 2001). Using instruments directly in different countries is almost impossible because of the constraints on spoken language, cultural, and social differences. In this respect, MacLeod and Fraser (2010) indicated that translations of validated learning environment questionnaires have provided valuable tools for researchers in many countries.

Review Of Related Literature

Koul, Fisher and Shaw (2010) validated the Technology-Rich Outcome-Focused Learning Environment Inventory (TROFLEI) in New Zealand settings. They used an 80-item 10-scale instrument administered to 1,027 students from 30 science classes. They investigated differences between students' perceptions of actual and preferred learning environments at year levels and gender wise; and to investigate associations between science classroom learning environment, attitude and self-efficacy. The validity and reliability of the TROFLEI and three affective outcome scales for use in New Zealand were established. Differences in actual and preferred scores confirmed that students participating in the study sought better learning environments. Female students generally perceived their technology-related learning environment more positively. Year-13 students had consistently higher means for most (8 out of 13) of the learning environment dimensions. Statistically significant associations were found between the scales of TROFLEI and three affective outcome scales.

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 ($\chi 2$ /sd=2,95, RMSEA=0.051, RMR=0.078, SRMR=0.056, CFI=0.97, TLI=0.97). The results of this research provide strong evidence of the sound psychometric properties of Turkish form of TROFLEI.

Gupta and Fisher (2012) assessed students' perceptions of their learning environments in technology-supported science classrooms in Indian classroom settings. It reported the use of a modified form of Technology-Rich Outcomes-Focused Learning Environment Inventory (TROFLEI). Analysis of data from 705 students from 15 classes provided evidence for the reliability and validity of the questionnaire in Indian science classrooms. The same data also were used for studying gender differences and associations between students' perceptions of their technology-supported learning environments and three learner outcomes (attitude towards science, academic efficacy and academic achievement).

Welch, Cakir, Peterson and Ray (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.

Background Of The Study

The term 'learning environment' is most often associated with the psychological or emotional conditions of the classroom as well as the social and cultural influences that are present. The concept of human environment has existed since Lewin's (1936) seminal work in non-educational settings recognised that both the environment and its interaction with characteristics of the individual are potent determinants of human behaviour. Results of studies conducted over the past 40 years have provided convincing evidence that the quality of

classroom environment in schools is a significant determinant of student learning (Fraser 2007, 2012). Students learn better when they perceive the classroom environment more positively (Dorman & Fraser 2009).

Researchers have developed numerous questionnaires designed to measure perceptions of a range of dimensions pertinent to the learning environment (Fraser, 1998). Review of past research gives detailed information regarding the work done by a number of researchers and educators in studying the impact of learning environments on education. However, few studies have been conducted in studying the learning environments of teacher education classrooms. The present study is significant as it would be one of the first studies to use the TROFLEI (Technology-Rich, Outcomes-Focused Learning Environments Inventory) in a teacher education college setting to study the students' perceptions of their learning environments in a technology supported classroom at the teacher education level.

OBJECTIVES OF THE STUDY

The specific objectives of the research study are:

1. To study the technology supported learning environments in teacher education classrooms.
2. To investigate students' perceptions about technology-supported learning environments in a teacher education classroom with reference to their previous qualification.
3. To investigate students' perceptions about technology-supported learning environments in a teacher education classroom with reference to their gender.
4. To investigate students' perceptions about technology-supported learning environments in a teacher education classroom with reference to their discipline (teaching subjects).

HYPOTHESES OF THE STUDY

To fulfil the objectives of the study, following hypotheses are formulated:

1. There is no significant difference in students' perceptions about their technology-supported learning environments in a teacher education classroom with reference to their previous qualification.
2. There is no significant difference in students' perceptions about their technology-supported learning environments in a teacher education classroom with reference to their gender.

3. There is no significant difference in students' perceptions about their technology-supported learning environments in a teacher education classroom with reference to their discipline (teaching subjects).

Research Methodology

A descriptive survey method was used to conduct the study and details about the sample and the tool used are given in this section.

