STUDY OF INNOVATIVE TEACHING LEARNING AND EVALUATION PRACTICES IN THE BEST RATED HIGHER EDUCATION INSTITUTIONS BY 'NAAC'

UGC Funded Major Research Project

Report

2020

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Acknowledgement

This is a matter of privilege to complete this Major Research Project funded by UGC, New Delhi. In spite of technical hurdles on the part of the authorities, the project has been completed only on the basis of the first instalment of grants from the UGC, New Delhi. Due to our obligations to the UGC and academic commitment, the national level project could be completed with the support rendered by our colleagues and research students from Education Department, University of Allahabad and friends from different universities and colleges of the country. The co-operation rendered by them in try-out of tools, field work, analysis and interpretation of data and report writing is quite commendable. Without their help the project could not have seen the light of the day.

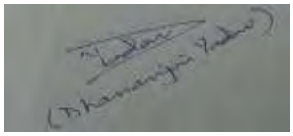
Specially, we are grateful to our colleagues from Education Department, University of Allahabad, Dr. Akanksha Singh, Dr. Saroj Yadav and Dr. Prashant Kumar Astalin for their active involvement in construction of tools of the project. Our special thanks to Dr. Sujeet Kumar Mishra, Associate Professor, GGD Central University, Bilaspur and Dr. Bikali Charan Das, Assistant Professor, Ravenshaw University, Cuttack.

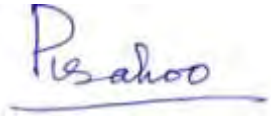
We are thankful to the dignified faculty members and researchers from different institutions of universities and colleges alike for their help at every stage of the project. We are grateful towards Prof. Mohammed Miyan, Former VC, MANUU, Prof. Sunil Kumar Singh, BHU, Prof. B.N. Panda, RIE, Bhubaneshwar, Prof. Dhaneshwar Harichandan, Mumbai University, Prof. Nirod Dash, SOE IGNOU, Prof. Amit Kaut, GND University, Amritsar, Prof. Madhu Kapani, Sri Satya Sai Institute of Higher Learning, Puttaparthi, Prof. Archana Dubey, DAVV, Indore, Prof. Mathuresh Pareek, Rajastahn University, Jaipur, Prof. S.S.Patil, Former VC and Registrar, Kuvampu University, Shivmoga, Prof. VA Benakanal, Gulegud, Karnataka, Prof. Anju Agarwal, MJPR University, Bareilli, Dr. B Kannan, MK University, Macherai, Dr. Ajay Surana, Banasthali Vidyapeeth, Banasthali, Sh. Akha Mao, Ambedkar University, Delhi, Dr. G.N. Tripathi, Amity University, Noida, Dr. Kalpalata Patri, BJB College, Bhubaneshwar, Dr. Pravakar Mallick, Kendrapada College, Kendrapara, Sh. Chintamani Majhi, Cuttack, Dr. Dinesh Kumar, GDPG College, Ballia and many other colleagues who extended their expertise, insight and efforts in completing different stages of the project.

We express special thanks to our colleagues from the associate colleges of University of Allahabad, Dr. Namita Sahoo, Associate Professor, KP Training College, Dr. Surendra Kumar, Assistant Professor, SSKGD College and Dr. Rama Gupta, Assistant Professor, JTGD College for their dedicated involvement in the project work.

We appreciate the help rendered by the research students of Education Department, University of Allahabad specially Dr. Priyanka Sharma, Dr. Brajesh Kumar, Dr. Chandan Prasad, Sh. Ashok Kumar and others who were an inseparable part of project data collection, analysis and report writing.

We are thankful to the Dean, Research, University of Allahabad and the office support staff Sh. Ram Lakhan Yadav, Sh. Sanjeev Singh and Sh. Avadhesh Dwivedi for their departmental co-operation.





Prayagraj
(31.03.2020)

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Appendix-II **Higher Education Teacher Behavior Scale For students. (HETBS)**

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Chapter- 1
Introduction

1.1 Origin of the Problem:

Any democratic society will have to ensure quality of life through provision of quality education for all. Especially in the field of higher education, search for excellence is considered major concern for teachers, professionals, policy makers and regulatory bodies. Quality is contextual in nature. Many discussions take place about quality measures adopted at institutional level with clear cut mission, vision, strategies and curriculum transaction. The issue of quality is associated with the concept of autonomy, democratization and participation of stakeholders in the decision making process. As pointed out by National Knowledge Commission (2005) report it is the duty of a democratic nation to promote varied opportunities for education to younger age group clienteles by adopting appropriate mechanism of quality assurance. In this context, the role of regulatory bodies like UGC, NAAC, NBA, AICTE and NCTE are considered very much valuable and relevant to the needs of the hour.

Institutionalized efforts are made at grassroots level to provide opportunities for innovative teaching learning to the students. Such movements are also well appreciated by the external evaluation bodies. Much discussion is going on to highlight the relevance of various mechanisms adopted to strengthen quality education practices at grass-root level. Various factors associated with quality teaching, learning and evaluation processes must be understood in-depth with a view to evolve alternative practices. Different models of quality enhancement can be projected among motivated functionaries of higher education institutions. Hence, there is an urgency to understand the process aspects of quality enhancement practices in teaching in the best rated institutions in the country.

The external assessment procedures adopted by the statutory bodies like NAAC, particularly, in the context of general undergraduate and postgraduate courses highlight the performance level of the institutions in the context of given criteria. The institutional processes highlighting the quality interventions in such institutions need to be focused through research endeavour at institutional level. Various contextual factors associated with innovative teaching learning and evaluation processes need to be explored through extensive fieldwork and interaction with the stake holders of the system.

Teaching-Learning Processes constitute the core component of functioning higher education institutions (HEIs). There may be variations in teaching learning and evaluation practices in different contexts like nature of discipline, course content, learners‟ background, institutional background and governance pattern of the institutions. The innovative practices rooted in the ground reality may reveal the experiences of the teachers and learners in initiating the innovations and the paths adopted to bring transformations in the teaching learning processes. Such kind of researches can be categorized in different themes and be projected for further generalizations in the Indian context.

Nobel laureate Economist Amartya Sen, has argued that root cause for most of India‟s development challenges lies in the deficiencies in the education sector. In this chain, the

UNESCO‟s Global Monitoring Report 2006 states that "out of 711 million illiterates in the world, 268 million are estimated to be residing in our country, which accounts for nearly one-third of the world‟s non-literates" **(Benjamin,2012)**.

It can be said that today quality along with quantitative growth is not only the demand; it has become a necessity for a sustainable development of any society as well as country, because when we sow good things we get good the results. Quality is multifaceted and it requires assessment by the stakeholders with experience, standards related to the objectives of a programme and achievements of stakeholders. Today, there is an urgency to evolve a common national standard of quality and excellence. Education has been considered as a tradable service by World Trade Organization (WTO) and the GATE declaration of WTO. In this regard the national and international quality assurance mechanism becomes the basic tenants for all the countries. Educational quality must be assessed periodically with the global perspective **(Benjamin,2012).**

The Indian higher education institutions performance has been poor in this regard. The National Assessment and Accreditation Council (NAAC) had accredited 148 out of 416 universities and 3934 out of 20,677 colleges by March, 2009. Thus the quality status was formally low for these institutions. A glance at the status of the accredited institutions revealed that 68% of colleges were rated as B while another 23% colleges were rated as C grade; **and only the remaining 9% were 'A' grade.** The situations for universities were not better as 46% universities were rated as B grade while another 23% are „C" grade; and the remaining **31% were 'A' grade and above.**

National Knowledge Commission (2005):

The overall task before the commission was to take steps that will give India the „Knowledge edge" in the coming decades, i.e. ensure our country becomes a leader in the creation, application and dissemination of knowledge. The NKC had come forward with some meaningful proposals aimed at ensuring excellence in higher education. The NKC"s recommendations for higher education constituted an important beginning. The changes suggested would make a real difference.

Of course the process of reform and change is continuous. There is more to be done, and NKC will continue to think about next steps, but it emphasizes the urgency of the situation, because India"s future depends on it. It is important to act here and now. The commission had drawn attention towards the universities and colleges which required continuous and substantial improvement. The commission had highlighted the basic things of higher education. According to the NKC, there were some reasons for major concern, Such as:

- Curricula did not keep pace with current developments.
- Assessment gives emphasis on low order cognitive process: memorizing and understanding.
- The teaching learning activities are mostly confined to classroom situation during 9:30AM – 1:30PM

- The academic calendar is not prone to teaching, learning and academic evaluation spreading over full academic year.
- The infrastructure is not inadequate.
- Research activities are sidelined.
- The boundaries between disciplines are very rigid. No effort for entry of new disciplines.
- The quantum of research in terms of quality of citation and quality of references is negligible.
- Academic accountability is negligible. Little efforts are made for rewards for performance and no penalties are assigned for non performance.
- The academic management is not responsive to developments in the system. It is subverted by vested interests.

No doubt, the NKC had come forward with some meaningful proposals aimed at ensuring excellence in higher education. We will have to work out proper strategies to implement various quality measures. In this context research efforts must be made to locate grass root level experiences made by best rated higher education institutions in the field of teaching learning and evaluation with high quality orientation. Even though researches on quality teaching at school stage has its root in the 70‟s of past century, studies on teaching learning practices at HEIs has a recent origin.

The National Education Policy, 2019 draft has focused on the concept of teaching universities with high quality teaching learning and evaluation practices in different programmes across disciplines. The policy draft also highlights high quality teaching as the goal of the colleges, especially running UG programmes in large scale.

On process dimension of teaching in the HEIs the National Education Policy draft 2019 stated about inter linkage of teaching of HEIs with research. There must be opportunities for continuing education programmes for the professional development of the teachers of HEIs. The policy document stressed upon expanding the scope of HRDCs as an integral part of HEIs.

Even though, the policy draft, 2019 discussed at length about the quality teaching and research in HEIs there has been limited discourse on the process components of teaching learning and evaluation with sound pedagogical principles. This leaves scope to ponder upon teaching at HEIs and development of teaching competencies among teachers of HEIs from different disciplines at UG and PG level.

1.2 Interdisciplinary Relevance of the Present Study:

Teaching learning processes are concerned with development of human potentials in various disciplines. Quality oriented teaching learning practices must be based on sound pedagogic principles and incorporation of available technological support system. Innovation in

the field of teaching leads to construction of knowledge in collaborative form. Involvement of teachers and learners in creating conducive environment for learning is a big challenge before any higher education institution. Teachers‟ role in motivating learners to solve critical problems and engaging them in inquiry based learning activities require institutional support, ICT based teaching learning strategies, open educational resources and dynamic leadership. Insightful experience based teaching learning strategies must be supported by research and development practices.

The study of such innovations must lead to transformations in teaching-learning culture of higher education institutions. In this context, teaching must be perceived as an interdisciplinary venture to bring quality in functioning of higher education system. The study on innovative practices must be based on understanding of various internal and external factors which are of interdisciplinary nature. Hence, the study of innovative teaching, learning and evaluation practices of high quality institutions can promote interdisciplinary perspective of generation of knowledge in education.

1.3 The Potential of the Project in generating knowledge with national importance:

Process oriented research revealing the quality experiences in the field of teaching learning and evaluation shall be useful in sharpening the understanding of innovations in higher education institutions. The inductive model of generation of knowledge concerning the experiences and experiments on teaching learning practices in the colleges and universities shall act as a torchbearer in quality enhancement projects in the country. On the basis of such rationale present study has been conducted on the following topic-

1.4 Title of the project: INNOVATIVE TEACHING LEARNING AND EVALUATION PRACTICES IN THE BEST RATED HIGHER EDUCATION INSTITUTIONS BY 'NAAC'.

1.5 Objectives:

The project has following major objectives:

1. To study the processes adopted by best rated higher education institutions on different innovations in teaching-learning and evaluation practices (TLEP) in Science and Arts faculties of best rated higher education institutions in the context of level of courses and nature of institutions as perceived by teachers.

2. To study the processes adopted by best rated higher education institutions on different innovations in teaching-learning and evaluation practices (TLEP) in Science and Arts faculties of best rated higher education institutions in the context of level of courses and nature of institutions as perceived by students.

3. To study the processes adopted by best rated higher education institutions on different innovations in teaching-learning and evaluation practices (TLEP) in Science and Arts faculties of best rated higher education institutions in the context of level of courses and nature of institutions as per observation of researchers.

1.5.1 Specific Objectives of the Study:

The specific objectives of the study read as Follows

Objective1: To study the main and interaction effect of teaching category (behaviouristic , cognitive and constructivist innovative) on self rating of teaching, learning and evaluation practices (TLEP) of HEI teachers in the context of discipline, level of courses and nature of institutions.

Objective2 - To study the main and interaction effect of teaching category (behaviouristic, cognitive and constructivist innovative) on students ratings of teaching learning and evaluation practices (TLEP) of HEI teachers in the context of discipline, level of courses and nature of institutions.

Objective-3 To study the main and interaction effect of teaching category on classroom teaching learning and evaluation practices (TLEP) of HEI teachers in the context of discipline and nature of institutions based on researchers" observation.

Objective 4 To study the main and interaction effect of teaching category on teaching learning and evaluation activities of HEI teachers in the context of discipline, level of courses and nature of institutions based on interview of students.

1.6 Major Research Hypothesis of the study:

The major research hypotheses of the study read as:

Teaching learning and evaluation practices of best rated institutions (NAAC Rating A and above) shall differ from each other in the context of faculties, levels of course and nature of institutions.

1.6.1 Specific Null Hypotheses:

1. There is no significant difference in TLE practices in science and arts stream of best rated institutions as per ratings of teachers, ratings of students and researchers observation respectively.

2. There is no significant difference in TLE practices in U.G. and P.G. levels of best rated institutions as per rating of teachers, rating of students and researchers observation respectively.

3. There is no significant difference in TLE practices in universities and colleges of best rated institutions as per ratings of teachers, ratings of students and researchers" observations respectively.

4. There is no significant interaction effect of faculties, levels of courses and type of institutions on the innovative TLE practices adopted in best rated institutions as per ratings of teachers, ratings of students and researchers" observations respectively.

1.7 Definition of Terms used:

1.7.1 Teaching learning and evaluation practices / process (TLEP): It includes exposition of teacher behaviour in classroom teaching and different kinds of practices/

activities performed by teachers in classroom and outside classroom settings of HEIs to promote learning among students.

1.7.2. Teachers teaching learning and evaluation activities: Teachers activities are understood as students exposure to learning and evaluation in different instructional situations inside the institutional set up of HEIs, including classroom teaching as measured through students interview schedule.

1.7.3. Teaching Learning and evaluation activities process category is used in the study in short form as 'Teaching category': Teaching category is classified under three pedagogical principles viz.;

Behaviouristic : teacher centric process;

Cognitive: concept centric process and

Constructivist: learner centric innovative process

1.7.3.1 Behaviouristic teacher centric process of Teaching Learning and Evaluation: It gives more emphasis on active behaviour of teacher in delivery of lessons, skillful behaviour of teacher and objective based structured learning experiences and objective assessment procedures in teaching. The learners participation is structured by the teacher. The objectives of instruction mainly focus on lower level cognitive process on factual knowledge, conceptual knowledge and procedural knowledge.

1.7.3.2 Cognitive, Concept Development based process of Teaching, Learning and Evaluation: Such process involves activeness of both teacher and learner to assimilate the concept on the basis of learners cognitive level, where the learners are provided opportunities to discover the knowledge. Individual differences in the context of cognitive domains are taken care of in the process of teaching concept. Teachers provide learning opportunities and engage students in different kinds of activities for clarification of concepts and to arrive at generalised meaning of the concepts.

The concepts are organised at different levels in the context of learners' cognitive attributes. Learners' experiences are taken care of while engaging them in discovery of relationships and concept development. The objectives of such kind of teaching learning process lead to attainment of cognitive skills like understanding, applying, analysis and evaluation of conceptual knowledge and procedural knowledge with some scope for own reflection on the concept meaning.

1.7.3.3 Constructivist Innovative process of teaching Learning and evaluation: Such process lays emphasis on socio-cultural experiences of learners groups influencing problem solving based learning. Teachers' involvement is essential to assist learners community to solve various problems of life taking in to cognigence their exposure to local issues as well as global environmental issues. The cognitive processes of

students interacting with their social and cultural context are nourished through teaching learning environment created by teachers and students jointly.

At higher education stage, the available learning resources at institution level are initialised by the students groups encouraging participatory and co-operative learning. Students engagement in own learning practices under supervision of teachers enable them to develop cognitive abilities like understanding, applying, analysing, evaluating and creating conceptual knowledge, procedural knowledge and meta cognitive knowledge. Teaching learning evaluation process emphasises on building conducive learning environment, interaction of students and teachers, students decision making, problem solving, formative evaluation, construction of new meaning to the concepts and creation of theoretical framework of analysis applying metacognitive skills.

Such kind of teaching learning processes are context specific and innovative in nature, since no prescribed and structured models are adopted therein. This approach emerges in institution specific, discipline specific and students community specific contexts with dynamic support and co-operation of teacher(s) highlighting scientific, participatory, experience based reflective process to knowledge generation by students.

1.7.4 Best rated Higher Education Institutions- The universities and colleges obtaining A grade and above by NAAC are considered as best rated institutions.

1.8 Variables of the study:

1.8.1 Independent Variable: The major independent variable of the study is „**Teaching Category'- behaviourist , cognitive, constructivist Innovative.**

1.8.2 Background Variable: There are 3 background variables

(i) HEI Institution: College and University

(ii) Discipline: Arts and Science

(iii) Level of HE: Undergraduate and Postgraduate

1.8.3 Dependent Variable: Teachers‟ teaching learning and evaluation Practices /processes **(TLEP),** Teachers‟ teaching learning and evaluation activities (For interview)

1.9 Delimitation of the study: The project has been delimited to general education programmes and arts- science disciplines of the NAAC accreditated colleges with A grade and above in different zones of the country.

The study is delimited to the teachers and students participating in regular mode face to face teaching learning programmes at Undergraduate and Postgraduate level.

Chapter 2
Review of Related Literature

2.0 Introduction

Review of research and development in the area of quality assessment of teaching learning system at higher education stage have been carried out at national level as well as international level. The gyst of these studies and related literature have been stated in the following.

2.1 International Level Studies: There have been research efforts abroad on different dimensions of teaching learning system at higher stages. They read as follows.

Paul (2005) conducted a study on „Continuous quality improvement practices by college teachers." The objective of the study was to understand the phenomenon that occurs when college faculty members apply continuous quality improvement strategies in teaching. Faculty members contribution to the quality programs, both inside and outside the classroom was assessed. The university level quality teaching system emerged in the study. The factors influencing faculty quality improvement practices were identified.

This study explored how the teachers were committed to practice various aspects of the quality enhancement programmes in varying degrees. In some cases , it hassled to little or no change.

A model was created to explain the phenomenon of quality improvement. The model highlights the teachers behaviour influenced by their others coupled with environmental factors.

Deborah (2005) conducted a study on the continuous improvement practices in higher education institutions. This was noticed that within higher education system TQM was introduced as an institutional initiative. While TQM has been successful in business and industry, the recent uses in higher education has been successful in HEIs institution-wide and in many cases it has been neglected after use for two to three years.

Key findings focused that most of the HEIs had attempted Continuous Quality Improvement (CQI) practices at some extent and continued to pursue CQI. They achieved the expected outcomes of improved service, quicker response and improvised efficiencies in the functioning of HEIs.

The use of CQI practices also increased financial returns while at the same time it resulted in improved communications within their department and with the institutions. Such improvements were realized irrespective of institution type, department type or type of CQI method used. Of course the HEIs encountered many obstacles.

It was concluded that TQM / CQI is not promoted in HEIs as there is limited evidence on continuing implementations. The study of course has found that department-based implementation is still in effect and these departments continue to use CQI methods.

William (2007) conducted a study on "evidence based quality assurance –an alternative paradigm for non- traditional higher education". The purpose of this study was to identify indicators that could be used to assess the quality of blended, graduate programs and to determine which of these were the strongest indicators of program quality. It was revealed that out of 75 indicators developed, process related measures were rated most highly overall and outcome- related measures as lowest as .33 of the 75 indicators.

The graduate students, faculty and program administrators all agreed on ten as the strongest indicators of program quality. These included three groups of indicators (a) faculty / instructor"s enthusiasm, "Communication skills availability and their responsiveness (b) learner"s mastery of the competencies, their ability to integrate theory and practice, and apply learning outcomes to work/ life, and (c) Well defined program and course materials are well organized, and the extent to which feedback is used to improve the program.

Scott (2008) conducted a study on undergraduate students" perceptions of service quality in higher education. The study examined undergraduate students" satisfaction with college services and environment and with the long term intent of minimizing detractors" to providing exceptional service quality.

The study revealed that students were satisfied with the library and dissatisfied with parking and course availability at the HEIs. They were significantly less satisfied with one-fifth of all support services and all the environmental categories. However they were significantly more satisfied with their library than those in the ACT national norm.

Jack (2008) studied the perception of academic administrators towards quality indicators in Internet based distance education. The study aimed at exploring the perceptions among executive and unit level academic administrations in two-year colleges in relation to the importance and the presence of indicators of quality in internet-based distance courses.

The study highlighted on Indicators of quality included institutional support, course development, teaching and learning, course structure, student support, faculty support and evaluation and assessment. Several recommendations of the study focused on development of improved communication strategies, assessment of the current state of quality in two-year distance education programme, development of viable strategies within the scope of institutional resources and funding and implementation of the formulated strategies.

Donna (2008) study focused on assessment of quality in asynchronous under graduate distance education course. The study determined the quality indicators within asynchronous distance education undergraduate courses of an accredited institution.

The study revealed that each group of respondents agreed that technical issues like course design, class procedures and expectations, interaction and content delivery were factors that among all stakeholders as to what constitute quality could be the catalyst for possible improvements to distance courses in the future. This was highlighted that inputs from the stakeholders‟ should be utilized for advancing and improving the quality of distance education courses.

Ken (2010) conducted a study that focused on evaluation of internal audit on students feedback within a British University. The Final year students attending British universities responded to a questionnaire to assess their views on their learning experiences of higher education (HE) from a variety of perspectives. The findings of the study indicated that, while most of the students were satisfied with existing feedback schemes, some variations in practice occur.

Gallifa et al. (2010) study was on students‟ perceptions of service quality in a multi-campus higher education system in Spain. Case study method was used to study student perceptions of service quality discussing the relevance of these perceptions for the important issue of quality improvement in higher education. It covered various examples of practical implications for the campuses where the process was implemented.

The findings highlight the value of this methodology for other higher educational systems interested in enhancement of service quality and continuous quality improvement.

The above studies conducted abroad revealed that there have been quality interventions at institutional level to a large extent. The results reveal participatory role of teachers, learners and leaders in innovative quality oriented practices in the colleges and universities. The stake-holders perception was found meaningful in the context of quality interventions in HEIs.

Omer F. (2011) suggested a nine step TQM model for quality enhancement of HEIs. He revealed that TQM may not be applied or used in institutional units / departments taking in to consideration their uniqueness.

2.2 National Studies:

Studies on assessment of quality of higher education have a recent origin. Of late, the studies have been because of NAAC‟s initiative. The research and development activities have been promoted in higher education institutions in India with a view to project their grades in public. Hence, most of the empirical studies and the articles focus on NAAC‟s assessment system and its impact on HEIs and the functioning of IQAC at universities and colleges. They are stated in the following:

Trivedi (2003) cited the case of Gujarat University to highlight the fact that ahead of on site visit, university give themselves much needed face lift. He stated that due to NAAC visit the university has not only been refurnished, projects that were long pending finally saw the light of day. For the first time the university campus has signs directing important landmarks. Roads had been laid across the campus. Dustbins were installed and 150 beds to university hostels were added.

In a huf, the university had also supplied 30 computers to computer center and

had set up a new computer lab with LAN connectivity to the library, apart from activating the Library Automation Programme. The write up highlights the limitations of external assessment system. The external motivation has contributed to quality measures as a compulsion, rather than internal motives for quality enhancement.

Mutthirulandi (2003) focused that the HEIs have become much worried to obtain „more stars" through NAAC accreditation, as the star-status of the colleges is sought to be linked with UGC funding. Such colleges adopt very dubious means and practices to satisfy the visiting teams from NAAC must be countered by regulatory body also that they shows like star-hotel accommodations, cosy local travel arrangements etc. It is a pity that government institutions have started imitating what greedy private managements do in matters of satisfying the visiting teams and keeping them in good humour.

Nair (2004) has stated that a number of old and well known colleges in Mumbai received low ratings while newer and lesser-known ones walked away with top grade. Miffed with the low grading, the educational institutions questioned the credibility of the NAAC teams visiting colleges. Allegations of pampering the teams, putting them up in five star hotels and giving them costly gifts have destroyed the credibility of NAAC ratings .

Chua (2004) studied quality attributes of higher education from various perspectives, including the parents, students, faculty members and the employers. The students perspective of quality falls into mainly the process (46.56%) and output (46.56%) categories. The parents expressed that quality should be in terms of input (46.52%) and output (46.52%) measures. The faculty members revealed that quality is wider in view than the other customers. They stated that the education system should focus on all aspects of teaching learning activities (i.e. input, process and output).

On the other hand the employers considered quality in terms of process (41.27%) and output (58.73%) quality only. This was revealed that different groups of stakeholders have different perspectives of quality .This was suggested that integrated quality model would be a better model for addressing the quality issue by addressing the needs and expectations of the stakeholders.

Pillai (2004) focused different measures to strengthen the accreditation process of NAAC viz.;

- Strengthening of assessors training
- Increase in the duration of the visit
- More involvement of affiliating university and government officials in the case of government colleges.
- Random and informal Interactions with peers moving across the campus.

- Reducing Variation in assessors‟ perceptions by itemizing each activity/ facility/ practice considered essential/ desirable and assigning specific marks for them.

Martin and Hernes (2005) opined that the assessment by NAAC concentrates on the institution as whole. The visiting team should of experts with a generalist point of view. Peer teams must be put together to represent a wide range of expertise, in particular when accreditation is conducted at the institutional level. The NAAC is still hesitant to include professionals in peer teams. There have been suggestions to involve other stakeholders but at the moment the experts are only academics. This practice need to be overhauled.

Goel and Goel (2005) threw light on several problems related to assessment and accreditation of HEIs such as:

- Persons selected to do this job were not most of the time persons of excellence.
- Assessors do not function in a team. Team should be well balanced. Before taking up the assessment activities; the team members need to discuss the method of working and who is to do what.
- Assessors generally lack perception. They do not clearly spell out the strong and weak points of the institution which is required in order to enable the institutions to improve the standards of higher education.
- It has been noticed that some persons have been involved in assessment for more than 10-15 institutions in a year as compared to others .There should no scope for vested interest.

Dharmapalan (2005) stated that it was an irony that most of the NAAC accredited institutions did not have even moderate quality in higher education. This was because what awaited the team were newly painted buildings, a list of cooked- up achievements, a list of non-existent facilities, and credentials of the institute that had been created especially for the purpose. For example, most of the college authorities in their record stated that their library functions from 8:30 am to 5:30 pm on all days and students utilized internet and digital library facilities free of cost. But in reality, the libraries were very poor compared to the overall status enjoyed by the institutes it was hardly open till 4 pm on normal working days. But during the period of one week before the visit of the NAAC team, the library staff started working efficiently till the day the team returns.

Similarly, the head of each department presented a brief account about various activities, most importantly students assessment of teachers. However most of the institutions did not adopt the assessment of teachers by students, as it was considered denigrating their profession. Many teachers did not appreciate learners assessment requirement.

Patil (2006) highlighted some of the concerns and was apprehensive. Firstly, the possibility for all Indian higher education institutions to be accredited by NAAC in a reasonable time frame. Secondly,

the debate over desirability of grades as an assessment outcome is ongoing. Thirdly, the NAAC"s engagement in institutional queries regarding the status of programmes offered by accredited institutions. Fourthly, the NAAC reluctance to assess of a few publicly funded institutions, including a handful of elite universities who come forward for assessment.

Jafri (2006) highlighted that, none of the major central universities have, however so far agreed to have an assessment through NAAC despite all the pressures exerted by the UGC. And even at the place where an assessment has been undertaken it has been on the basis of stage managed data and after full preparation by the concerned institution. It, therefore, appears desirable that this responsibility is taken over by the UGC itself.

Rajendran (2006) conducted a study to find out whether the existing methodology, criteria and core indicators of the NAAC are sufficient enough to accredit the administrative affairs of the higher educational institutions. The study revealed that the lack of administrative components in the methodology, criteria and core indicators of the NAAC would certainly lead to incomplete accreditation and the lapse cannot be compromised with the concept of autonomy, discretionary and prerogative power of decision making authorities.

NAAC carries out the academic audit and concentrates mainly on assessing and accrediting the academic programmes. Since academic and administration are two sides of the same coin, the lapse of the assessment of administration would naturally affect the academics, as such, assessment and accreditation are equally important to administrative affairs, without that the process and product of NAAC would certainly be farce in the absence of administrative assessment of HEIs.

Prabhu (2006) found that for the first time there was indexing of books in the library. Students were permitted to enter the prohibited area i.e. the college library. Teachers and principals began to maintain records. Buildings were repaired and whitewashed. Signboards indicating many academic activities, though fake appeared at various places in the campus. Everything was stage managed.

The members of the council arrived and they were kept in some kind of unlawful confinement. The meeting with the parents was superficial. Ex-students were invited on a selected basis. Similarly, the library was looked after by a retired clerk. There were some teachers who had been working as office bearers in their caste association.

Pillai and Srinivas (2006) conducted a study on the post accreditation scenario in the north-eastern region of India : A meta – evaluation of the National Assessment and Accreditation Council processes and procedures was conducted by them. This was pointed out that one of the colleges accredited with B grade was of the opinion that the assessment work was done quickly. According to them the peer team spent only one day visiting their college, which is of three streams of arts, commerce and science. Similarly in many colleges the peer team visits were scheduled for two days and they suggested that two days was too short for a comprehensive assessment of various activities undertaken by the colleges.

Dutta (2007) views on IQAC"s revealed that HEIs will have to work hard to demonstrate their effectiveness in various areas. Superficial attempts may not fetch them quality. A successful strategy in one context may prove to less effective in another institution. Hence Institution specific efforts must be promoted. Analysing the potential of strategy in the institution context has to be done by the institution itself to understand the culture of understanding self.

It is necessary for HEI"s to conduct context specific research on the areas that may have specific and immediate relevance to their effectiveness. Various deficiencies at institution level are to be recognized. Appropriate measures should be taken tackle own problems by HEIs.

Bariana (2007) stated that the format of NAAC was tedious. Many questions and concepts were not clear such as autonomy, mobility, student progression and research projects. This had caused confusions in the minds of college authorities that they would be placed in lower grades. A lot was required to be done in the sphere of infrastructure, libraries and other facilities which became difficult in the wake of dwindling government grants. This was needed for asking the NAAC to relook into the assessment process keeping in mind the ground realities.

Pasha (2007) highlighted that the scope for methodological errors in finalizing the grades become more complex when the team consists of academicians with no training in the so called NAAC assessment methodology. It is a known fact that more than three fourth of the peer team members have hardly got an opportunity to understand the system before they went assessment.

Many of the Heads of institutions searched for the identity of the peer members when they received the list of the peer team. One of the principals who happened to be a peer team member later painfully disclosed that his institution would have go to higher grade if another team with which he had moved recently had visited his college. The writer was included in the peer team without any training on the assessment package and he did his assessment job for seven colleges.

Soundararaj (2008) pointed out that the internal quality assurance cell, (IQAC) was a strategy devised by NAAC to sustain quality. It was a non-starter in many accredited colleges. NAAC was not well informed about academic audit, as some questions included in the self-study report recently indicate. Assessment by NAAC therefore had left majority of HEIs in the same condition they were found before accreditation. The role of NAAC, therefore, as a quality promoter was weak. It has failed to develop a vibrant academic community comprising self-reliant and global comparable in their profession and academic life. In short, NAAC was yet to perceive the way to excellence in the area of teaching-learning.

Sai (2008) studied the awareness of quality among college students. The students were from different colleges of Mumbai, affiliated to University of Mumbai. The results confirmed incidentally the hypotheses that the awareness of quality grows from year to year in college education. Instanced the awareness of quality was spread among procedures is learnt by students only during accreditation exercise of HEIs. It was found that students" role perception was poor. Poor role perception in equality issues generally put the onus of quality on the institution, university and government the authorities. Awareness alone can enlighten the role of students in quality management since they are the prime stakeholders of the system.

Kashyap (2009) narrated in detail about the preparations done by the HEIs of higher learning in Chandigarh just before the visit of NAAC team. The way seminars, workshops and functions were organized suddenly held without a breath clearly reflected a sense of urgency and artificially. Competitions and events were organized at a feverish pace. Students had no respite as they were herded from one activities to another .There were big posters files to be completed and projects to be submitted by the departments in a hurry.

Conscious efforts were made to project the best image of the institute. Old records were dugout, alumni were traced and honoured. Many innovative ideas were projected with a lot of unfair, and

ambitious schemes were started with a big bang which eventually ended in a whimper. Overnight new structures were erected. Cosmetic change was made to give a new look to the colleges. Buildings were spruced up, walls were repainted, new furniture was added, and freshly painted signboards adorned the colleges. Clearly, the colleges were hit by the NAAC Strom. Everything was back to square one just after one throughout year. It was calm after the storm. The colleges got good grades.

Sen (2009) stated that problems of colleges and universities working with the same type of students are widely different, a fact which has been overlooked by UGC and NAAC in a most unfortunate manner. The eminent persons at top level of UGC and NAAC could not do justice to their eminence in this regard. The academic environment of the HEIs differs widely. Discussing about the Annual Quality Assurance Report (AQAR) of Internal Quality Assurance Cell (IQAC) the following short comings were noticed:

a) New academic programmes cannot be initiated in affiliated colleges. It is the absolute jurisdiction of the affiliating university
b) Innovations in curricular design and transaction-Innovations can be done in universities but NAAC has included this key result area in the AQAR for colleges also.
c) C) Inter- disciplinary programmes started and examination reforms implemented- the NAAC authorities are well aware that these two areas are outside the jurisdiction of general colleges.

The NAAC authority must look into the matter and formulate different assessment criteria for undergraduate level affiliating general colleges giving top most priority to diversified colleges should be treated as under graduate college and specialized mechanism should be evolved for the benefit of UG students of these colleges.

Singh (2009) in her study on teachers perception about the credibility of the National Assessment and Accreditation Council (NAAC) found that they have perceived the credibility of NAAC only to a moderate degree and not much to the highly appreciable degree NAAC should adopt valuable recommendations like: NAAC team should visit institutions without any fixed calendar /prior notice, Group interaction in the campus should be conducted in a random and informal manner; NAAC should extend the time devoted to meetings during the institutional visit. A separate evaluation of each teaching department should also be incorporated in the report of institutional assessment; NAAC should expand the national panel of evaluators through continuous training.

Quinn et al. (2009) studied on-techniques used to take on the challenges of quality improvement in higher education in which they examined two elementary difficulties: first, definition of the stakeholders and second measuring stakeholders quality perception. An examination of repetitive applications of quality techniques revealed poor methodology. Availability of Internal Quality Assurance Cell (IQAC) was also poor at college level. Only12% students accepted its availability where as only 20% students were satisfied with the functioning of IQAC and 39% students were not sure about the existence of IQAC.

Belavategi (2010) in his article stated that on getting the accredited status, institutions have a tendency to forget the outcome of self study and perhaps believed that the process needs to be reviewed only for the next accreditation visit. The IQAC must play significant role in the process by building upon the benefits of self assessment corrective measures to improve their quality. It can take-up research studies on various aspects of institutional effectiveness and to sustain its impact.

Jaiswal (2010) highlighted that quality of HEIs, is determined by various factors: such as the changing perception of society to teaching and learning, the social expectations towards the student inputs balance between the research and studies in the establishment of institution, structure and content of study programmes, implementation of the study process, study conditions and satisfying the needs of students (quoted in Harvey, 2002).

Singh (2010) conducted a study on to find out the training needs of higher education teachers for effective teaching, and the objective of the study was to study the status of effectiveness on teaching in humanity and social science streams and the results showed that the teachers from both streams agreed with effective role of teaching. They should be well prepared and well manageable towards their role in quality improvement of teaching learning system.

Mangnale and Potluri (2011) conducted a study on role of Internal Quality Assurance Cell (IQAC) in quality management of HEIs. The study was to explore the perceptions of both the higher education institutions and students on the various dimensions of quality in the Indian higher institution personal education system along with careful observation of the role in sustaining quality delivery of education service. This study was delimited to Pune district of Maharashtra state.

The finding of the analysis confirmed that institutions were confidently provided academic activity, reflecting their goals and objectives with highly qualified faculty through an eclectic approach with the support of research with ample focus on library studies and community services. Students also expressed positive views on the academic activities, faculty communication skills, motivation and mentoring etc.

Angappapillai and Annapoorani (2012) noticed quality issues of HEIs from market perspective. The quality attributes of higher education were explored as viewed by students, teachers, parents, employers and other stakeholders. The quality dimensions covered input, process and output of HEIs.

Singhal (2012) explored that teaching and learning in professional education institutions of **Hisar city, Haryana** was well**.** Research and development status in government institutions was better than of private ones

Parai and Saha (2013) highlighted the awareness of TQM among teachers of vishwa Bharati. The teachers had average level awareness of the principles of quality management and moderate level usage of the TQM components.

Patel (2013) explored the reasons for adopting TQM in HEIs. Output of TQM must be considered in the context of high students morale bridge of faculty staff functions stakeholders satisfaction and continuity in efforts for quality management of HEIs.

Sudha (2013) explored five parameters of HEI students satisfaction viz; commitment of top authorities; course delivery through teaching; campus facilities; courtesy; and students feedback for development.

Patil (2014) did a literary analysis of documents on higher education and concluded that the regulatory bodies role has been prominent in improving quality education in HEIs and to

match HEIs standard with the international level norms.

Ranjan (2014) explored quality status of private universities and concluded that they have been more competitive in the market. However, the quality has not yet been achieved in such institutions. The costs of private education are not affordable by meritorious and middle/poor class students. Their products do not the demands of job market at national and international level, except a few one.

Srivastava (2014) focused on studying the existing status of IQAC in the HEIs of India. She noticed that the functioning of IQACs in the Indian universities were high with regard to planning and notification of institutional events, management of entrance tests to research courses and strengthening doctoral course works; establishment of departmental committees and grievance redressed; students support activities , following academic calendar and invitation for guest lectures, promoting students feedback and preparation of feedback reports.

The colleges had an edge over universities on IQAC‟s functioning on administrative functions, academic functions, evaluation procedures. On the contrary, the IQAC‟s functioning at university level was found superior with regard to research functions teaching learning functions and students support system. A large majority of teachers of HEIs cutting across institution background appreciated the role of IQAC in quality enhancement process.

Sahoo and Singh (2015) reported that with a view to maintain quality majority of HEI teachers(58 to 67%) from humanities and social science subjects gave priority to different classroom teaching competencies like making teaching interesting, planning for class teaching and delivery of effective lectures in own subject. Especially, majority of social science teachers (59%) gave higher weightage to making students aware of study of own subject and making best use of language for classroom communication.

On self development dimension of profession, majority of HEI teachers (62 to 69%) emphasized on making themselves updated about contemporary knowledge , assessment of own strengths and limitations in teaching, exploring challenges in teaching making continuous efforts for own professional development and being fair to students in evaluation process.

Srivastava and Sahoo (2016) reported that the university and college teachers reaction towards NAAC evaluation criteria were found close to each other, especially in the context of group based teaching learning activities, teachers as resource persons and counselling for teachers response. Towards provision of academic calendar and opportunities of revaluation and learners feedback were of higher weightage than that of their university counterparts.

Sahoo and Das (2018) noticed that the challenge regarding nano level assessment practices is very much linked with opportunity to change learning styles, students involvement in teaching learning practices and self development. Students and teachers understanding of learning objectives must be very clear. Learner evaluation practices in higher education must be interlinked with attainment of higher order learning outcome particularly with reference to conceptual and meta-cognitive knowledge in different areas.

Ravidran (2019) revealed that the participation level of teachers of Bharatidashan university in TQM was affected by different background factors like research projects

undertaken by teachers, gender and publication of articles in journals. The students had different perception of TQM on the basis of their locale and level of studies.

2.3 Significance of the Present Study:

In the light of the above mentioned literature we can conclude that the process of quality enhancement in Indian higher education system is slow due to lack of proper implementation of the policies, poor leadership, and provision of limited funds. In an article **Ravi and Jani (2012)** emphasized that there is a focus of raising the Gross Enrolment Ratio (GER) in Higher Education. Three pillars will continue to be access, equity and excellence in higher education.

Strategies will be of expansion with consolidation greater inclusion and focus on improving quality of higher education. There must be teacher-centric and learner –driven plan and it should to create a skilled work force to meet the global economic needs. It must create an enabling eco system where research is encouraged and creativity of mind flourishes leading to innovations at individual and institutional level.