Sample

The sample for the study was collected with the help of Criterion Sampling technique. The sample from the college of education, which fulfilled the criterion, consisted of 317 teacher trainees (both boys and girls). Out of 317 participants, 262 (82.65%) were female students and 55 (17.35%) were male students. In the sample, 225 (70.98%) students were only graduates and 92 (29.02%) students were postgraduates, 197 (62.15%) students had opted for Arts teaching subjects and 120 (37.85%) students had opted for Science teaching subject.

Tool Used

Technology-Rich, Outcomes-Focused Learning Environments Inventory (TROFLEI) is based on the What Is Happening In This Class (WIHIC) (Fraser, Fisher, & McRobbie, 1996) and has mainly been used at the school level. Gupta (2008) modified the TROFLEI for the first time for use in Indian classroom situations. The questionnaire is available in two forms, the Actual and the Preferred. The Actual Form measured the classroom environment in its present situation while the Preferred Form measures perceptions of students' ideal or preferred classroom environments. The students respond to items using a five-point rating scale (viz. Almost Never, Seldom, Sometimes, Often, Almost Always).

The TROFLEI (Gupta, 2008) was further modified for the use at college level for the purpose of this study. First, the Investigation scale was removed from the questionnaire as it was meant for science classrooms only and a new scale Innovation was added in its place. Secondly, a decision was taken to include the Individualisation scale. Both the new scales are taken from the CUCEI, College and University Classroom Environment Inventory (Fraser and Treagust, 1986; Fraser et al., 1986). Both these scales consisted of eight items to which the same five-point response scale was applied. Scale names and descriptions of the Modified TROFLEI are shown in Table 1.

Table 1
Scale Names and Descriptions of the Modified TROFLEI.

Scale Name	Scale Description
Student Cohesiveness (SC)	The extent to which student know, help and are supportive of one another.
Teacher Support (TS)	The extent, to which the teacher helps, befriends trusts and is interested in students.
Involvement (IV)	The extent, to which students are attentive, interested, participate in discussions, do additional work and enjoy the class.
Task Orientation (TO)	The extent to which it is important to complete the activities planned and stays on the subject matter.
Innovation (IN)	Extent to which the instructor plans new, unusual activities, teaching techniques and assignments.
Cooperation (CO)	The extent to which students cooperate rather than compete with one another on learning tasks.
Equity (EQ)	The extent to which the teacher treats students equally.
Differentiation (DI)	The extent to which teachers cater for students differently on the basis of ability, rate of learning and interests.
Technology Teaching (TT)	The extent to which students find learning through the use of technology interesting, lively and informative.
Individualisation (IND)	The extent to which the teaching approaches allow students to proceed at their own pace.

RESULTS OF THE STUDY

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

Validation of the TROFLEI

First and foremost the data were analysed for determining the reliability and validity of the modified TROFLEI questionnaire for use in Indian teacher education classroom settings. The results of the three 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 0.63 for the Innovation scale to 0.87 for the Technology Teaching scale in the Actual Form and from 0.65 for the Innovation scale to 0.90 for the Technology Teaching scale in the Preferred Form. These indices of reliability are comparable to those in past studies that have used the TROFLEI (Aldridge, Dorman & Fraser, 2004; Aldridge & Fraser, 2003; Kerr, 2006; Gupta, 2011). The reliability results of the TROFLEI were consistently above 0.50. This suggested that the modified TROFLEI can be considered a reliable tool (De Vellis, 1991) with Indian students especially those enrolled in the teacher education programmes. Using the individual as the unit of analysis, the discriminant validity results (mean correlation of a scale with other scales) for the ten scales of the modified

TROFLEI ranged from 0.19 for the Individualization scale to 0.36 for the Cooperation scale in the Actual Form and between 0.19 for the Individualization scale to 0.43 for the Cooperation and Task Orientation scale in the Preferred Form (Table 2). The analysis of variance (ANOVA) was used to determine the ability of the actual version of each TROFLEI scale to differentiate between the perceptions of students in different classes. The one-way ANOVA for each scale involved class membership as the independent variable and the individual student as the unit of analysis. Table 2 reports the ANOVA eta2 results showing that five of the ten scales of TROFLEI i.e. Teacher Support, Innovation, Equity, Differentiation and Technology Teaching differentiate significantly between classes ($p<0.05$, $p<0.01$ and $p<0.001$). Thus, students within the same class perceive the environment in a relatively similar manner on these scales, while the within-class mean perceptions of the students vary between classes. The eta2 statistic (an estimate of the strength of association between class membership and the dependent variable) ranges from 0.01 for the Cooperation and Involvement scale to 0.08 for the Teacher Support and Innovation scale.

Table 2

Internal Consistency Reliability (Cronbach Alpha Coefficient), Discriminant Validity (Mean Correlation with Other Scales) and Ability to Differentiate between Classrooms (ANOVA Results) for the Modified TROFLEI.

Scale Name	No. of Items	Alpha Reliability		Mean Correlation with Other Scales		ANOVA *eta*^{2}
		Act.	Pref.	Act.	Pref.	
Teacher Support (TS)	8	0.81	0.79	0.34	0.34	0.08***
Involvement (IN)	8	0.77	0.82	0.31	0.38	0.01
Task Orientation (TO)	8	0.76	0.79	0.34	0.43	0.02
Innovation (INC)	8	0.63	0 .65	0.22	0.23	0.08***
Cooperation (CO)	8	0.78	0.83	0.36	0.43	0.02
Equity (EQ)	8	0.81	0.81	0.32	0.41	0.05**
Differentiation (DI)	8	0.74	0.74	0.24	0.30	0.04*
Technology Teaching (TT)	8	0.87	0.90	0.32	0.27	0.03*
Individualisation (IND)	8	0.76	0.77	0.19	0.19	0.01

** Significant at p<0.05 ** Significant at p<0.01 *** Significant at p<0.001 n = 317*

Act. Means Actual and Pref. means Preferred

The eta2 statistics (which is the ratio of 'between' to 'total' sum of squares) represents the proportion of variance explained by class membership.

Means and Standard Deviations on the TROFLEI

The data was collected on the ten scales of the TROFLEI from 317 students in 6 classes who have been studying through a technology-supported classroom setting. Item means and standard deviations were computed to determine the nature of the technology-supported classroom-learning environments using the TROFLEI. The statistical significance of the difference between means (t-test) of the Actual and Preferred Forms of the TROFLEI was also calculated to study the differences in the means obtained on various scales. The data obtained are presented in Table 3.

Table 3

Means, Standard Deviations (SD) and Significance of the Difference between Means (t) for the Modified TROFLEI.

Scale Name	No. of Items	Mean		Standard Deviation (SD)		*t*
		Act.	Pref.	Act.	Pref.	
Student Cohesiveness	8	4.13	4.47	0.57	0.44	12.67*
Teacher Support	8	3.41	4.01	0.76	0.65	17.03*
Involvement	8	3.26	3.96	0.62	0.63	19.06*
Task Orientation	8	4.22	4.54	0.51	0.46	14.34*
Innovation	8	3.32	3.52	0.46	0.38	7.93*
Cooperation	8	4.09	4.53	0.57	0.51	17.58*
Equity	8	4.01	4.47	0.69	0.55	15.68*
Differentiation	8	3.46	3.91	0.64	0.63	15.24*
Teaching Technology	8	4.15	4.48	0.65	0.63	11.44*
Individualisation	8	3.15	3.37	0.43	0.38	10.07*

* *Significant at p<0.001* n= 317

Act. means Actual and Pref. means Preferred

From Table 3 it can be seen that the mean scores of the different scales of the TROFLEI ranged from 3.15 for the Individualisation scale to 4.22 for the Task Orientation scale in the Actual Form of the questionnaire. It shows that students were generally able to perceive the technology-supported teaching as beneficial to them and technology was being used quite often in the day-to-day teaching in the college. An examination of the scores in the Preferred Form of the TROFLEI shows that the mean score ranged from 3.37 for the Individualisation scale to 4.54 for the Task Orientation scale. This indicates that students usually want more of technology-supported teaching in their classroom. 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 the technology-supported learning environment in their classrooms.