All higher educational institutions must enjoy greater autonomy and get as knowledge generating hubs having linkage with the larger society and explore avenues for academic enrichment and making India a global educational hub and fostering greater international collaboration. (MHRD, 2012).

In this context it can be observed that researches conducted so far take note of centralized initiatives made by NAAC on quality assurance. Limited numbers of studies have been conducted to throw light on institutional initiatives, particularly with regard to teaching learning practices. There have been scanty efforts to study the role of Internal Quality Assurance Cell (IQAC) in Universities and Colleges (Srivastava, 2014) on the ground that there are lots of demerits of external assessment and accreditation process. There is a strong need to focus on inbuilt Internal Quality Assurance Process studies at institutional level. On this background the present project was proposed to study the teaching learning and evaluation practices in the best rated higher education institutions by NAAC.

The following research questions are raised for the present project work: in what way best rated institutions are successful in implementing different innovations in teaching learning practices? And in what way best rated institutions are unique in implementing different learner centric constructive principles in evaluations? The answers to such questions shall be useful to evolvement of suitable alternative models of teaching learning practices leading to quality assurance of higher education cutting across various regional and institutional disparities in the country.

Chapter 3

Methods and procedures

3.1 Introduction:

The study was conducted by applying mixed method survey with a view to achieve different objectives and to test the concerned null hypotheses as stated in this chapter. The ex-post facto research employing 3x2 Factorial design was employed for testing the null hypotheses of the study. The details of Null hypotheses, population of the study, data collection and data analysis procedures have been presented in the following sections.

3.2 Testing Hypothesis: The following null hypotheses were formulated in the context of specific objectives of the study-

HEI teachers TLE Practices according to teachers' self rating
(In the context of Discipline, Nature of Institution and level of HE)

1.1 (i) There is no significant effect of discipline on self rating TLE Practices of HEI teachers.

(ii) There is no significant effect of teaching category on self rating TLE Practices of HEI teachers.

(iii)There is no significant interactive effect of discipline and teaching category on self rating TLE Practices of HEI teachers.

1.2 (i) There is no significant effect of discipline on self rating TLE Practices of college teachers.

(ii) There is no significant effect of teaching category on self rating TLE Practices of college teachers.

(iii) There is no significant interactive effect of discipline and teaching category on self rating TLE Practices of college teachers.

1.3 (i) There is no significant effect of discipline on self rating TLE Practices of university teachers.

(ii) There is no significant effect of teaching category on self rating TLE Practices of university teachers.

(iii) There is no significant interactive effect of discipline and teaching category on self rating TLE Practices of university teachers.

1.4 (i) There is no significant effect of nature of institutions on self rating TLE Practices of arts subject teachers of HEI.

(ii) There is no significant effect of teaching category on self rating TLE Practices of arts subject teachers of HEI.

(iii) There is no significant interactive effect of nature of institutions and teaching category on self rating TLE Practices of arts subject teachers of HEI.

1.5 (i) There is no significant effect of nature of institution on self rating TLE Practices of science subject teachers of HEI.

(ii) There is no significant effect of teaching category on self rating TLE Practices of science subject teachers of HEI.

(iii) There is no significant interactive effect of nature of institution and teaching category on self rating TLE Practices of science subject teachers of HEI.

HEI teachers TLE Practices according to students rating. (In the context of Discipline, Nature of Institution and level of HE)

2.1(i) There is no significant effect of discipline on student rating of TLE Practices of HEI arts teachers.

(ii) There is no significant effect of teaching category on student rating of TLE Practices of HEI arts teachers.

(iii)There is no significant interactive effect of discipline and teaching category on student rating of TLE Practices of HEI arts teachers.

2.2 (i) There is no significant effect of level of HE on college arts student rating of TLE Practices of college teachers.

(ii) There is no significant effect of teaching category on college arts student rating of TLE Practices of college teachers.

(iii) There is no significant interactive effect of level of HE and teaching category on college arts student rating of TLE Practices of college teachers.

2.3 (i) There is no significant effect of level of HE on University arts student rating of TLE Practices of university teachers.

(ii) There is no significant effect of teaching category on University arts students rating of TLE Practices of university teachers.

(iii) There is no significant interactive effect of level of HE and teaching category on University arts student rating of TLE Practices of University teachers.

2.4 (i) There is no significant effect of nature of institution on UG arts student rating of TLE Practices of HEI teachers.

(ii) There is no significant effect of teaching category on UG arts students rating of TLE Practices of HEI teachers.

(iii) There is no significant interactive effect of nature of institution and teaching category on UG arts student rating of TLE Practices of HEI teachers.

2.5 (i) There is no significant effect of nature of institution on PG arts student rating of TLE Practices of HEI teachers.

(ii) There is no significant effect of teaching category on PG arts students rating of TLE Practices of HEI teachers.

(iii) There is no significant interactive effect of nature of institution and teaching category on PG arts student rating of TLE Practices of HEI teachers.

2.6 (i) There is no significant effect of level of HE on student rating of TLE Practices of HEI science teachers.
(ii) There is no significant effect of teaching category on student rating of TLE Practices of HEI science teachers.

(iii)There is no significant interactive effect of level of HE and teaching category on student rating TLE Practices of HEI science teachers

2.7 (i) There is no significant effect of level of HE on college science student rating of TLE Practices of college teachers.

(ii) There is no significant effect of teaching category on college science student rating of TLE Practices of college teachers.

(iii) There is no significant interactive effect of level of HE and teaching category on college science student rating of TLE Practices of college teachers.

2.8 (i) There is no significant effect of level of HE on University science student rating of TLE Practices of university teachers.

(ii) There is no significant effect of teaching category on University science students rating of TLE Practices of university teachers.

(iii) There is no significant interactive effect of level of HE and teaching category on University science student rating of TLE Practices of University teachers.

2.9 (i) There is no significant effect of nature of institution on UG science student rating of TLE Practices of HEI teachers.

(ii) There is no significant effect of teaching category on UG science students rating of TLE Practices of HEI teachers.

(iii)There is no significant interactive effect of nature of institution and teaching category on UG science student rating of TLE Practices of HEI teachers.

2.10. (i) There is no significant effect of nature of institution on PG science student rating of TLE Practices of HEI teachers.

(ii) There is no significant effect of teaching category on PG science students rating of TLE Practices of HEI teachers.

(iii) There is no significant interactive effect of nature of institution and teaching category on PG science student rating of TLE Practices of HEI teachers.

2.11 (i) There is no significant effect of discipline on UG student rating of TLE Practices of HEI teachers.
(ii) There is no significant effect of teaching category on UG student rating of TLE Practices of HEI teachers.

(iii)There is no significant interactive effect of discipline and teaching category on student rating TLE Practices of HEI science teachers.

2.12 (i) There is no significant effect of discipline on PG student rating of TLE Practices of HEI teachers.

(ii) There is no significant effect of teaching category on PG student rating of TLE Practices of HEI teachers.

(iii) There is no significant interactive effect of discipline and teaching category on PG student rating of TLE Practices of HEI teachers.

2.13 (i) There is no significant effect of discipline on college UG student rating of TLE Practices of college teachers.

(ii) There is no significant effect of teaching category on college UG student rating of TLE Practices of college teachers.

(iii)There is no significant interactive effect of discipline and teaching category on college UG student rating of TLE Practices of college teachers.

2.14 (i) There is no significant effect of discipline on college PG student rating of TLE Practices of college teachers.

(ii) There is no significant effect of teaching category on college PG student rating of TLE Practices of college teachers.

(iii) There is no significant interactive effect of discipline and teaching category on college PG student rating of TLE Practices of college teachers.

2.15 (i) There is no significant effect of discipline on University UG student rating of TLE Practices of university teachers.

(ii) There is no significant effect of teaching category on University UG students rating of TLE Practices of university teachers.

(iii) There is no significant interactive effect of discipline and teaching category on University UG student rating of TLE Practices of University teachers.

2.16 (i) There is no significant effect of level of HE on University PG student rating of TLE Practices of university teachers.

(ii) There is no significant effect of teaching category on University PG students rating of TLE Practices of university teachers.

(iii) There is no significant interactive effect of level of HE and teaching category on University PG student rating of TLE Practices of University teachers.

HEI teachers TLE Practices according to observers' rating (In the context of Discipline, Nature of Institution and level of HE)

3.1 (i) There is no significant effect of level of HE on researcher observation of TLE Practices of HEI- arts teachers.

(ii) There is no significant effect of teaching category on researcher observation of TLE Practices of HEI-arts teachers.

(iii) There is no significant interactive effect of level of HE and teaching category on researcher observation of TLE Practices of HEI-arts teachers.

3.2 (i) There is no significant effect of level of HE on researcher observation of TLE Practices of HEI- science teachers.

(ii) There is no significant effect of teaching category on researcher observation of TLE Practices of HEI science teachers.

(iii) There is no significant interactive effect of level of HE and teaching category on researcher observation of TLE Practices of HEI science teachers.

3 .3 (i) There is no significant effect of discipline on researcher observation of TLE Practices of HEI -UG teachers.

(ii) There is no significant effect of teaching category on researcher observation of TLE Practices of HEI-UG teachers.

(iii) There is no significant interactive effect of discipline and teaching category on researcher observation of TLE Practices of HEI-UG teachers.

3 .4 (i)There is no significant effect of discipline on researcher observation of TLE Practices of HEI- PG teachers.

(ii) There is no significant effect of teaching category on researcher observation of TLE Practices of HEI-PG teachers.

(iii) There is no significant interactive effect of discipline and teaching category on researcher observation of TLE Practices of HEI-PG teachers.

HEI teachers TLE Practices based on students interview (In the context of Discipline, Nature of Institution and level of HE)

4.1 (i) There is no significant effect of level of HE on students response on TLE activities of HEI arts teachers.

(ii) There is no significant effect of teaching category on students response of TLE activities of HEI arts teachers.

(iii) There is no significant interactive effect of discipline and teaching category on students response of TLE activities of HEI arts teachers.

4.2 (i) There is no significant effect of level of HE on students response on TLE activities of HEI science teachers.

(ii) There is no significant effect of teaching category on students response of TLE activities of HEI science teachers.

(iii) There is no significant interactive effect of discipline and teaching category on students response of TLE activities of HEI science teachers.

4.3 (i) There is no significant effect of discipline on UG students response on TLE activities of HEI teachers.

(ii) There is no significant effect of teaching category on UG students response of TLE activities of HEI teachers.

(iii) There is no significant interactive effect of discipline and teaching category on UG students response of TLE activities of HEI teachers.

4.4 (i) There is no significant effect of discipline on PG students response on TLE activities of HEI teachers.

(ii) There is no significant effect of teaching category on PG students response of TLE activities of HEI teachers.

(iii) There is no significant interactive effect of discipline and teaching category on PG students" response of TLE activities of HEI teachers.

3.3 Design of the study: The design of the study is presented in Table.1

Table 1

Design of the study

SL.NO.	Specific objectives	Population	Sample	Tool	Analysis
1	To study the main and interaction effects of teaching category (behaviouristic , cognitive and constructivist innovative) on self rating of TLE practices of HEI teachers in the context of discipline, level of courses and nature of institutions	All Arts & Science Teachers of A grade & above HEIs	12 Univ.+ 16 colleges. 200 teachers: 100 University teachers+100 college teachers	Questionnaire: **Teacher Behaviour self reflection inventory**	2x3 Factorial design ANOVA & t test
2	To study the main and interaction effect of teaching category (behaviouristic, cognitive and constructivist innovative) on students ratings of teaching learning and evaluation (TLE) practices of HEI teachers in the context of discipline, level of courses and nature of institutions.	All Arts & Science students UG & PG of A grade & above HEIs	12 Univ. + 16 colleges 800 students survey 400 university+ 400 college students	Questionnaire: **Higher Education Teacher Behaviour Scale**	2x3 Factorial design ANOVA & t test

3	To study the main and interaction effects of teaching category on classroom teaching learning and evaluation (TLE) practices of HEI teachers in the context of discipline and nature of institutions based on researchers‟ observation.	All Arts & Science Teachers of A grade & above HEIs	4 universities + 4 colleges 80 teachers (40 university teachers+40 college teachers) Class observation	Observation Schedule : **TLE Practices Schedule**	2x3Factorial design ANOVA & t test
4	To study the main and interactional effects of teaching category on teaching learning and evaluation activities of HEI teachers in the context of discipline, level of courses and nature of institutions based on interview of students.	All Arts & Science students UG & PG of A grade & above HEIs	12 universities +16 colleges 200 students interview 100 university students+100 college students	Structured Interview Schedule: **Teaching Activities Interview Schedule**	2x3Factorial design ANOVA & t test

3.4 Population of the study:

The population of study covered all the HEIs (Universities and Colleges) of the country offering UG and PG programmes in Arts and Science streams and accredited by NAAC with A Grade and above.

Table 2 List of Sample HE Institutions zone wise

Universities	Colleges
North zone Universities 1. Ambedkar Central University, Delhi 2. Ambedkar University, Lucknow 3. BHU, Varanasi 4. Dayal Bag Institute, Deemed University, Agra UP. 5. Amity University Noida, NCR,UP 6. GND University, Amritsar, Punjab	**North zone Colleges** 1. S S Khanna Girls Degree College, U.P. 2. RRPG College, Amethi, U.P 3. RBS College, Agra,`U.P. 4. Sri Agrasen Womens PG College, Varanasi U.P 5. Bareilly College, Bareilly, U.P 6. Khalsa College, Amritsar, Punjab
Western Zone University 1. Rajasthan Central University, Kishangarh, Rajasthan 2. Banasthali Vidyapeeth, Banasthali Rajasthan 3. DAVV, Indore, MP	**Western Zone Colleges** 1. S.S Jain (Subodh) PG College, Jaipur, Rajasthan. 2. Khalsa College, Indore, MP 3. Bilaspur Girls PG College, Bilaspur CG 4. CMD PG College, Bilsapur, CG 5. Engineer Raghavendra Rao Science College, Bilaspur, CG.
Eastern zone University **1.** Ravenshaw University, Cuttack, Odisha	**Eastern zone Colleges** 1. Kendrapara College, Kendrapara, Odisha 2. PN College, Khurdha, Odisha. 3. BJB Autonomous College, Bhubaneswar, Odisha 4. Rama Devi Autonomous College, Bhubaneswar, Odisha
Southern zone University 1. M.K. University, Madurai TN 2. Sri Sathyasai Institute of Higher Education , AP.	**Southern zone Colleges** 1. SM Bhandari College, Gulelgud, Karnataka 2. Basaveshwar Arts College, Bagalkot Karnataka 3. Basaveshwar Science College. Bagalkot, Karnataka

3.5 Sample of the study:

The study consisted of 12 NAAC „A" Grade Universities and 18 Colleges representing North, South, East and Western zones. The sample consisted of 30 institutions offering Arts and Science courses at UG and PG level and accredited by NAAC with A grade and above on random basis.

The multistage sampling procedure was adopted for identification of institutions and the sample respondents from amongst teachers and students representing arts and science discipline and UG and PG level. The list of institutions zone wise is stated in Table 2

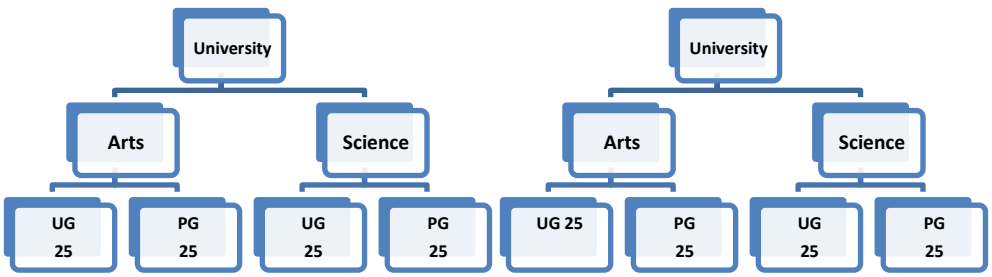
3.5.1 Teachers Sample (For Objective 1)**:**

The quota was fixed for teacher respondents and student respondents course wise and levels of higher education. 10 teachers each from 30 HEIs were selected randomly representing Arts and Science disciplines At initial stage, the teachers sample consisted of 300 number .However, 200 sample teachers were chosen randomly from 300 initial sample teacher respondents with equal size of 100 teachers from universities and 100 teachers from colleges. It was also considered for representation of 100 teachers each from Arts discipline and Science discipline, respectively. Institution wise and discipline wise sample breakup of teachers is given in Table 3 and Figure 1.

Table: 3 Teachers sample classification

University teachers-100		College Teachers-100		Total
Arts	50	Arts	50	100
Science	50	Science	50	100
Total	100	Total	100	200

Figure-1 Teachers sample classification



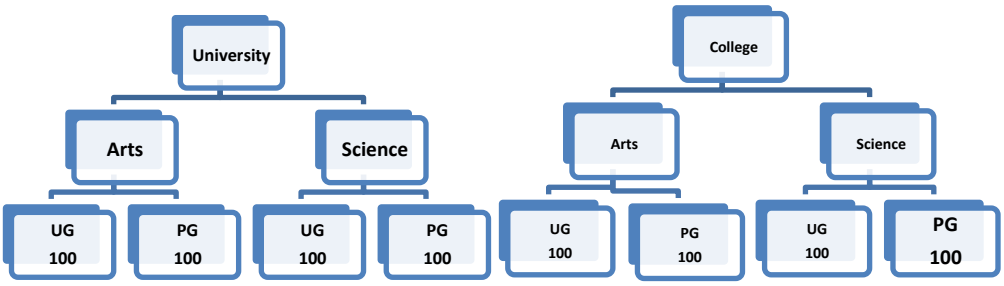
3.5.2 Students Sample (For objective 2):

The quota of student respondents institution wise was fixed as 32. At initial stage 32 students sample was chosen randomly institution wise. In all 960 students sample was chosen for the study with due representation to Arts and Science disciplines and UG and PG levels. However, 800 students sample was chosen randomly from the list of 896 with equal representation to institutions i.e., universities 400 and colleges 400 and representation to the disciplines Arts 400 and Science 400. The sample breakup of students Institution wise, discipline wise and stage / level wise is stated in Table-3 and Figure 2

Table: 4 Students sample classification

University students -400				College Students-400				Total=800
Arts		Science		Arts		Science		
200		200		200		200		800
UG	PG	UG	PG	UG	PG	UG	PG	
100	100	100	100	100	100	100	100	800
Total Arts=400				Total Science=400				800
Total UG= 400				Total PG= 400				800
Total Arts UG=200				Total Science UG 200				400
Total Arts PG=200				Total Science PG=200				400

Figure-2 Students sample classification

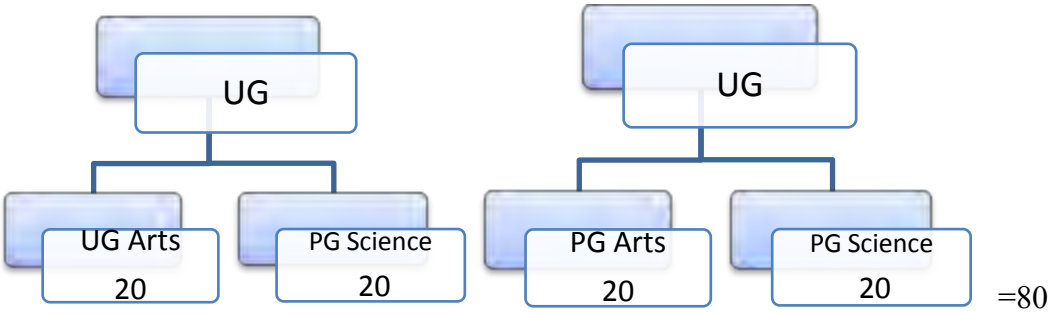


3.5.3 Teachers sample (Objective 3)

80 teachers classes 40 each from colleges and universities from Arts and Science faculties at UG and PG level were considered as the sample observation by the researchers. See Figure 3

Figure-3

Teachers sample classification for class observation (objective 3)

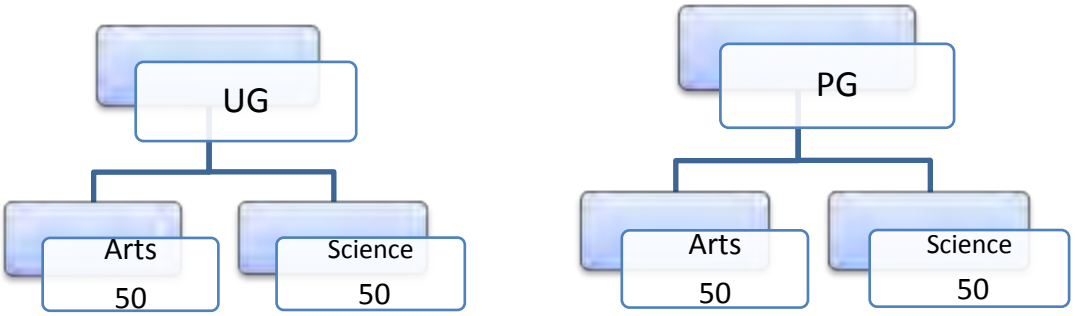


=80

3.5.4 Students Sample (Objective 4)

200 students, 100 each from colleges and universities were finally considered the sample respondents depending on clarity of their expressions. See Figure 4

Figure-4 Student sample classification for interview (objective 4)



=200 Total

3.6 Tools of the study:

Four tools were developed by the researchers‟ for data collection purpose, such as:

1. Teacher Behaviour self reflection Inventory
2. Higher Education Teacher Behaviour scale for students.
3. Teaching behaviour observation tool (Researchers)
4. Teaching activities observation interview schedule for students.