The results for the paired sample t-tests indicated that there is a significant difference ($p<0.001$) between the actual and preferred means for all the scales which shows that students' preferred learning environments that have more student cohesiveness, more support from the teacher than what is being provided at present, more involvement in classroom activities, more task orientation, develop more innovative ability than what students perceive they have at present, more of cooperation in learning with other students in the class, more equity, more technology-based teaching and more individual attention is required in the classroom. Although, all the scales of the TROFLEI show a good response from the students, the main objective is to improve the existing learning environments in the technology-supported classrooms and the information from the students' perceptions of their preferred learning environments gives us vital clues towards the areas that require our immediate focus for further improvement. Figure 1 represents the mean scores on the Actual and Preferred Forms of TROFLEI in a graphical form.

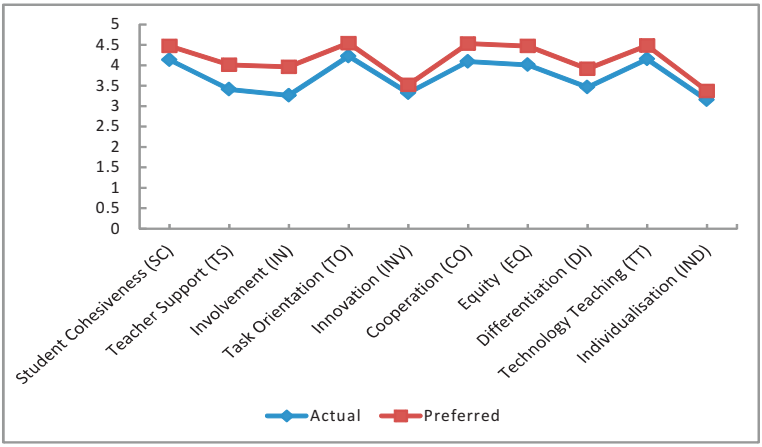

Figure 1. Mean Scores of the Actual and Preferred Forms of the TROFLEI.

Investigation of Students' Perceptions of their Technology Supported Learning Environments in Relation to Previous Qualification

From the information given in Table 4, it can be seen that out of the ten scales of the TROFLEI only one scale, i.e. Innovation with a t value of 2.12 is statistically significant ($p<0.05$). In this scale graduate students have a higher mean score than post graduate students. This means that graduate students may feel that in a technology-supported classroom, their teachers plan new and unusual class

activities. Their teaching techniques and assignments on learning tasks are modern and innovative. Thus, the hypothesis that there is no significant difference in students' perceptions about their technology-supported learning environment in a teacher education classroom with reference to their previous qualification is partially rejected.

Table 4

Means, Standard Deviations and Significance of the difference between Means (t-test) on the Modified TROFLEI based on Previous Qualifications of the students.

Scale	Previous Qualification	Mean	Mean Difference (G-P)	Standard Deviation	*t*
Student Cohesiveness	Graduation	4.10	-0.09	0.54	1.50
	Post Graduation	4.19		0.50	
Teacher Support	Graduation	3.44	0.10	0.71	1.21
	Post Graduation	3.34		0.72	
Involvement	Graduation	3.28	0.09	0.59	1.18
	Post Graduation	3.19		0.68	
Task Orientation	Graduation	4.21	-0.06	0.51	0.99
	Post Graduation	4.27		0.51	
Innovation	Graduation	3.36	0.12	0.43	2.12*
	Post Graduation	3.24		0.48	
Cooperation	Graduation	4.09	-0.01	0.55	0.22
	Post Graduation	4.10		0.62	
Equity	Graduation	3.99	-0.08	0.71	0.97
	Post Graduation	4.07		0.61	
Differentiation	Graduation	3.47	0.08	0.62	1.03
	Post Graduation	3.39		0.65	
Technology Teaching	Graduation	4.17	0.07	0.65	0.91
	Post Graduation	4.10		0.66	
Individualisation	Graduation	3.14	0.01	0.39	0.23
	Post Graduation	3.13		0.49	

**Significant at p<.05* Graduation: n=225, Post Graduation: n=92

Investigation of Students' Perceptions of their Technology Supported Learning Environments in Relation to Gender

The means and standard deviations for each of the male and female groups were computed followed by a test of significance of difference between means (t-test for independent samples) on the ten scales of the TROFLEI. The data obtained are presented in Table 5. From the information given in Table 6, it can be seen that out of ten scales of the TROFLEI only four scales, i.e. Teacher

Support with a t value of 2.61, Task Orientation with a t value of 2.31, Cooperation with a t value of 2.20 and Equity with a t value 3.38 are statistically significant ($p<0.05$, $p<0.01$ and $p<0.001$). Out of four statistically significant scales i.e. Task Orientation, Cooperation and Equity scales, female students have a higher mean score than males. This suggests that female students complete the activities planned in the class, stay on the subject matter and support one another; also they show more cooperation with one another on learning tasks in a technology-supported classroom environment. They also feel that their teachers equally treat them. Female students may be more attentive and interested to participate in classroom discussions, want to do additional work and enjoy the classroom as compared to male students. On the scale of Teacher Support, male students have a higher mean score than female students. This may suggest that male students feel their teachers are more helpful, friendly, and trustworthy and take personal interest in students work as compared to their female counterparts. Thus the hypothesis "there is no significant difference in students' perceptions about their technology-supported learning environment in a teacher education classroom with reference to their gender" is partially rejected. Figure 2 depicts the respective means of male and female students on the ten scales of TROFLEI.

Table 5

Means, Standard Deviations and Significance of the Difference between Means (t-test) on the Modified TROFLEI based on Gender.

Scale	Gender	Mean	Mean Difference (F-M)	Standard Deviation	*t*
Student Cohesiveness	Females	4.15	0.15	0.52	1.89
	Males	4.00		0.59	
Teacher Support	Females	3.36	-0.27	0.71	2.61**
	Males	3.63		0.69	
Involvement	Females	3.26	-0.02	0.62	0.22
	Males	3.28		0.63	
Task Orientation	Females	4.26	0.18	0.51	2.31*
	Males	4.08		0.49	
Innovation	Females	3.32	-0.04	0.47	0.64
	Males	3.36		0.37	
Cooperation	Females	4.12	0.18	0.57	2.20*
	Males	3.94		0.56	
Equity	Females	4.07	0.34	0.65	3.38***
	Males	3.73		0.80	
Differentiation	Females	3.43	-0.17	0.64	1.88
	Males	3.60		0.59	
Technology Teaching	Females	4.15	-0.01	0.66	0.06
	Males	4.16		0.61	
Individualisation	Females	3.15	0.01	0.44	0.05
	Males	3.14		0.38	

** Significant at p<0.05, ** Significant at p<0.01, ***Significant at p<0.001*
Female; n= 262, Male; n=55

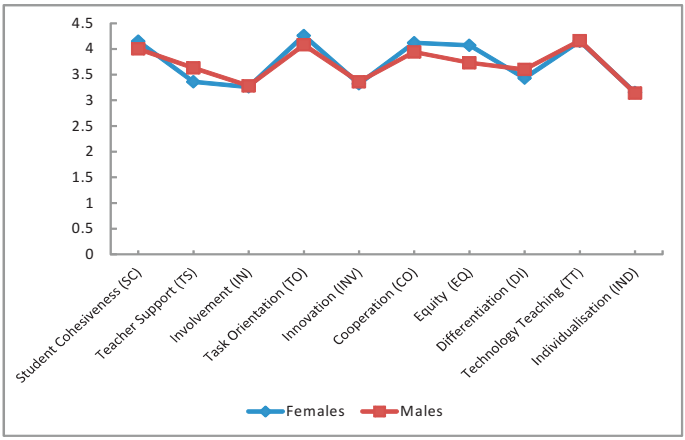

Figure 2. Mean Scores of Female and Male Students on the TROFLEI.