3.6.1 Teacher Behaviour Self Reflection Inventory for Teachers: This tool incorporates items concerning own teaching behaviour in real situation. There are 52 items covering the process dimensions of teaching learning and evaluation. The items belong to different pedagogic principles viz.; Behaviouristic, cognitive and constructivist schools. Teachers‟

response to these items reveals their orientation towards any of these categories of pedagogy. The items were classified.

- Cognitive: 1,2,39,15,16,17 27 & 34
- Behaviourist: 7,8,11,12,13,14,20,21,25,26.31,32
- Constructivist 4,5,6,10,18,19,22,23,24,28,29,33

3.6.2 Higher Education Teacher Behaviour Scale for students: This tool includes 53 items on teaching behaviour of their teachers. The items belong to different pedagogic principles viz.; Behaviouristic, cognitive and constructivist schools. Teachers‟ response to these items reveals their orientation towards any of these categories of pedagogy. The item classifications read as:

- Cognitive 1,2,3,5,10,,13,15,24,26,35
- Behaviourist: 6,7,8,11,12,14,15,23,25,30,31,32,33,36,53.
- Constructivist Innovative:9,16,17,19,20,21,22,25,27,28,29.

3.6.3 Teaching Behaviour observation Tool for Researchers: This tool included 35 items on behaviour dimensions of teachers in dealing with teaching learning and evaluation process. There were three teaching categories of items:

- Cognitive:1,7,8,16,21
- Behaviourist:4,5,6,9,11,12,13,14,15,17,18,19,20,28-35
- Constructivist Innovative:2,3,10,24,25,27

3.6.4 Teaching Activities Interview Schedule for Students: There were 20 items concerning different areas of teaching learning and evaluation process. They cover three areas of cognitive, Behaviourist and Constructivist Innovative teaching. The item wise classification read as:

- Cognitive:1,5,6,16,17,20
- Behaviourist 2,4,8,9,14,15,18,19
- Constructivist Innovative 3,10,11,12,13

3.7 Construction of Tools:

The questionnaires, observation tools and interview schedules were developed on the basis of theoretical analysis of teaching and learning theories from the perspectives of behaviourism, cognitivism and constructivism. The observations of teaching learning evaluation practices of two HEIs, one college level and one university level were done by the team members of the project. The non structured interviews were conducted with the faculty members and the heads of the institutions of 2 HEIs viz. SSKGDC, Allahabad and Sri Sathaya Sai Institute of higher learning, Anantapur, AP.

The teaching, learning and evaluation activities were listed down. Various activities were classified in the context of the theoretical framework of the study. Teachers behaviour in carrying out teaching learning and evaluation practices were analysed in the context of traditional teacher centric and behaviour centric category, cognitive concept development category and constructivist learner centric innovative category. The tools items were checked by the experts, researchers and teachers in the field of teacher education and higher education from leading HEIs of the country.

The tools face validity was examined on the basis of experts‟ judgement. The pilot study was carried out in one constituent college of Allahabad University to examine the respondents acquaintance with the items, language used and time required for filling up the questionnaire, conducting interviews and conducting observation of classroom teaching behaviour of teachers of HEIs. The tools were finalised by taking in to consideration the opinion of the respondents, opinion of the observers and the interviewers about the items quality, their relevance in the context of different kinds of respondents.

3.8 Data collection process: Data were collected by the researchers team visiting different sample HEIs located in different parts of the country .The researchers team spent two to three days time approximately for collecting data from the each HEI i.e.; administrating questionnaires to teachers and students, conducting observations and conducting interviewers of students.

3.9 Scoring of items:

1. The response to teachers questionnaire items responses were given 1,2 and 3 scores for Least agree, Agree and Most agree alternatives respectively.

Similarly, the students response to items as were given 1,2 and 3scores for Least, Sometimes and Always alternatives respectively.

For observation items the scoring was done as 0,1 and 2 on Never, Seldom and Often alternatives respectively.

For Interview of students items the scoring was done by assigning 0, 1 and 2 on Never, Seldom and Often alternatives respectively.

The mean values obtained by each respondent on different teaching categories were calculated separately by division of total scores by total number of items category wise. The mean value of each teaching category obtained by each respondent was considered as the score for each respondent category. Similarly, the observation scores for each teacher teaching behaviour was calculated by taking average score of each teacher category wise. The scores obtained by the teacher respondents, student respondents and observation of teachers were subject to further analysis of data for testing the null hypotheses of the study as stated in this chapter.

3.10 Analysis Procedures:

The data were analysed qualitatively to test different statistical hypotheses as stated in the first section (3.2) of this chapter. The statistical techniques like Mean, SD, ANOVA and Post hoc t tests were used to analyse the data. 3x2 factorial design were used to study the main effects and interaction effects of independent variable viz.; teaching category as per different hypotheses. Details of analysis and interpretation of data have been presented in the following chapter.

Chapter -4

Analysis and Interpretation of Data

4.0 Statistical Analysis of Data

4.1 Effect of teaching category on Self Rating TLE Practices of Teachers of HEIs in the context of discipline (Arts and Science) and Nature of Institutions

4.1.1 Self Rating TLE Practices of Teachers of HEIs in the context of discipline (Arts and Science)

S. No.	Discipline	Teaching Category					
		Behaviourist/ Teacher Centric		Cognitive/ Concept Centric		Constructivist/ Innovative	
1.	Arts N=100	Mean 2.50	S.D. 0.25	Mean 2.40	S.D. 0.18	Mean 2.30	S.D. 0.27
2.	Science N=100	2.71	0.17	2.40	0.15	2.43	0.14
3.	Total Arts & Science N=200	2.61	0.23	2.40	0.17	2.37	0.22

Table 4.1

Summary of 2×3 ANOVA on Effect of Discipline and Teaching Category on Self rating TLE Practices of HEI Teachers

S. No.	Source of Variation	SS	Df	MS	F	F crit
1.	Discipline	1.92	1	1.92	48.80*	3.86
2.	Teaching Category	6.92	2	3.49	88.91*	3.01
3.	Discipline Teaching Category Interaction	1.12	2	0.56	14.25*	3.01
4.	Within	23.33	594	0.039		
5.	Total	33.34	5.99			

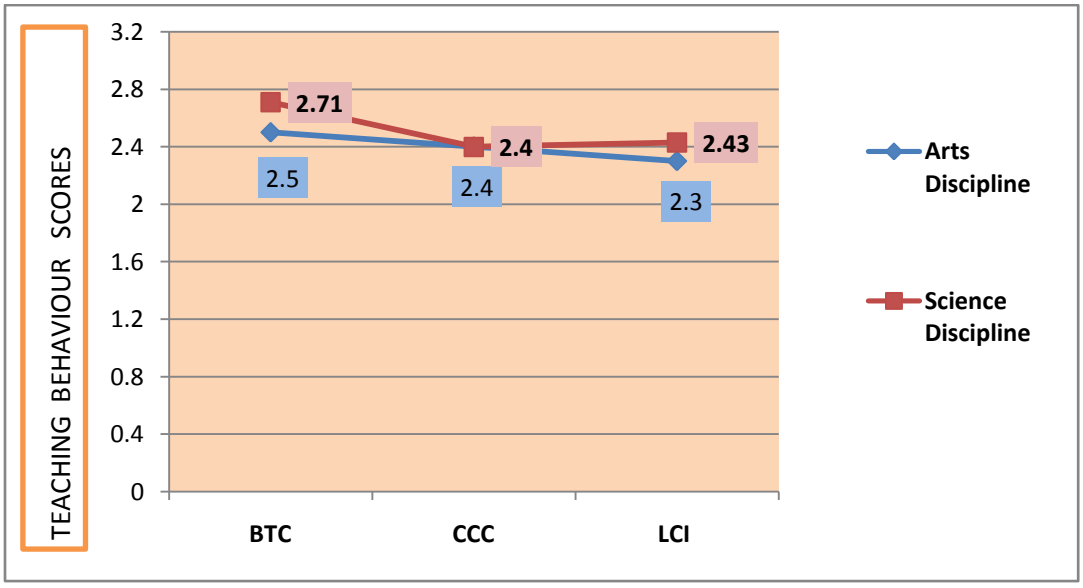
Note: *Significant at 0.01 level of significance

From Table 4.1. it can be observed that the calculated 'F' value on effect of discipline on TLE Practices of HEI teachers is 48.80 which is greater than the 'F' ratio of 3.86 required for significance against df 1 & 594 at 0.01 level. Hence, it can be concluded that the null hypothesis of no significant effect of discipline on self rating TLE Practices of HEI teachers is rejected at 0.01 level of significance. It means, there is significant effect of discipline on self rating TLE Practices of HEI teachers. This shows that discipline as a single main variable shows significant independent effect on TLE Practices of HEI Teachers.

In the case of effect of teaching category of teachers on TLE Practices of HEI teachers, the 'F' value is found as 88.91, which is significant at 2/594 df at 0.01 level of significance. So, the null hypothesis of no significant effect of teaching category on self rating TLE Practices of HEI teachers is rejected at 0.01 level of significance. It indicates that teaching category has significant effect on teaching behavior of HEI teachers.

In case of interactive effect of discipline and teaching category of HEI teachers the 'F' value is found to be 14.25 which is more than critical value of 'F' with 2/594 df at 0.01 level of significance hence it is significant. So, the null hypothesis of no significant interactive effect of discipline and teaching category on self rating TLE Practices of HEI teachers is rejected at 0.01 level of significance. It can be concluded that there is significant interactive effect of discipline and teaching category on TLE Practices of HEI teachers. This shows that discipline and teaching category are-interdependent to explain the TLE Practices of HEI teachers.

Figure: 4.1 Interactive effect of discipline and teaching category on self rating TLE Practices of HEI teachers



From Figure: 4.1 It can be observed that discipline as well as teaching category affect teacher behaviour in interactive form. It can be noticed that the science teachers‟ scores are higher than Arts teachers on behavioristic teaching category and learner centric innovative categories respectively whereas the cognitive concept centric scores were similar for both the groups. The pattern of TLE Practices of arts and science teachers‟ category wise was found different from each other.

Table: 4.2

Post hoc‘t’ test on self rating teaching behavior of total HEIs mean difference with regard to teaching category in different pairs

	M1(BTC) (2.61)	M2(CCC) (2.40)	M3(LCI) (2.37)
M1(BTC) (2.61)	-	0.21	0.24
M2(CCC) (2.40)	-	-	0.03
M3(LCI) (2.37)	-	-	-

The post hoc test of mean difference by use of „t‟ was adopted to study critical mean difference between different pairs of teaching category. The „t‟ values to be significant difference of mean scores pair were calculated by multiplying SED (0.0197) with 2.59 for 0.01 level and 1.97 for .05 level with df 398 respectively. The table of mean pair differences indicated that TLE Practices of HEI teachers category wise revealed that two mean differences were found significant at .01 level. It revealed that behaviouristic teacher centric category TLE Practices mean scores were higher than cognitive concept centric and learner centric innovative category TLE Practices of Arts and Science stream teachers. It was also revealed that cognitive concept centric category TLE Practices was not significantly different from Learner centric innovative behaviour of HEI teachers of arts and science streams.

4.1.2 Self Rating TLE Practices of College Teachers in the Context of discipline (Arts & Science)

Discipline	**Teaching Category**					
	Behaviourist/ Teacher Centric		**Cognitive/ Concept Centric**		**Constructivist/ Learner Centric Innovative**	
Arts Teachers N = 50	Mean 2.50	S.D. 0.21	Mean 2.35	S.D. 2.64	Mean 2.40	S.D. 0.13
ScienceTeacher N = 50	2.69	0.17	2.41	1	2.37	0.18
Total Arts & Science(N=50)	2.60	0.22	2.40	1.7	2.38	0.15

Table 4.3 Summary of 2 × 3 ANOVA on effect of Discipline and teaching category on self rating TLE Practices of college teachers

Source of Variation	SS	Df	MS	F	Fcrit
Discipline	0.33	1	0.33	11.95*	3.87
Teaching Category	2.81	2	1.41	50.84*	3.03
Discipline × Teaching Category Interaction	0.68	2	0.34	12.37*	3.03
Within	8.13	294	0.03		
Total	11.96				

Note: *Significant at 0.01 level of significance

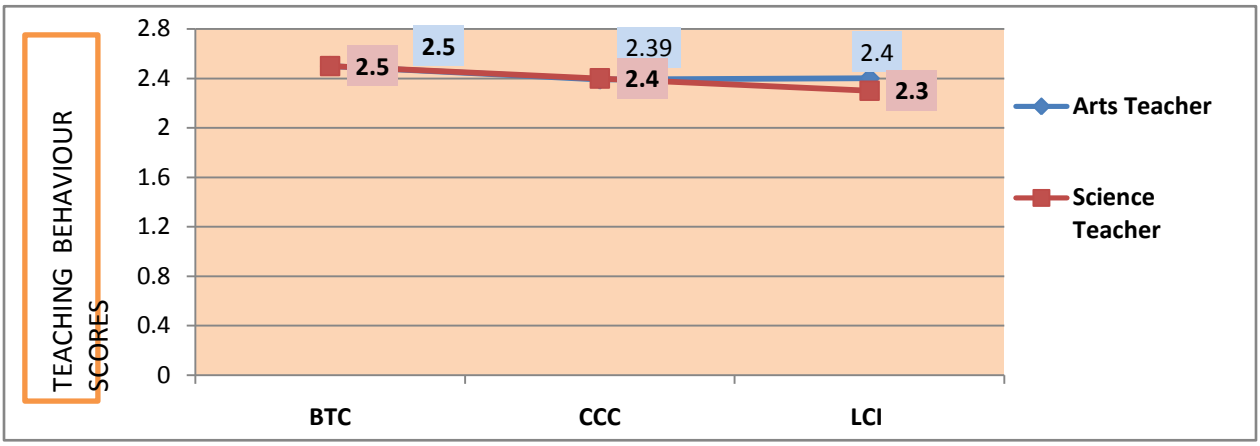
From Table 4.3 it can be observed that the calculated 'F' value on effect of discipline on TLE Practices of college teachers is 11.95 which is greater than the table value 3.87 at 1/294 df. This 'F' ratio is significant at 0.01 level of significance. Hence, it can be concluded that the null hypothesis of no significant effect of discipline on self rating TLE Practices of college teachers is rejected at 0.01 level of significance. This indicates that discipline shows significant effect on TLE Practices of college teachers. Hence TLE Practices of college teachers cannot be said to be independent of teaching category.

The calculated 'F' ratio for effect of teaching category of teachers on TLE Practices of college teachers is 50.84 which is greater than the 'F' ratio of 3.03 required for significant against 2 and 294 df at 0.01 level. So, the null hypothesis of no significant effect of teaching category on self rating TLE Practices of college teachers is rejected at 0.01 level of significance. This shows that teaching category has significant effect our TLE Practices of college teachers.

The calculated 'F' ratio for interaction A×B i.e. joint effect of teaching category and discipline of college teachers is 12.37 which is higher than the table value of 3.03 at 2/294 df. It shows that interaction of discipline and teaching category is significant at 0.01 level of significance. So, the null hypothesis of no significant interactive effect of discipline and teaching category on self rating TLE Practices of college teachers is rejected at 0.01 level of significance. It can be concluded that there is significant interactive effect of discipline and teaching category on TLE Practices of college teachers. This shows that discipline and teaching category are interdependent to explain the TLE Practices of college teachers.

Figure: 4.2

Interactive effect of discipline and teaching category on self rating teaching behaviour of college teachers



From Figure: 4.2 It can be observed that discipline as well as teaching category affects college teachers‟ behaviour in interactive form. It can be noticed that the science teachers and Arts teachers‟ scores are same on behavioristic teaching category. On concept centric category science teachers score is higher than arts teachers‟ scores whereas for learner centric innovative category arts teachers‟ scores were higher than the science teachers‟ scores. The pattern of college teachers‟ TLE Practices of arts and science teachers‟ category was found different from each other.

Table: 4.1.4

Post hoc ‘t’ test on self rating teaching behavior of college teachers HEIs mean difference with regard to teaching category in different pairs

	M1(BTC) (2.60)	M2(CCC) (2.40)	M3(LCI) (2.38)
M1(BTC) (2.60)	-	0.20	0.22
M2(CCC) (2.40)	-	-	0.020
M3(LCI) (2.38)	-	-	-

The post hoc test of mean difference by use of „t‟ was adopted to study critical mean difference between different pairs of teaching category. The „t‟ values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.024) with 2.59 for 0.01 level (.062) and 1.97 for .05 level (.047) with df 294 respectively. The table of mean pair differences indicated that TLE Practices of college teachers category wise revealed that two mean differences were found significant at .01 level. It revealed that behaviouristic teacher centric category TLE Practices

mean scores were higher than cognitive concept centric and learner centric innovative category TLE Practices of Arts and Science stream teachers. It was also revealed that cognitive concept centric category TLE Practices was not significantly different from Learner centric innovative behaviour of HEI teachers of arts and science streams.

4.1.3

Self Rating TLE Practices of Teachers of University in the Context of Discipline (Arts & Science)

S. No.	Discipline	Teaching Category					
		Behaviourist/ Teacher Centric		Cognitive/ Concept Centric		Constructivist/ Learner Centric Innovative	
1.	Arts N=50	Mean 2.69	S.D. 0.17	Mean 2.37	S.D. 0.17	Mean 2.49	S.D. 0.21
2.	Science Teachers N=50	2.45	0.28	2.38	0.13	2.39	0.19
3.	Total Arts + Science N=100	2.57	0.26	2.38	0.26	2.44	0.18

Table 4.5

Summary of 2×3 ANOVA on Effect of discipline and teaching category on TLE Practices of university teachers

S. No.	Source of Variation	SS	Df	MS	F	F crit
1.	Discipline	.89	1	.89	25.44*	3.87
2.	Teaching Category	1.91	2	.96	27.44*	3.03
3.	Discipline x Teaching Category Interaction	.82	2	.41	11.74*	3.03
4.	Within	10.23	294	.035		
5.	Total	13.84	299			

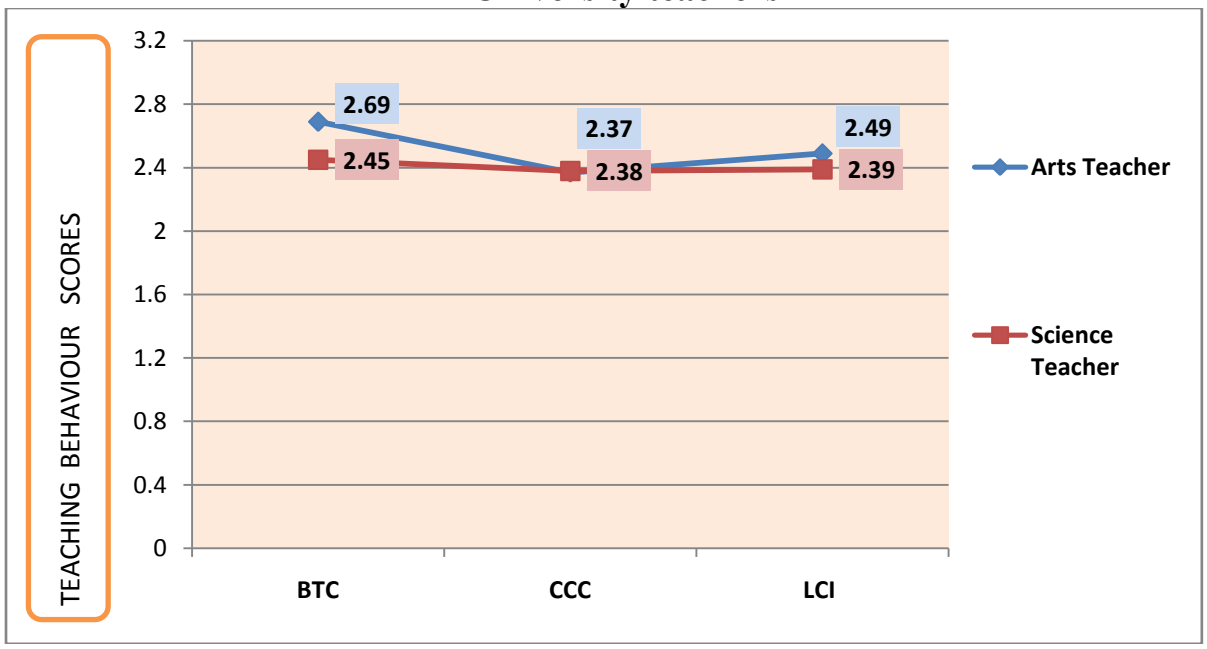
Note: *Significant at 0.01 level of significance.