Investigation of Students' Perceptions of their Technology Supported Learning Environments in Relation to Teaching Subjects

The means and standard deviations for each of the arts and science groups were computed followed by a test of significance of difference between means (t-test for independent samples) on the ten scales of the TROFLEI. The data obtained are presented in Table 6. From the information given in Table 6, it can be seen that out of the ten scales of the TROFLEI only three scales, i.e. Student Cohesiveness with a t value of 2.17, Cooperation with a t value of 3.17 and Equity with a t value 2.64 are statistically significant ($p<0.05$ and, $p<0.01$). In all these three statistically significant scales, Science students have a higher mean score than Arts students. This means that students having Science as teaching subject show more cohesiveness and cooperation within their group and also the teacher in various learning tasks in a technology-supported classroom environment may treat them equally. It may be because that the science students are generally considered to be disciplined, cooperative and they value teamwork as compared to the students who have taken arts teaching subjects. Hence the Hypothesis that there is no significant difference in students' perceptions about their technology-supported learning environments in a teacher education classroom with reference to their discipline (teaching subjects) is partially rejected. Figure 3 depicts mean scores of Science and Arts students on the ten scales of the TROFLEI.

Table 6
Means, Standard Deviations and Significance of the Difference between Means for Teaching Subjects in Students' Perceptions of Learning Environments as Measured by the Modified TROFLEI.

Scale	Teaching Subjects	Mean	Mean Difference (S-A)	Standard Deviation	*t*
Student Cohesiveness	Science	4.21	0.13	0.47	2.17*
	Arts	4.08		0.56	
Teacher Support	Science	3.47	0.10	0.70	1.23
	Arts	3.37		0.72	
Involvement	Science	3.26	0.00	0.66	0.00
	Arts	3.26		0.59	
Task Orientation	Science	4.28	0.09	0.53	1.59
	Arts	4.19		0.50	
Innovation	Science	3.33	0.01	0.45	0.29
	Arts	3.32		0.45	
Cooperation	Science	4.21	0.20	0.52	3.17**
	Arts	4.01		0.58	
Equity	Science	4.14	0.20	0.68	2.64**
	Arts	3.94		0.67	
Differentiation	Science	3.45	-0.00	0.65	0.11
	Arts	3.45		0.62	
Technology Teaching	Science	4.19	0.07	0.63	0.95
	Arts	4.12		0.66	
Individualisation	Science	3.16	0.03	0.40	0.77
	Arts	3.13		0.43	

** Significant at p<0.05, **Significant at p<0.01* Science: n=120, Arts: n=197

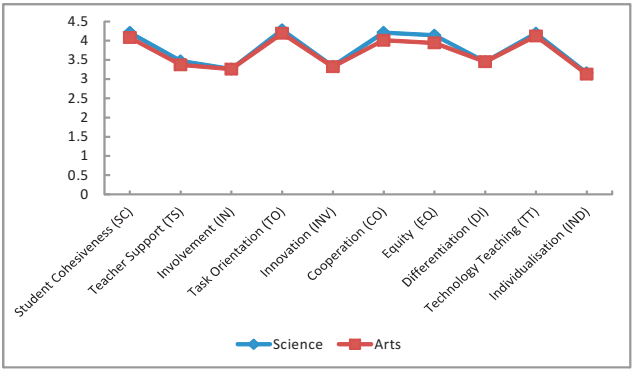

Figure 3. Mean Scores of Science and Arts Students on the TROFLEI.

Conclusions

The results from the present study favours teaching through the introduction of technology tools in teacher education classrooms. This study gives the information about the way in which students perceive the learning environments of technology-supported classrooms in the teacher education programme. The instrument used was modified TROFLEI. The results show that the students perceive their technology-supported learning environments in a positive manner. Results on investigation of previous qualification, gender differences and teaching subjects suggest that there exist some differences in technology-supported learning environments on few scales as measured by the TROFLEI. Such results show that the overall objectives of the study have been achieved as the effectiveness of the technology-supported classrooms has been established at the teacher education level. With these results technology-supported classrooms can be used to provide mainstream education in various programmes at the higher education level. Technology can and should prove to be an effective multimedia aid to strengthen the teaching methodology by helping teachers to provide individual attention, quick feedback and provide motivation for learners. The findings of this research can be broadly applied to study the psychosocial learning environments in other parts of India.

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