From Table 4.5 it can be observed that the calculated 'F' value on effect of discipline on TLE Practices of university teachers is 25.44 which is greater than the 'F' ratio of 3.87 required for significance against df 1 & 294 at 0.01 level. So, the null hypothesis of no significant effect of discipline on self rating TLE Practices of university teachers is rejected at .01 level of significance. This shows that discipline as a single main variable shows significant effect on TLE Practices of university teachers.

In the case of effect of teaching category on TLE Practices of university teachers the F value is found as 27.44 which is significant at2/294 df at .01 level of significance. So the null hypothesis of no significant effect of teaching category on self rating TLE Practices of university teachers is rejected at .01 level of significance. It indicates that teaching category has significant effect on TLE Practices of university teachers.

In case of interactive effect of discipline and teaching category on TLE Practices of university teachers the F value is found to be 11.74 which is more than critical value of „F" with df 2/294 at .01 level of significance hence it is significant. So, the null hypothesis of no significant interactive effect of discipline and teaching category on self rating TLE Practices of university teachers is rejected at .01 level of significance. It can be concluded that there is significant interactive effect of discipline and teaching category on TLE Practices of university teachers.

Figure: 1.3
Interactive effect of discipline and teaching category on TLE Practices of University teachers



From Figure: 1.3 It can be observed that discipline as well as teaching category affect university teachers" behaviour in interactive form. It can be noticed that the arts teachers" scores are higher than science teachers on behavioristic teaching category and learner centric innovative categories respectively whereas for the cognitive concept centric category science teachers" scores are higher than arts teachers" scores. The pattern of University teachers" TLE Practices of arts and science teachers" was found different from each other category wise.

Table: 4.1.6 Post hoc 't' test on self rating teaching behavior of university teachers HEIs mean difference with regard to teaching category in difference pairs

	M1(BTC) (2.61)	M2(CCC) (2.40)	M3(LCI) (2.37)
M1(BTC) (2.61)	-	0.21	0.24
M2(CCC) (2.40)	-	-	0.030
M3(LCI) (2.37)	-	-	-

The post hoc test of mean difference by use of „t" was adopted to study critical mean difference between different pairs of teaching category. The „t" values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.083) with 2.59 for 0.01 level (.21) and 1.97 for .05 level (.16) with df 294 respectively. The table of mean pair differences indicated that TLE Practices of university teachers category wise revealed that two mean differences were found significant at .01 level. It revealed that behaviouristic teacher centric category TLE Practices mean scores were higher than cognitive concept centric and learner centric innovative category TLE Practices of Arts and Science stream teachers. It was also revealed that cognitive concept centric category TLE Practices was not significantly different from Learner centric innovative behaviour of HEI teachers of arts and science streams.

4.1.4 Self Rating TLE Practices of Arts Subject Teachers of HEIs in the Context of Nature of Institutions

S. No.	Nature of Institutions	Teaching Category					
		Behaviourist/ Teacher Centric		Cognitive/ Concept Centric		Constructivist/ Innovative	
1.	University Art Teacher N=50	Mean 2.69	S.D. 0.17	Mean 2.36	S.D. 0.16	Mean 2.48	S.D. 0.15
2.	College Art Teacher N=50	2.50	0.21	2.39	0.16	2.39	0.13
	Total University+ College N=100	2.59	0.21	2.38	0.16	2.44	0.15

Table 4.7
Summary of 2×3 ANOVA on Effect of nature of institutions and teaching category on TLE Practices of HEI arts Teachers

S. No.	Source of Variation	SS	df	MS	F	F crit
1.	Nature of institutions (University & College)	.61	1	.61	22.13*	3.87
2.	Teaching Category	2.43	2	1.21	44.14*	3.03
3.	Discipline x Teaching Category Interaction	.54	2	.27	9.90*	3.03
4.	Within	8.08	294	0.03		
5.	Total	11.66	299			

Note: *Significant at 0.01 level of significance

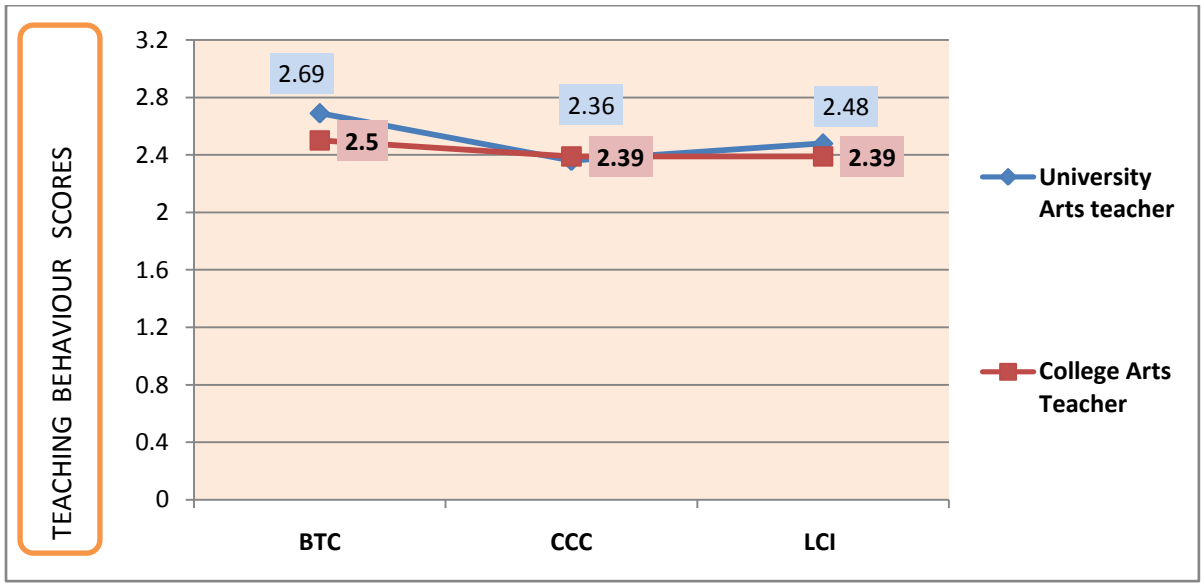
From Table 4.7 it can be observed that the calculated 'F' value on effect of nature of institution on self rating teaching behavior of HEI teachers is 22.13 which is greater than the 'F' ratio of 3.87 required for significance against of 1 & 294 at 0.01 df. So, the null hypothesis of no significant effect of nature of institutions on self rating TLE Practices of arts teachers of HEIs is rejected at .01 level of significance. This indicates that nature of institution shows significant effect on TLE Practices of arts teachers of HEIs.

The calculated „F" ratio for effect of teaching category on self rating TLE Practices of arts teachers of HEIs is 44.14 which is greater than the F ratio of 3.03 required for significance against 2 and 294 df at .01 level. So the null hypothesis of no significant effect of TLE Practices on self rating TLE Practices of arts teachers of HEIs is rejected at .01 level of significance. This shows that teaching category has significant effect on self rating TLE Practices of arts teachers of HEIs.

The calculated „F" ratio for interaction i.e. joint effect of nature of institution and teaching category on self rating TLE Practices of arts teachers of HEIs is 9.90 which is higher than the table value at 2/294 df. It shows that interaction of nature of institution and teaching category is significant at .01 level of significance. So the null hypothesis of no significant interactive effect of nature of institutions and teaching category on self rating TLE Practices of arts teachers of HEIs is rejected at .01 level of significance. It may be concluded that there is significant interactive effect of nature of institutions and teaching category on self rating TLE Practices of arts teachers of HEIs. This shows that nature of institutions and teaching category are interdependent to explain the self rating TLE Practices of HEIs teachers teaching arts subjects.

Figure: 4.4

Interactive effect of nature of institutions and teaching category on self rating TLE Practices of HEI Arts teachers



From Figure: 4.4 It can be observed that nature of institution as well as teaching category affect HEI teachers‟ behaviour in interactive form. It can be noticed that the university arts teachers‟ scores are higher than college arts teachers on behavioristic teaching category and learner centric innovative categories respectively whereas for the cognitive concept centric category college arts teachers‟ scores are higher than university arts teachers. The pattern of TLE Practices of arts teachers of university and college was found different from each other.

Table: 4.1.8

Post hoc ‘t’ test on self rating TLE Practices on nature of institution in HEIs mean difference with regard to teaching category in difference pairs

	M1(BTC) (2.59)	M2(CCC) (2.38)	M3(LCI) (2.44)
M1(BTC) (2.59)	-	0.21	0.15
M2(CCC) (2.38)	-	-	0.060
M3(LCI) (2.44)	-	0.060	-

The post hoc test of mean difference by use of „t" was adopted to study critical mean difference between different pairs of teaching category. The „t" values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.024) with 2.59 for 0.01 level (.062) and 1.97 for .05 level (.047) with df 294 respectively. The table of mean pair differences indicated that TLE Practices of university and college teachers category wise revealed that two mean differences were found significant at .01 level. It revealed that behaviouristic teacher centric category TLE Practices mean scores were higher than cognitive concept centric and learner centric innovative category TLE Practices of university and college teachers. It was also revealed that cognitive concept centric category TLE Practices was not significantly different from Learner centric innovative behaviour of teachers of university and college.

4.1.5 Self Rating TLE Practices of Science Subject Teachers of HEIs in the Context of Nature of Institutions

S. No.	Nature of Institutions	Teaching Category					
		Behaviourist/ Teacher Centric		Cognitive/ Concept Centric		Constructivist/ Learner Centric Innovative	
1.	University Science Teachers (N=50)	Mean 2.45	S.D. 0.28	Mean 2.38	S.D. 0.13	Mean 2.39	S.D. 0.19
2.	College Science Teachers (N=50)	2.69	0.17	2.41	0.13	2.36	0.18
	Total University + College Science Teachers (N=100)	2.57	0.26	2.39	0.13	2.37	0.18

Table 4.1.9
Summary of 2×3 ANOVA on Effect of nature of institutions and teaching category on self rating TLE Practices of science teachers of HEIs

S. No.	Source of Variation	SS	df	MS	F	F crit
1.	Nature of institutions	.54	1	.54	15.49*	3.87
2.	Teaching Category	2.26	2	1.13	32.36*	3.03
3.	Discipline x Teaching Category Interaction	.99	2	.50	14.15*	3.03
4.	Within	10.29	294	0.03		
5.	Total	14.08	299			

Note: *Significant at 0.01 level of significance

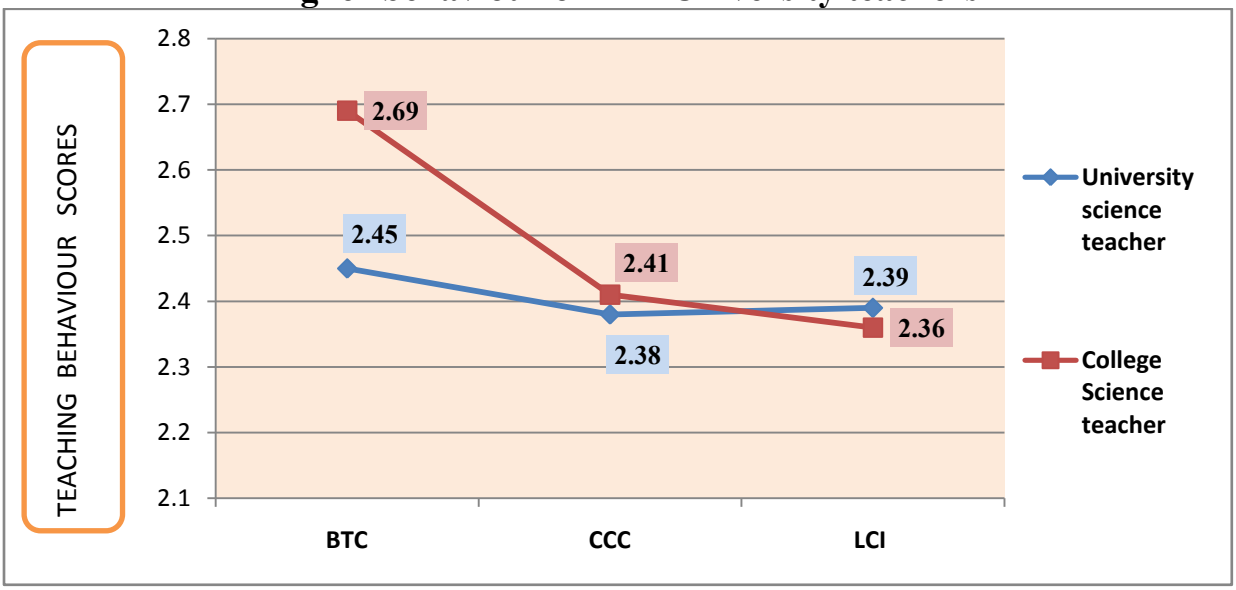
From Table 4.1.9 it can be observed that the calculated 'F' value on effect of nature of institution on self rating TLE Practices of HEI teachers teaching science subjects is 15.49 which is significant at .01 level of significance at 1/294 df. So, the null hypothesis of no

significant effect of nature of institutions on self rating TLE Practices of science teachers of HEIs is rejected at .01 level of significance. This indicates that nature of institution shows significant effect on self rating TLE Practices of science teachers of HEIs

The calculated „F" ratio for effect of teaching category on self rating TLE Practices of science teachers of HEIs is 32.36 which is greater than the F ratio of 3.03 required for significance against 2 and 294 df at .01 level. So, the null hypothesis of no significant effect of teaching category on self rating TLE Practices of science teachers of HEIs is rejected at .01 level of significance. This shows that teaching category has significant effect on self rating TLE Practices of teachers of HEIs teaching science subjects.

The calculated „F" ratio for interaction i.e. joint effect of nature of institution and teaching category on self rating TLE Practices of teachers teaching science subjects the „F" value is found to be 14.15 which is higher than the table value at 2/294 df at .01 level of significance . So the null hypothesis of no significant interactive effect of nature of institutions and teaching category self rating TLE Practices of science teachers of HEIs is rejected at .01 level of significance. It can be concluded that there is significant interactive effect of nature of institutions and teaching category on TLE Practices of HEI teachers teaching science subjects. This shows that nature of institutions and teaching category are interdependent to explain the self rating TLE Practices of HEIs teachers teaching science subjects.

Figure: 4.5
Interactive effect of nature of institutions and teaching category on higher behaviour of HEI University teachers



From Figure: 4.5 It can be observed that nature of institution as well as teaching category affect HEI science teachers‟ TLE Practices in interactive form. It can be noticed that the college science teachers‟ scores are higher than university science teachers on behavioristic teaching category and cognitive concept centric categories respectively whereas for the learner centric innovative category scores were less for college science teachers as compared to university science teachers, The pattern of TLE Practices of science teachers‟ of university and college was found different from each other category wise.

Table: 4.1.10

Post hoc‘t’ test on self rating teaching behavior of nature of institution HEIs mean difference with regard to teaching category in difference pairs.

	M1(BTC) (2.57)	M2(CCC) (2.39)	M3(LCI) (2.37)
M1(BTC) (2.57)	-	0.18	0.20
M2(CCC) (2.39)	-	-	0.020
M3(LCI) (2.37)	-	-	-

The post hoc test of mean difference by use of „t‟ was adopted to study critical mean difference between different pairs of teaching category. The „t‟ values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.024) with 2.59 for 0.01 level (.062) and 1.97 for .05 level (.047) with df 294 respectively. The table of mean pair differences indicated that TLE Practices of university and college teachers category wise revealed that two mean differences were found significant at .01 level. It revealed that behaviouristic teacher centric category TLE Practices mean scores were higher than cognitive concept centric and learner centric innovative category TLE Practices of university and college teachers. It was also revealed that cognitive concept centric category TLE Practices was not significantly different from Learner centric innovative behaviour of HEI teachers of university and college.

Objective 2

To study the main and interactional effect of teaching category (behaviouristic, cognitive and constructivist) on students ratings of TLE Practices of HEI teachers in the context of discipline, level of courses and nature of institutions.

4.2.2

Effect of teaching category on students ratings of TLE Practices of HEI teachers in the context of discipline, level of courses and nature of institutions

4.2.1 HEI arts students rating of TLE Practices of teachers in the context of level of HEI (UG & PG)

Nature of institutions	Teaching Category					
	Behaviourist/ Teacher Centric		Cognitive/ Concept Centric		Constructivist/ Learner Centric Innovative	
UG students N=200	Mean 2.80	S.D. .05	Mean 2.69	S.D. 1.64	Mean 2.55	S.D. .19
PG Students N=200	.09	2.38	2.67	.22	2.48	.21
Total UG and PG N=400	1.45	1.36	2.68	.19	2.51	.18

Table 4.11 Summary of 2×3 ANOVA on Effect of Level of HE of Arts students and Teaching Category on TLE Practices of HEI Teachers

S. No.	Source of Variation	SS	Df	MS	F	F crit
1.	Level of HE (UG & PG)	264.7	1	264.7	10808.61*	3.85
2.	Teaching Category	358.30	2	179.15	7315.34*	3.00
3.	Level of He x Teaching Category Interaction	477.70	2	238.85	9752.94*	3.00
4.	Within	29.24	1194	0.02		
	Total	1129.95	1199			

*Significant at 0.01 level of significance

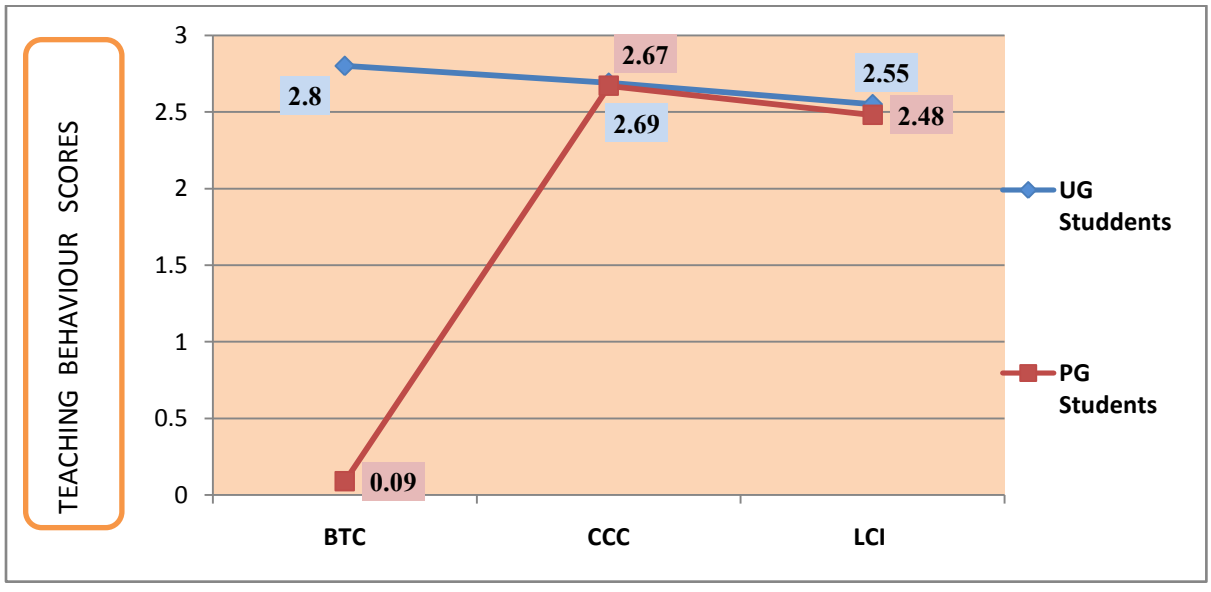
From Table 4.11, it can be observed that the calculated 'F' value on effect of level of HE on TLE Practices of HEI teachers teaching arts subject is 10808.61 which is greater than the 'F ratio' of 3.85 required for significance against df 1 and 1194 at 0.01 level. So, the null hypothesis of no significant effect of level of HE on students rating of teaching behavior of HEI arts teachers is rejected at .01 level of significance. This shows that level of HE as a single main variable shows significant effect on TLE Practices of HEI teachers teaching arts subjects.

In the case of effect of teaching category on student rating of TLE Practices of HEI teachers teaching arts subjects, the 'F' value is found as 7315.34 which is significant at 2/1194 df at 0.01 level of significance. So, the null hypothesis of no significant effect of teaching category on student rating of teaching behavior of HEI arts teachers is rejected at .01 level of significance. It indicates that teaching category has significant effect on students rating of TLE Practices of HEI teachers teaching arts subjects.

In case of interactive effect of level of HE (UG & PG) of students and teaching category of HEI teachers teaching arts subject, the 'F value' is found to be 9752.94 which is more than critical value of 'F' with df 2/1194 at 0.01 level of significance, hence it is significant. So, the null hypothesis of no significant interactive effect of level of HE and teaching category on students rating on teaching behavior of HEI arts teachers is rejected at .01 level of significance. It can be concluded that there is significant interactive effect of level of HE and teaching category on student rating of TLE Practices of HEI teachers teaching arts subjects. This shows that level of HE and teaching category are interdependent to explain the student rating of TLE Practices of HEI teachers teaching arts subjects.

Figure: 4.6

Interactive effect of nature of institutions and teaching category on TLE Practices of HEI University teachers



From Figure: 4.6 It can be observed that level of HE as well as teaching category affects arts students rating of HEI teachers‟ TLE Practices in interactive form. It can be noticed that the

teachers teaching UG students scored higher at all the three categories- behaviorist teacher centric category , cognitive concept centric category and learner centric innovative approach as compared to teachers teaching at PG level. The pattern of TLE Practices of arts teachers teaching at PG and UG level was found different from each other category wise.

Table:4.12 Post hoc't' test on self rating teaching behavior of nature of institution HEIs mean difference with regard to teaching category in difference pairs.

	M1(BTC) (1.45)	M2(CCC) (2.68)	M3(LCI) (2.51)
M1(BTC) (1.45)	-	1.23	1.06
M2(CCC) (2.68)	-	-	0.17
M3(LCI) (2.51)	-	-	-

The post hoc test of mean difference by use of „t" was adopted to study critical mean difference between different pairs of teaching category. The „t" values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.024) with 2.58 for 0.01 level (.025) and 1.96 for .05 level (.019) with df 1194 respectively. The table of mean pair differences indicated that TLE Practices of university and college teachers category wise revealed that three mean differences were found significant at .01 level. It revealed that cognitive concept centric behaviour teachers score were higher than innovative category and behaviouristic teacher centric category TLE Practices mean scores as per student rating of TLE Practices of university and college teachers.

4.2.2 College arts students' rating of TLE Practices of teachers in the context of Level of HEI

Level of HE	**Teaching Category**					
	Behaviourist/ Teacher Centric		**Cognitive/ Concept Centric**		**Constructivist/ Learner Centric Innovative**	
UG (N=100)	Mean 2.81	S.D. .05	Mean 2.69	S.D. .16	Mean 2.58	S.D. .12
PG (N=100)	0.09	2.01	2.71	.19	2.45	.23
Total N=100	1.45	1.36	2.70	.18	2.51	.19

Table 4.13

Summary of 2 x 3 ANOVA on effect of level of HE (UG & PG) of college arts students and teaching category on TLE Practices of teachers

S. No.	Source of Variation	SS	Df	MS	F	F crit
1.	Level of HE	134.16	1	134.16	6204.99*	3.85
2.	Teaching Category	182.19	2	91.09	4213.18*	3.01
3.	Level of HE× Teaching Category Interaction	238.44	2	119.22	5513.85*	3.01
4.	Within	12.84	594	.02		
	Total	567.63	599			

*Significant at 0.01 level of significance

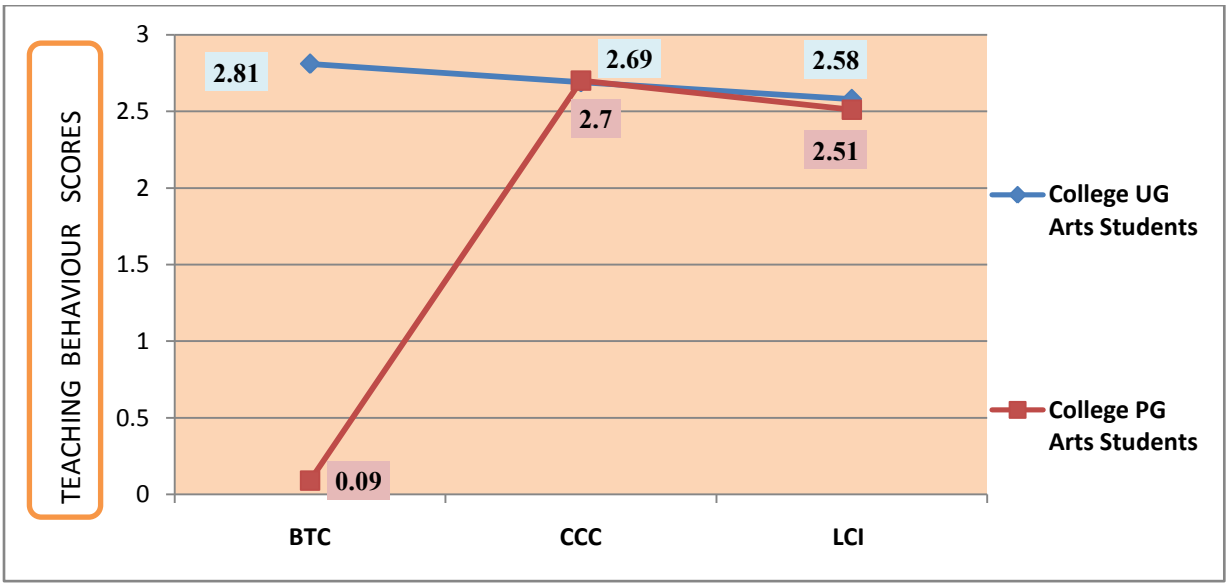
From Table 4.13, it can be observed that the calculated 'F' value on effect of level of HE on TLE Practices of college teachers teaching arts subject is 6204.99 which is greater than the 'F ratio' of 3.85 required for significance against df 1 and 594 at 0.01 level. So, the null hypothesis of no significant effect of level of HE on students rating of teaching behavior of college arts teachers is rejected at .01 level of significance. This shows that level of HE as a single main variable shows significant effect on TLE Practices of college teachers teaching arts subjects.

In the case of effect of teaching category on student rating of TLE Practices of HEI teachers teaching arts subjects, the 'F' value is found as 4213.18 which is significant at 2/594 df at 0.01 level of significance. So, the null hypothesis of no significant effect of teaching category on student rating of teaching behavior of college arts teachers is rejected at .01 level of significance. It indicates that teaching category has significant effect on students rating of TLE Practices of college teachers teaching arts subjects.

In case of interactive effect of level of HE (UG & PG) of students and teaching category of college teachers teaching arts subject, the 'F value' is found to be 5513.85 which is more than critical value of 'F' with df 2/1194 at 0.01 level of significance, hence it is significant. So, the null hypothesis of no significant interactive effect of level of HE and teaching category on students rating on TLE Practices of college arts teachers is rejected at .01 level of significance. It can be concluded that there is significant interactive effect of level of HE and teaching category on student rating of TLE Practices of college teachers teaching arts subjects. This shows that level of HE and teaching category are interdependent to explain the student rating of TLE Practices of college teachers teaching arts subjects.

Figure: 4.7

Interactive effect of level of HE and teaching category on college Arts students' ratings on TLE Practices of teachers



From Figure: 4.7 It can be observed that level of HE as well as teaching category affects college arts students rating of teachers" TLE Practices in interactive form. It can be noticed that the college UG teachers" scores are higher than PG teachers on behavioristic teaching category and learner centric innovative categories respectively whereas for the cognitive concept centric scores college PG teachers" scores are higher than UG teachers. The pattern of TLE Practices of college UG and PG arts teachers" was found different from each other category wise.

Table 4.14

Post hoc't' test on College arts students rating TLE Practices of level of HEIs mean difference with regard to teaching category in difference pairs

	M1(BTC) (1.45)	M2(CCC) (2.70)	M3(LCI) (2.51)
M1(BTC) (1.45)	-	1.25	1.06
M2(CCC) (2.70)	-	-	0.19
M3(LCI) (2.51)	-	-	-

The post hoc test of mean difference by use of „t" was adopted to study critical mean difference between different pairs of teaching category. The „t" values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.014) with 2.58 for 0.01 level (.036) and 1.96 for .05 level (.027) with df 594 respectively. The table of mean pair differences indicated that TLE Practices of college UG arts and college PG arts teachers of HEI category wise revealed that three mean differences were found significant at .01 level . It revealed that cognitive concept centric behaviour score were higher than innovative category TLE Practices and behaviouristic teacher centric category teachers behaviour respectively as per student rating of TLE Practices of college UG arts and college PG arts teachers.

4.2.3 University arts students rating of TLE Practices of teachers in the context of level of HE

Level of HE (UG & PG)	Teaching Category					
	Behaviourist/ Teacher Centric		Cognitive/ Concept Centric		Constructivist/ Learner Centric Innovative	
UG students N=100	Mean 2.8	S.D. .06	Mean 2.7	S.D. .17	Mean 2.52	S.D. .15
PG Students N=100	.08	.01	2.63	.24	2.50	.19
Total N=200	1.44	1.36	2.66	.21	2.5	.17

Table 4.15

Summary of 2x 3 ANOVA on effect of level of HEI of university Arts students and teaching category on TLE Practices of teachers

S. No.	Source of Variation	SS	df	MS	F	F crit
1.	Level of HE (UG & PG)	130.55	1	130.55	4924.55*	3.86
2.	Teaching Category	176.19	2	88.10	3323.14*	3.01
3.	Discipline × Teaching Category Interaction	239.75	2	119.87	4521.68*	3.01
4.	Within	15.75	594	.03		
	Total	562.25	599			

*Significant at 0.01 level of significance

From Table 4.15, it can be observed that the calculated 'F' value on effect of level of HE on TLE Practices of university teachers teaching arts subject is 4924.55 which is greater than

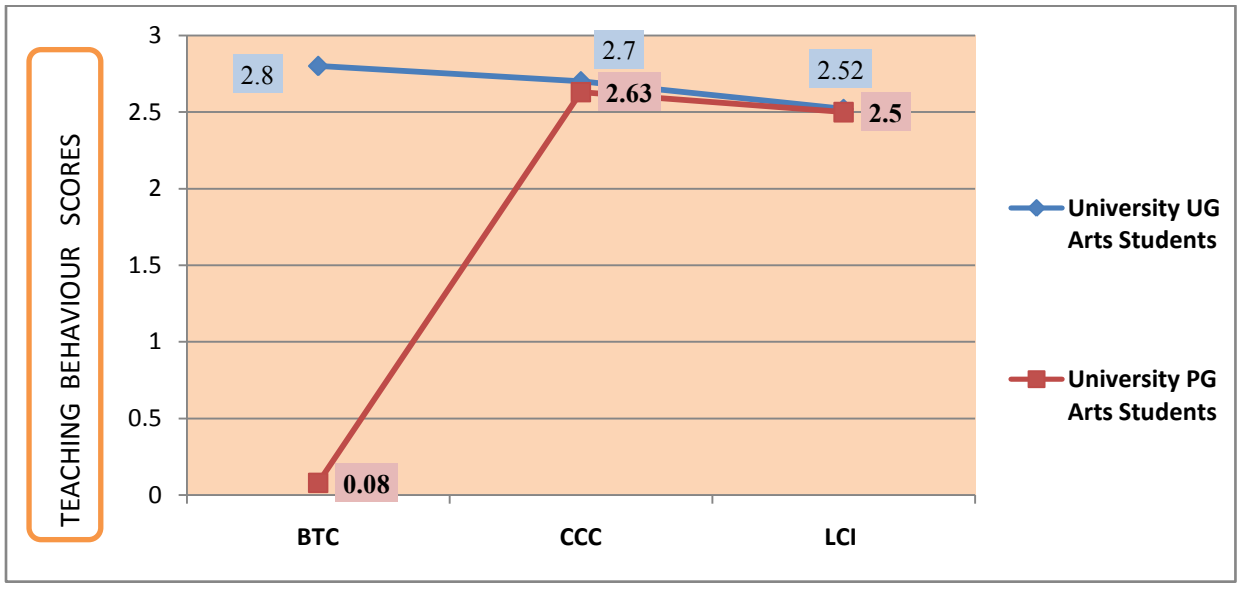
the 'F ratio' of 3.86 required for significance against df 1 and 594 at 0.01 level. So, the null hypothesis of no significant effect of level of HE on students rating of teaching behavior of university arts teachers is rejected at .01 level of significance. This shows that level of HE as a single main variable shows significant effect on TLE Practices of university teachers teaching arts subjects.

In the case of effect of teaching category on student rating of TLE Practices of university teachers teaching arts subjects, the 'F' value is found as 3323.14 which is significant at 2/594 df at 0.01 level of significance. So, the null hypothesis of no significant effect of teaching category on student rating of teaching behavior of university arts teachers is rejected at .01 level of significance. It indicates that teaching category has significant effect on students rating of TLE Practices of university teachers teaching arts subjects.

In case of interactive effect of level of HE (UG & PG) of students and teaching category of university teachers teaching arts subject, the 'F value' is found to be 4521.68 which is more than critical value of 'F' with df 2/1194 at 0.01 level of significance, hence it is significant. So, the null hypothesis of no significant interactive effect of level of HE and teaching category on students rating on TLE Practices of university arts teachers is rejected at .01 level of significance. It can be concluded that there is significant interactive effect of level of HE and teaching category on student rating of TLE Practices of university teachers teaching arts subjects. This shows that level of HE and teaching category are interdependent to explain the student rating of TLE Practices of university teachers teaching arts subjects.

Figure: 4.8

University arts students rating of TLE Practices of teachers in the context of level of HE



From Figure: 4.8 It can be observed that level of HE as well as teaching category affects university arts students rating of teachers‟ TLE Practices in interactive form. It can be noticed that the university UG arts teachers‟ scores are higher than PG teachers‟ scores on behavioristic teacher centric, cognitive concept centric and Learner centric innovative categories. The pattern

of TLE Practices of university UG and PG arts teachers" was found different from each other category wise.

Table: 4.16

Post hoc't' test on University arts students rating of TLE Practices of discipline HEIs mean difference with regard to teaching category in difference pairs.

	M1(BTC) (1.44)	M2(CCC) (2.66)	M3(LCI) (2.50)
M1(BTC) (1.44)	-	1.22	1.06
M2(CCC) (2.66)	-	-	0.16
M3(LCI) (2.50)	-	-	-

The post hoc test of mean difference by use of „t" was adopted to study critical mean difference between different pairs of teaching category. The „t" values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.017) with 2.58 for 0.01 level (.044) and 1.96 for .05 level (.033) with df 594 respectively. The table of mean pair differences indicated that TLE Practices of university UG arts and university PG arts teachers of HEI category wise revealed that three mean differences were found significant at .01 level. It revealed that cognitive concept centric behaviour scores were higher than innovative category TLE Practices and behaviouristic teacher centric behaviour respectively as per student rating of TLE Practices of university UG arts and university PG arts teachers.

4.2.4 HEI - UG arts students rating of TLE Practices of teachers in the context of nature of institutions

Level of HE	**Teaching Category**					
	Behaviourist/ Teacher Centric		**Cognitive/ Concept Centric**		**Constructivist/ Learner Centric Innovative**	
College Students N=100	Mean 2.81	S.D. .05	Mean 2.69	S.D. .16	Mean 2.57	S.D. .11
University Students N=100	2.81	.06	2.70	.17	2.51	1.58
Total students N=200	2.80	.06	2.69	.17	2.54	.14

Table 4.17 Summary of 2x 3 ANOVA on effect of nature of institution on UG-Arts students rating and teaching category on TLE Practices of HEI teachers

S. No.	Source of Variation	SS	df	MS	F	F crit
1.	Nature of institution (college and university)	.07	1	.07	4.26*	3.86
2.	Teaching Category	6.87	2	3.43	202.93*	3.01
3.	Nature of institution× Teaching Category Interaction	.11	2	.05	3.20*	3.01
4.	Within	10.05	594	.02		
	Total	17.10	599			

*Significant at 0.01 level of significance

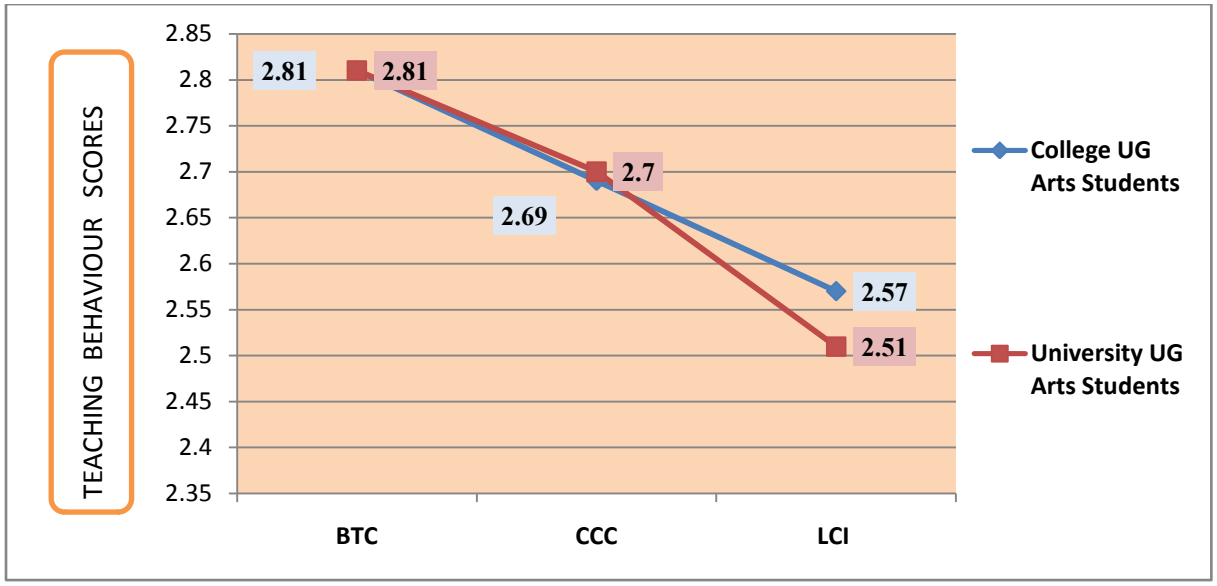
From Table 4.17, it can be observed that the calculated 'F' value on effect of Nature of institution (college and university) on TLE Practices of HEI teachers teaching UG arts students is 4.26 which is significant at 0.01 level of significance at 1/594 df. So, the null hypothesis of no significant effect of on nature of institution (college and university) on UG arts students rating of TLE Practices of HEI teachers is rejected at .01 level of significance. This indicates that nature of institution shows significant effect on TLE Practices of HEI teachers teaching UG arts students, hence TLE Practices of HEI teachers teaching UG arts students cannot be said to be independent of nature of institutions.

The calculated 'F ratio' for effect of teaching category on TLE Practices of HEI teachers teaching UG arts students is 202.93 which is greater than the 'F ratio' of 3.01 required for significance against 2 and 594 df at 0.01 level. So, the null hypothesis of no significant effect of teaching category on UG arts students rating of TLE Practices of HEI teachers is rejected at .01 level of significance. This shows that teaching category has significant effect on TLE Practices of teachers teaching UG arts students.

The calculated 'F ratio' for interaction i.e. joint effect of nature of institutions and teaching category on UG arts students rating of teachers is 3.20 which is higher than the table value at 2/594 df. It shows that interaction of nature of institutions and teaching category is significant at 0.01 level of significance. So, the null hypothesis of no significant interactive effect of nature of institutions and teaching category on UG arts students rating of teaching behavior of HEI teachers is rejected at .01 level of significance. So, it can be concluded that there is significant interactive effect of and nature of institutions teaching category on TLE Practices of teachers teaching UG arts students. This shows that nature of institutions and teaching category are interdependent to explain the TLE Practices of HEI teachers teaching UG arts students.

Figure: 4.9

UG arts students rating of TLE Practices of teachers in the context of nature of institutions



From Figure: 4.9 It can be observed that nature of institutions as well as teaching category affects undergraduate arts students rating of teachers‟ TLE Practices in interactive form. It can be noticed that the university UG arts teachers‟ scores and college UG arts teachers‟ scores are same on behavioristic teaching category. In case of cognitive concept centric category university UG arts teachers‟ scores are higher than college UG arts teachers‟ scores whereas college UG arts teachers‟ scores are higher than university UG arts teachers scores for learner centric innovative categories. The pattern of TLE Practices of college UG arts teachers and university UG arts teachers was found different from each other category wise.

Table: 2.18

Post hoc ‘t’ test on UG arts students rating of TLE Practices of nature of institution HEIs mean difference with regard to teaching category in different pairs

	M1(BTC) (2.80)	M2(CCC) (2.69)	M3(LCI) (2.54)
M1(BTC) (2.80)	-	0.11	0.26
M2(CCC) (2.69)	-	-	0.15
M3(LCI) (2.54)	-	-	-

The post hoc test of mean difference by use of „t" was adopted to study critical mean difference between different pairs of teaching category. The „t" values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.014) with 2.58 for 0.01 level (.036) and 1.96 for .05 level (.027) with df 594 respectively. The table of mean pair differences indicated that TLE Practices of college UG arts and university UG arts teachers of HEI category wise revealed that three mean differences were found significant at .01 level. It revealed that behaviouristic teacher centric behaviour scores were higher than cognitive concept centric behaviour and innovative category TLE Practices respectively as per student rating of TLE Practices of college UG arts and university UG arts teachers.

4.2.5 PG arts students rating of TLE Practices of teachers in the context of nature of institutions

Nature of institution (college and university)	Teaching Category					
	Behaviourist/ Teacher Centric		**Cognitive/ Concept Centric**		**Constructivist/ Learner Centric Innovative**	
College Arts Students, N=100	Mean .09	S.D. .05	Mean 2.71	S.D. .16	Mean 2.45	S.D. .11
University Arts Students N=100	2.81	.06	2.63	.17	2.50	1.58
Total Arts & Science N=200	2.80	.06	2.67	.17	2.47	.14

Table 4.19

Summary of 2x 3 ANOVA on effect of nature of institution of PG-Arts students rating and teaching category on TLE Practices of HEI teachers

S. No.	Source of Variation	SS	Df	MS	F	F crit
1.	Nature of institution (college and university)	.01	1	.01	.40	3.85
2.	Teaching Category	829.13	2	414.57	13284.6*	3.01
3.	Nature of institution × Teaching Category Interaction	.46	2	.23	7.33*	3.01
4.	Within	18.53	594	.03		
	Total	848.15	599			

*Significant at 0.01 level of significance

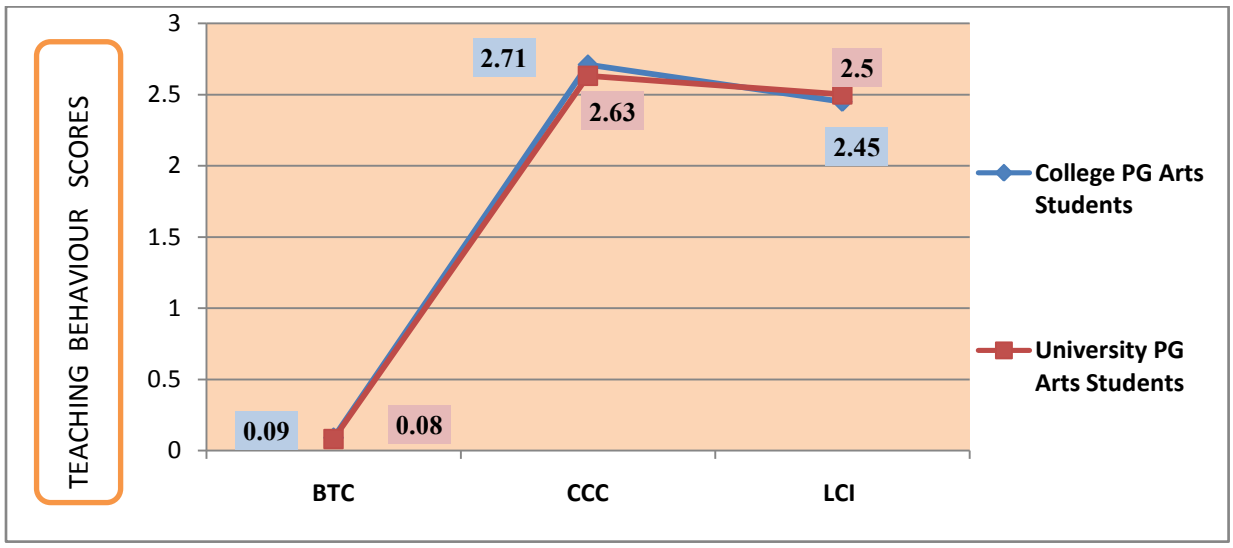
From Table 4.19, it can be observed that the calculated 'F' value on effect of Nature of institution (college and university) on TLE Practices of HEI teachers teaching PG arts students is .40 which is significant at 0.01 level of significance at 1/594 df. So, the null hypothesis of no significant effect of nature of institution on PG arts students rating of TLE Practices of HEI teachers is rejected at .01 level of significance. This indicates that nature of institution shows significant effect on TLE Practices of HEI teachers teaching PG arts students, hence TLE Practices of HEI teachers teaching PG arts students cannot be said to be independent of nature of institutions.

The calculated 'F ratio' for effect of teaching category on TLE Practices of HEI teachers teaching PG arts students is 13284.63 which is greater than the 'F ratio' of 3.01 required for significance against 2 and 594 df at 0.01 level. So, the null hypothesis of no significant effect of teaching category on PG arts students rating of TLE Practices of HEI teachers is rejected at .01 level of significance. This shows that teaching category has significant effect on TLE Practices of HEI teachers teaching PG arts students.

The calculated 'F ratio' for interaction i.e. joint effect of nature of institutions and teaching category on PG arts students rating of teachers is 7.33 which is higher than the table value at 2/594 df. It shows that interaction of nature of institutions and teaching category is significant at 0.01 level of significance. So, the null hypothesis of no significant interactive effect of nature of institutions and teaching category on PG arts students rating of teaching behavior of HEI teachers is rejected at .01 level of significance. So, it can be concluded that there is significant interactive effect of and nature of institutions teaching category on TLE Practices of teachers teaching PG arts students. This shows that nature of institutions and teaching category are interdependent to explain the TLE Practices of HEI teachers teaching PG arts students.

Figure: 4.10

PG arts students rating of TLE Practices of teachers in the context of nature of institution



From Figure: 4.10 It can be observed that nature of institutions as well as teaching category affects postgraduate arts students rating of teachers‟ TLE Practices in interactive form. It can be noticed that the college PG arts teachers‟ scores are higher than university PG arts teachers‟ scores on behavioristic teaching category and cognitive concept centric category whereas for Learner centric innovative categories university PG arts teachers score was higher than college PG arts teachers‟ scores. The pattern of TLE Practices of university PG arts and college PG arts teachers‟ was found different from each other category wise.

Table: 4.20

Post hoc 't' test on PG arts students rating of teaching behavior of nature of institutions HEIs mean difference with regard to teaching category in difference pairs.

	M1(BTC) (0.09)	M2(CCC) (2.67)	M3(LCI) (2.47)
M1(BTC) (0.09)	-	2.58	2.38
M2(CCC) (2.67)	-	-	0.20
M3(LCI) (2.47)	-	-	-

The post hoc test of mean difference by use of„t‟ was adopted to study critical mean difference between different pairs of teaching category. The „t‟ values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.017) with 2.58 for 0.01 level (.043) and 1.96 for .05 level (.033) with df 594 respectively. The table of mean pair differences indicated that TLE Practices of of HEI category wise revealed that three mean differences were found significant at .01 level. It revealed that cognitive concept centric behaviour scores were higher than innovative category TLE Practices and behaviouristic teacher centric behaviour scores respectively as per student rating of TLE Practices of university PG arts teachers and college PG arts teachers.

4.2.6 HEI – Science students' ratings of teaching behavior of teachers in the context of level of HE (UG & PG)

Level of HEI	**Teaching Category**					
	Behaviourist/ Teacher Centric		**Cognitive/ Concept Centric**		**Constructivist/ Learner Centric Innovative**	
UG Science N=100	Mean 2.78	S.D. .30	Mean 2.48	S.D. .25	Mean 2.51	S.D. .17
PG Science Students, N=100	2.74	.11	2.65	.26	2.46	.24
Total UG & PG (N=200)	2.76	.10	2.56	.26	2.48	.21

Table 4.21

Summary of 2x3 ANOVA on effect of level of HE(UG & PG) on science students ratings and TLE Practices on teaching behavior of HEI teachers

S. No.	Source of Variation	SS	df	MS	F	F crit
1.	Level of HE	0.199	1	0.199	5.059*	3.85
2.	Teaching Category	16.14	2	8.071	204.74*	3.00
3.	Discipline × Teaching Category Interaction	2.93	2	1.465	37.16*	3.00
4.	Within	47.07	1194	0.039		
	Total	66.34	1199			

*Significant at 0.01 level of significance.

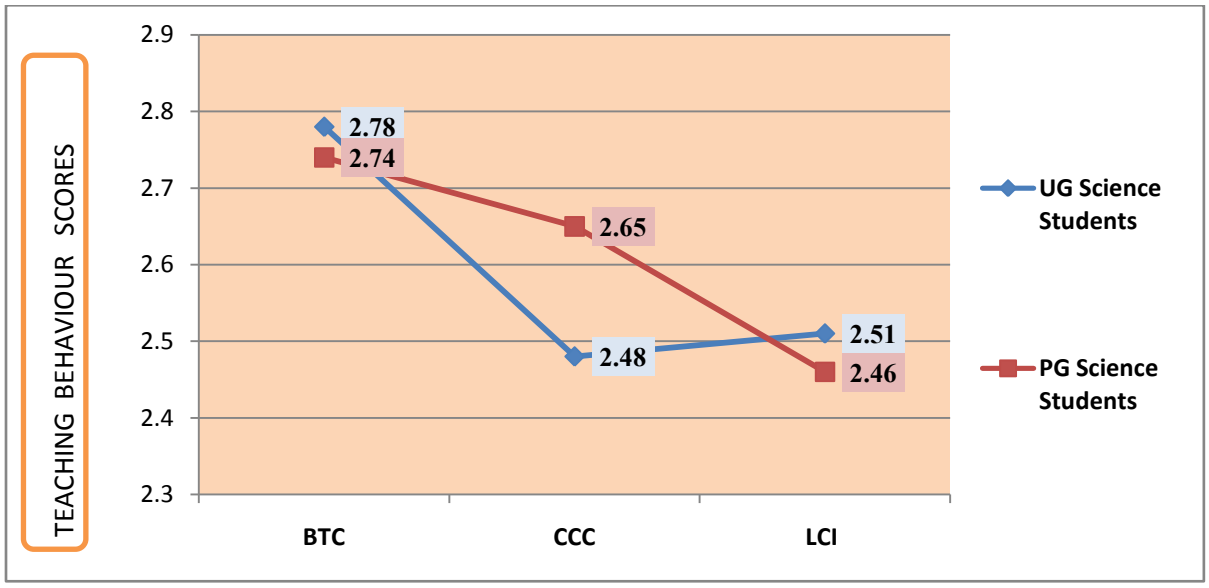
From Table 4.21, it can be observed that the calculated 'F' value on effect of level of HE on TLE Practices of HEI teachers teaching science subjects is 5.059 which is greater than the 'F ratio' of 3.85 required for significance against df 1 and 1194 at 0.01 level. So, the null hypothesis of no significant effect of level of HE on students rating of teaching behavior of HEI science teachers is rejected at .01 level of significance. This shows that level of HE as a single main variable shows significant effect on TLE Practices of HEI teachers teaching science subjects.

In the case of effect of teaching category on student rating of TLE Practices of HEI teachers teaching science subjects, the 'F' value is found as 204.74 which is significant at 2/1194 df at 0.01 level of significance. So, the null hypothesis of no significant effect of teaching category on student rating of teaching behavior of HEI science teachers is rejected at .01 level of significance. It indicates that teaching category has significant effect on students rating of TLE Practices of HEI teachers teaching science subjects.

In case of interactive effect of level of HE (UG & PG) of students and teaching category of HEI teachers teaching science subjects, the 'F value' is found to be 37.16 which is more than critical value of 'F' with df 2/1194 at 0.01 level of significance, hence it is significant. So, the null hypothesis of no significant interactive effect of level of HE and teaching category on students rating on teaching behavior of HEI science teachers is rejected at .01 level of significance. It can be concluded that there is significant interactive effect of level of HE and teaching category on student rating of TLE Practices of HEI teachers teaching science subjects. This shows that level of HE and teaching category are interdependent to explain the student rating of TLE Practices of HEI teachers teaching science subjects.

Figure: 4.11

Interactive effect of level of HE and teaching category on science students ratings of TLE Practices of HEI teachers



From Figure: 4.11 It can be observed that level of HE as well as teaching category affects science students rating of HEI teachers‟ TLE Practices in interactive form. It can be noticed that the teachers teaching UG science students scored higher on behaviorist and learner centric innovative categories but on cognitive concept centric category PG science teachers score was higher than UG science teachers score. The pattern of TLE Practices of UG science and PG science teachers‟ was found different from each other category wise.

Table: 4.22

Post hoc 't' test on science students rating of teaching behavior of level of HE mean difference with regard to teaching category in difference pairs.

	M1(BTC) (2.76)	M2(CCC) (2.56)	M3(LCI) (2.48)
M1(BTC) (2.76)	-	0.20	0.28
M2(CCC) (2.56)	-	-	0.08
M3(LCI) (2.48)	-	-	-

The post hoc test of mean difference by use of „t‟ was adopted to study critical mean difference between different pairs of teaching category. The „t‟ values to be significant

,difference of mean scores pair were calculated by multiplying SED (0.0139) with 2.58 for 0.01 level (.035) and 1.96 for .05 level (.027) with df 1194 respectively. The table of mean pair differences indicated that TLE Practices of UG science and PG science teachers of HEI category wise revealed that three mean differences were found significant at .01 level. It revealed that behaviouristic teacher centric category teachers score were higher than cognitive concept centric behaviour and innovative category TLE Practices respectively as per student rating of TLE Practices of UG science and PG science teachers.

4.2.7 College science students rating of TLE Practices of teachers in the context of level of HEI

Level of HE	Teaching Category					
	Behaviourist/ Teacher Centric		Cognitive/ Concept Centric		Constructivist/ Learner Centric Innovative	
UG N=100	Mean 2.77	S.D. 0.1	Mean 2.45	S.D. .25	Mean 2.45	S.D. .19
PG N=100	2.73	.12	2.60	.26	2.45	1.56
Total N=200	2.75	.11	2.53	.27	2.45	.19

Table 4.23

Summary of 2x 3 ANOVA on effect of level of HE of college science students and teaching category on TLE Practices of teachers

S. No.	Source of Variation	SS	df	MS	F	F crit
1.	Level of HE	.19	1	.19	4.69*	3.86
2.	Teaching Category	9.64	2	4.82	119.01*	3.01
3.	Discipline × Teaching Category Interaction	1.02	2	.51	12.61*	3.01
4.	Within	24.07	594	.04		
	Total	34.93	599			

*Significant at 0.01 level of significance.

From Table 4.23, it can be observed that the calculated 'F' value on effect of level of HE on TLE Practices of college teachers teaching science subject is 4.69 which is greater than the 'F ratio' of 3.86 required for significance against df 1 and 594 at 0.01 level. So, the null hypothesis of no significant effect of level of HE on students rating of teaching behavior of college scince teachers is rejected at .01 level of significance. This shows that level of HE as

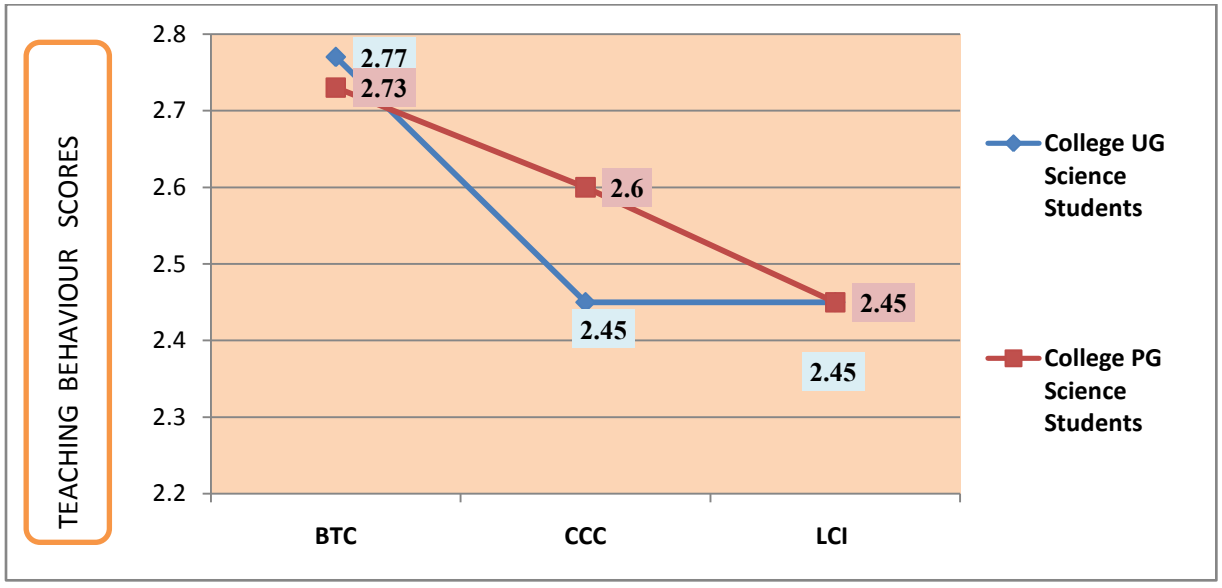
a single main variable shows significant effect on TLE Practices of college teachers teaching science subjects.

In the case of effect of teaching category on student rating of TLE Practices of HEI teachers teaching science subjects, the 'F' value is found as 119.01 which is significant at 2/594 df at 0.01 level of significance. So, the null hypothesis of no significant effect of teaching category on student rating of TLE Practices of college science teachers is rejected at .01 level of significance. It indicates that teaching category has significant effect on students rating of TLE Practices of college teachers teaching science subjects.

In case of interactive effect of level of HE (UG & PG) of students and teaching category of college teachers teaching science subject, the 'F value' is found to be 12.61 which is more than critical value of 'F' with df 2/594 at 0.01 level of significance, hence it is significant. So, the null hypothesis of no significant interactive effect of level of HE and teaching category on students rating on TLE Practices of college science teachers is rejected at .01 level of significance. It can be concluded that there is significant interactive effect of level of HE and teaching category on student rating of TLE Practices of college teachers teaching science subjects. This shows that level of HE and teaching category are interdependent to explain the student rating of TLE Practices of college teachers teaching science subjects.

Figure: 4.12

Interactive effect of level of HE and teaching category on college Science students' ratings on TLE Practices of teachers



From Figure: 4.12 It can be observed that level of HE as well as teaching category affects college science students rating of teachers‟ TLE Practices in interactive form. It can be noticed that the college UG teachers‟ scores are higher than PG teachers on behavioristic teaching category whereas the cognitive concept centric scores were more for college PG science teachers group.

Learner centric category scores were same for both the groups. The pattern of TLE Practices of college UG and PG science teachers‟ was found different from each other category wise.

Table:4.24

Post hoc‘t’ test on College science students rating of teaching behavior of level of HEIs mean difference with regard to teaching category in difference pairs.

	M1(BTC) (2.75)	M2(CCC) (2.53)	M3(LCI) (2.45)
M1(BTC) (2.75)	-	0.22	0.30
M2(CCC) (2.53)	-	-	0.08
M3(LCI) (2.45)	-	-	-

The post hoc test of mean difference by use of „t‟was adopted to study critical mean difference between different pairs of teaching category. The „t‟values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.02) with 2.58 for 0.01 level (.051) and 1.96 for .05 level (.039) with df 594 respectively. The table of mean pair differences indicated that TLE Practices of college UG science and college PG science teachers of HEI category wise revealed that three mean differences were found significant at .01 level. It revealed that behaviouristic teacher centric category teachers behaviour scores were higher than cognitive concept centric behaviour and innovative category TLE Practices respectively as per student rating of TLE Practices of college UG science and college PG science teachers.

4.2.8

University science students rating of TLE Practices of teachers in the context of level of HE (UG & PG)

Level of HE	**Teaching Category**					
	Behaviourist/ Teacher Centric		**Cognitive/ Concept Centric**		**Constructivist/ Learner Centric Innovative**	
UG students N=100	Mean 2.8	S.D. .09	Mean 2.5	S.D. .22	Mean 2.6	S.D. .13
PG Students N=100	2.8	.1	2.7	.22	2.5	.27
Total N=200	2.8	.09	2.6	.24	2.5	.21

Table-4.25

Summary of 2x 3 ANOVA on effect of level of HE of university science students and teaching category on TLE Practices of teachers

S. No.	Source of Variation	SS	df	MS	F	F crit
1.	Level of HE (UG & PG)	.04	1	.04	1.04	3.85
2.	Teaching Category	6.64	2	3.32	91.03*	3.01
3.	Level of HE× Teaching Category Interaction	2.06	2	1.03	28.31*	3.01
4.	Within	21.68	594	.04		
	Total	30.43	599			

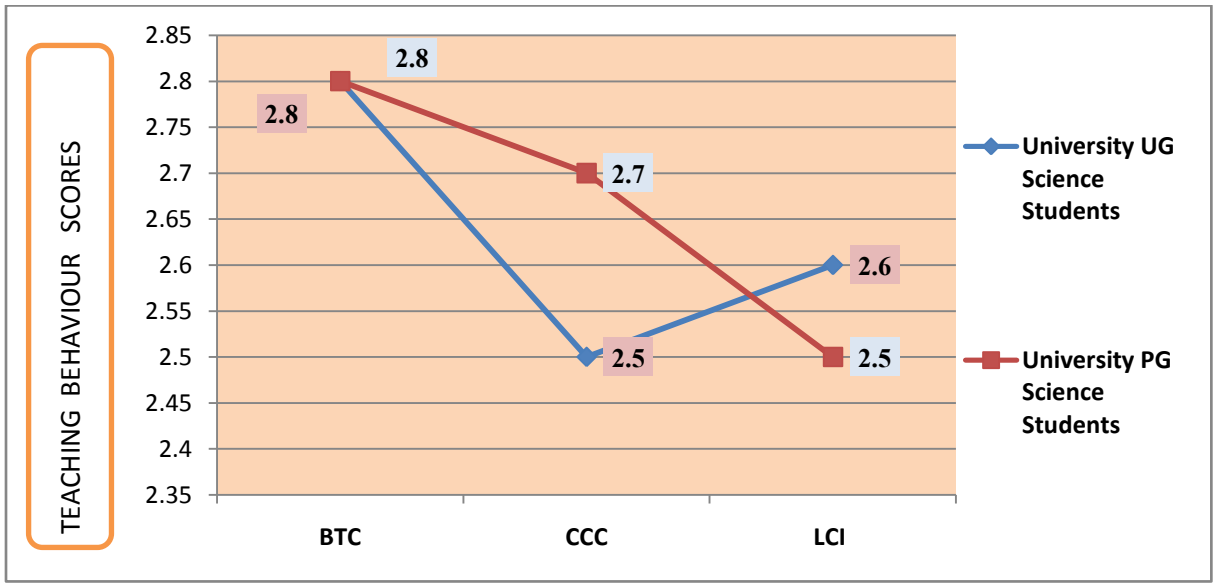
*Significant at 0.01 level of significance

From Table 4.25, it can be observed that the calculated 'F' value on effect of level of HE on TLE Practices of university teachers teaching science subject is 1.04 which is less than the 'F ratio' of 3.85 required for significance against df 1 and 594 at 0.01 level. So, the null hypothesis of no significant effect of level of HE on students rating of TLE Practices of university science teachers is accepted at .01 level of significance. This shows that level of HE as a single main variable shows no significant effect on TLE Practices of university teachers teaching science subjects.

In the case of effect of teaching category on student rating of TLE Practices of university teachers teaching arts subjects, the 'F' value is found as 91.03 which is significant at 2/594 df at 0.01 level of significance. So, the null hypothesis of no significant effect of teaching category on student rating of teaching behavior of university science teachers is rejected at .01 level of significance. It indicates that teaching category has significant effect on students rating of TLE Practices of university teachers teaching science subjects.

In case of interactive effect of level of HE (UG & PG) of students and teaching category of university teachers teaching science subject, the 'F value' is found to be 28.31 which is more than critical value of 'F' with df 2/594 at 0.01 level of significance, hence it is significant. So, the null hypothesis of no significant interactive effect of level of HE and teaching category on students rating on TLE Practices of university science teachers is rejected at .01 level of significance. It can be concluded that there is significant interactive effect of level of HE and teaching category on student rating of TLE Practices of university teachers teaching science subjects. This shows that level of HE and teaching category are interdependent to explain the student rating of TLE Practices of university teachers teaching science subjects.

Figure: 4.13
University science students rating of TLE Practices of teachers in the context of level of HE



From Figure 4.13, It can be observed that level of HE as well as teaching category affects university science students rating of teachers‟ TLE Practices in interactive form. It can be noticed that the university UG science teachers scores and PG science teachers‟ scores on behavioristic teaching category are same. In case of cognitive concept centric category PG science teachers scores are higher than UG science teachers‟ scores whereas UG science teachers score was more than PG teachers on Learner centric innovative categories. The pattern of TLE Practices of UG and PG science teachers‟ was found different from each other category wise.

Table: 4.26
Post hoc‘t’ test on University science students rating of teaching behavior of level of HEIs mean difference with regard to teaching category in difference pairs.

	M1(BTC) (2.80)	M2(CCC) (2.60)	M3(LCI) (2.50)
M1(BTC) (2.80)	-	0.20	0.30
M2(CCC) (2.60)	-	-	0.10
M3(LCI) (2.50)	-	-	-

The post hoc test of mean difference by use of „t" was adopted to study critical mean difference between different pairs of teaching category. The „t" values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.02) with 2.58 for 0.01 level (.052) and 1.96 for .05 level (.039) with df 594 respectively. The table of mean pair differences indicated that TLE Practices of university UG science and university PG science teachers of HEI category wise revealed that three mean differences were found significant at .01 level. It revealed that behaviouristic teacher centric behaviour scores were higher than cognitive concept centric behaviour and innovative category TLE Practices respectively as per student rating of TLE Practices of university UG science and university PG science teachers.

4.2.9 UG science students rating of TLE Practices of teachers in the context of nature of institutions

Nature of institutions	Teaching Category					
	Behaviourist/ Teacher Centric		Cognitive/ Concept Centric		Constructivist/ Learner Centric Innovative	
College Students N=100	Mean 2.77	S.D. .1	Mean 2.45	S.D. .25	Mean 2.45	S.D. .19
University Students N=100	2.79	.08	2.50	.23	2.56	.13
Total Arts & Science N=200	2.78	.08	2.48	.24	2.50	.17

Table 4.27

Summary of 2x 3 ANOVA on effect of nature of institution of UG- science students ratings and teaching category on TLE Practices of HEI teachers

S. No.	Source of Variation	SS	df	MS	F	F crit
1.	Nature of institution (college and university)	.67	1	.67	21.03*	3.85
2.	Teaching Category	11.05	2	5.53	171.63*	3.01
3.	Discipline × Teaching Category Interaction	.19	2	.09	2.96	3.01
4.	Within	19.13	594	.03		
	Total	31.05	599			

*Significant at 0.01 level of significance

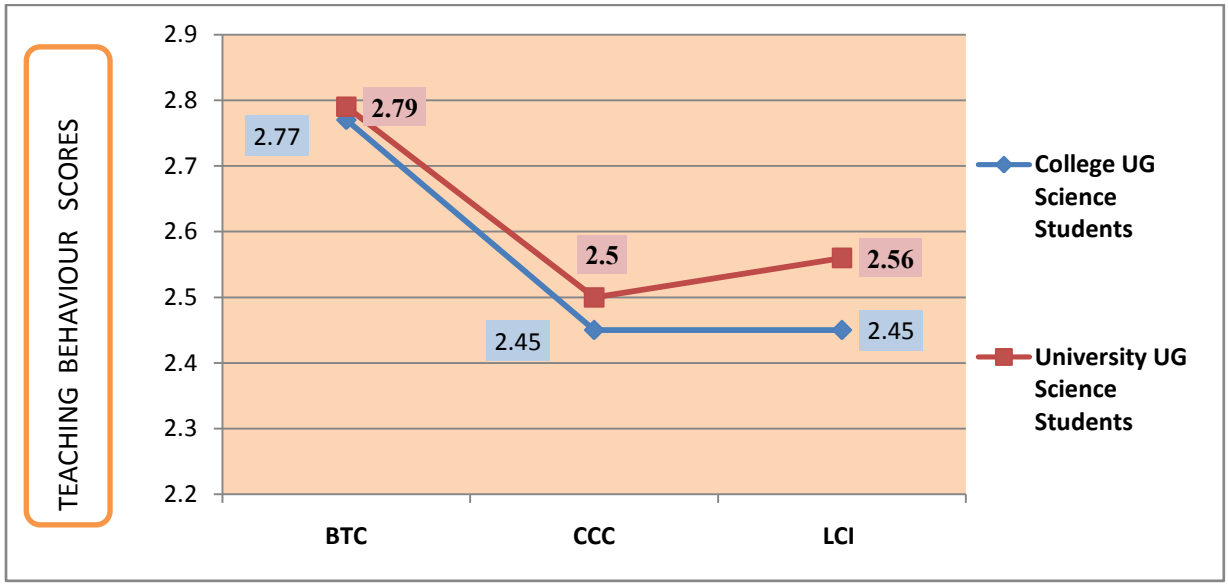
From Table 4.27, it can be observed that the calculated 'F' value on effect of Nature of institution (college and university) on TLE Practices of HEI teachers teaching UG science students is 21.03 which is significant at 0.01 level of significance at 1/594 df. So, the null hypothesis of no significant effect of on nature of institution (college and university) on UG science students rating of TLE Practices of HEI teachers is rejected at .01 level of significance. This indicates that nature of institution shows significant effect on TLE Practices of HEI teachers teaching UG science students, hence TLE Practices of HEI teachers teaching UG science students cannot be said to be independent of nature of institutions.

The calculated 'F ratio' for effect of teaching category on TLE Practices of HEI teachers teaching UG science students is 171.63 which is greater than the 'F ratio' of 3.01 required for significance against 2 and 594 df at 0.01 level. So, the null hypothesis of no significant effect of teaching category on UG science students rating of TLE Practices of HEI teachers is rejected at .01 level of significance. This shows that teaching category has significant effect on TLE Practices of teachers teaching UG science students.

The calculated 'F ratio' for interaction i.e. joint effect of nature of institutions and teaching category on UG science students rating of teachers is 2.96 which is less than the table value of 3.01 at 2/594 df. It shows that interaction of nature of institutions and teaching category is not significant at 0.01 level of significance. So, the null hypothesis of no significant interactive effect of nature of institutions and teaching category on UG science students rating of teaching behavior of HEI teachers is accepted at .01 level of significance. So, it can be concluded that there is no significant interactive effect of nature of institutions teaching category on TLE Practices of teachers teaching UG science students. This shows that nature of institutions and teaching category are independent to explain the TLE Practices of HEI teachers teaching UG science students.

Figure: 4.14

UG science students rating of TLE Practices of teachers in the context of nature of institution



From Figure: 4.14 It can be observed that nature of institutions as well as teaching category affects undergraduate science students rating of teachers‟ TLE Practices in interactive form. It can be noticed that the university UG science teachers scores are higher than scores of college UG science teachers‟ on all the three categories i.e. behavioristic teacher centric, cognitive concept centric Learner centric innovative. The pattern of TLE Practices of university UG science and college UG science teachers‟ was found different from each other category wise.

Table: 4.28

Post hoc 't' test on UG science students rating of teaching behavior of nature of institutions HEIs mean difference with regard to teaching category in difference pairs

	M1(BTC) (2.78)	M2(CCC) (2.48)	M3(LCI) (2.50)
M1(BTC) (2.78)	-	0.30	0.28
M2(CCC) (2.48)	-	-	0.02
M3(LCI) (2.50)	-	-	-

The post hoc test of mean difference by use of „t‟ was adopted to study critical mean difference between different pairs of teaching category. The „t‟ values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.017) with 2.58 for 0.01 level (.043) and 1.96 for .05 level (.033) with df 594 respectively. The table of mean pair differences indicated that TLE Practices of college UG science and university university UG science teachers of HEI category wise revealed that two mean differences were found significant at .01 level. It revealed that behaviouristic teacher centric behaviour scores were higher than innovative category TLE Practices and cognitive concept centric behaviour scores respectively as per student rating of TLE Practices of college UG science and university UG science teachers. It also revealed that cognitive concept centric category TLE Practices was not significantly different from Learner centric innovative behaviour of college UG science and university UG science teachers.

4.2.10

PG science students rating of TLE Practices of teachers in the context of nature of institutions

Nature of institutions	**Teaching Category**					
	Behaviourist/ Teacher Centric		**Cognitive/ Concept Centric**		**Constructivist/ Learner Centric Innovative**	
College Students N=100	Mean 2.73	S.D. .11	Mean 2.60	S.D. .27	Mean 2.44	S.D. .19

University Students N=100	2.75	.10	2.68	.23	2.47	1.57
Total N=100	2.74	.10	2.65	.26	2.46	.24

Table 4.29

Summary of 2x 3 ANOVA on effect of nature of institution of PG-science students and teaching category on TLE Practices of HEI teachers

S. No.	Source of Variation	SS	df	MS	F	F crit
1.	Nature of institution (college and university)	.34	1	.34	7.55*	3.85
2.	Teaching Category	8.01	2	4.01	89.46*	3.01
3.	Discipline × Teaching Category Interaction	.11	2	.06	1.27	3.01
4.	Within	26.62	594	.04		
	Total	35.09	599			

*Significant at 0.01 level of significance

From Table 4.29, it can be observed that the calculated 'F' value on effect of Nature of institution (college and university) on TLE Practices of HEI teachers teaching PG science students is 7.55 which is significant at 0.01 level of significance at 1/594 df. So, the null hypothesis of no significant effect of nature of institution on PG science students rating of TLE Practices of HEI teachers is rejected at .01 level of significance. This indicates that nature of institution shows significant effect on TLE Practices of HEI teachers teaching PG science students, hence TLE Practices of HEI teachers teaching PG science students cannot be said to be independent of nature of institutions.

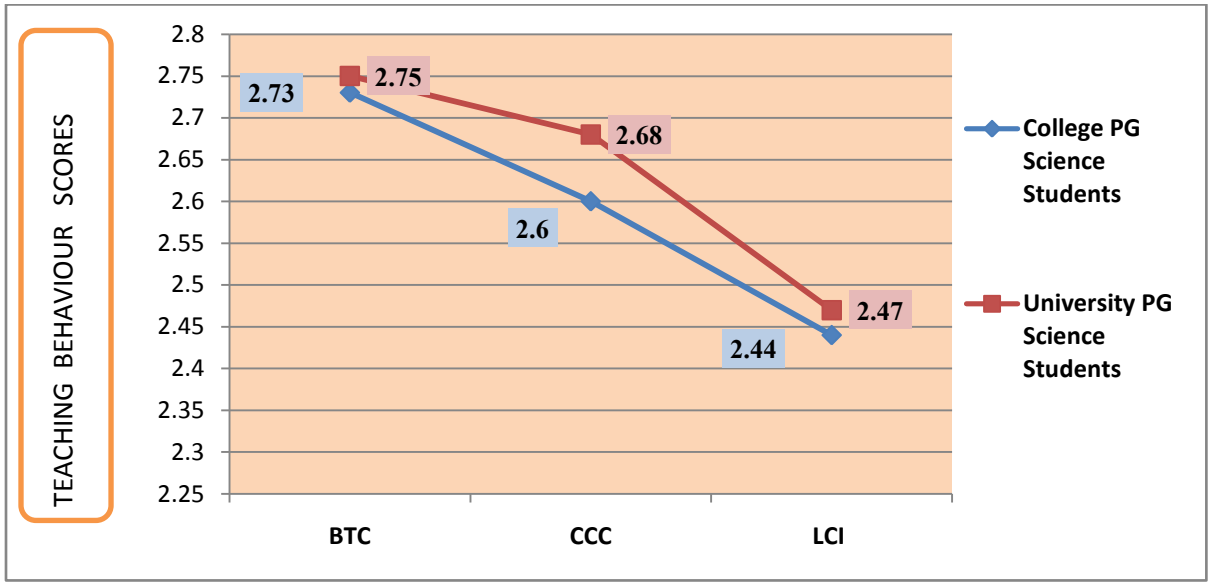
The calculated 'F ratio' for effect of teaching category on TLE Practices of HEI teachers teaching PG science students is 89.46 which is greater than the 'F ratio' of 3.01 required for significance against 2 and 594 df at 0.01 level. So, the null hypothesis of no significant effect of teaching category on PG science students rating of TLE Practices of HEI teachers is rejected at .01 level of significance. This shows that teaching category has significant effect on TLE Practices of teachers teaching PG science students.

The calculated 'F ratio' for interaction i.e. joint effect of nature of institutions and teaching category on PG science students rating of teachers is 1.27 which is less than the table value of 3.01 at 2/594 df. It shows that interaction of nature of institutions and teaching category is not significant at 0.01 level of significance. So, the null hypothesis of no significant interactive effect of nature of institutions and teaching category on PG science students rating of teaching behavior of HEI teachers is accepted at .01 level of significance. So, it can be concluded that there is no significant interactive effect of and nature of

institutions teaching category on TLE Practices of teachers teaching PG science students. This shows that nature of institutions and teaching category are independent to explain the TLE Practices of HEI teachers teaching PG science students.

Figure: 4.15

PG science students rating of TLE Practices of teachers in the context of nature of institution



From Figure 4.15 It can be observed that nature of institutions as well as teaching category do not affects postgraduate science students rating of teachers‟ TLE Practices in interactive form. It can be noticed that the university PG science teachers scores are higher than scores of college PG science teachers‟ on all the three categories i.e. behavioristic teacher centric, cognitive concept centric and Learner centric innovative. The pattern of TLE Practices of college and university PG science teachers‟ was found different from each other category wise.

Table: 4.30

Post hoc‘t’ test on PG science students rating of teaching behavior of nature of institutions HEIs mean difference with regard to teaching category in difference pairs.

	M1(BTC) (2.74)	M2(CCC) (2.65)	M3(LCI) (2.46)
M1(BTC) (2.74)	-	0.09	0.28
M2(CCC) (2.65)	-	-	0.19
M3(LCI) (2.46)	-	-	-

The post hoc test of mean difference by use of „t" was adopted to study critical mean difference between different pairs of teaching category. The „t" values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.02) with 2.58 for 0.01 level (.052) and 1.96 for .05 level (.039) with df 594 respectively. The table of mean pair differences indicated that TLE Practices of college PG science and university PG science teachers of HEI category wise revealed that three mean differences were found significant at .01 level. It revealed that behaviouristic teacher centric behaviour scores were higher than cognitive concept centric behaviour and innovative category TLE Practices scores respectively as per student rating of TLE Practices of college PG science and university PG science teachers.

4.2.11

HEI –Under graduate students' ratings of teaching behavior of teachers in the context of discipline

Discipline	Teaching Category					
	Behaviourist/ Teacher Centric		Cognitive/ Concept Centric		Constructivist/ Learner Centric Innovative	
Arts students N= 200	Mean 2.80	S.D. .05	Mean 2.69	S.D. .16	Mean 2.54	S.D. .14
Science students N=200	2.78	.08	2.48	.24	2.50	.17
Total Arts & Science, N=400	2.79	.07	2.58	.23	2.53	.16

Table 4.31

Summary of 2×3 ANOVA on effect of discipline on UG students' ratings and Teaching Category on TLE Practices of HEI Teachers

S. No.	Source of Variation	SS	df	MS	F	F crit
1.	Discipline	2.59	1	2.59	102.25*	3.85
2.	Teaching Category	15.74	2	7.87	310.76*	3.00
3.	Discipline × Teaching Category Interaction	2.18	2	1.09	43.19*	3.00
4.	Within	30.23	1194	.03		
	Total	50.74	1199			

*Significant at 0.01 level of significance.

From Table 4.31, it can be observed that the calculated 'F' value on effect of discipline on TLE Practices of HEI teachers teaching UG students is 102.25 which is significant at 0.01

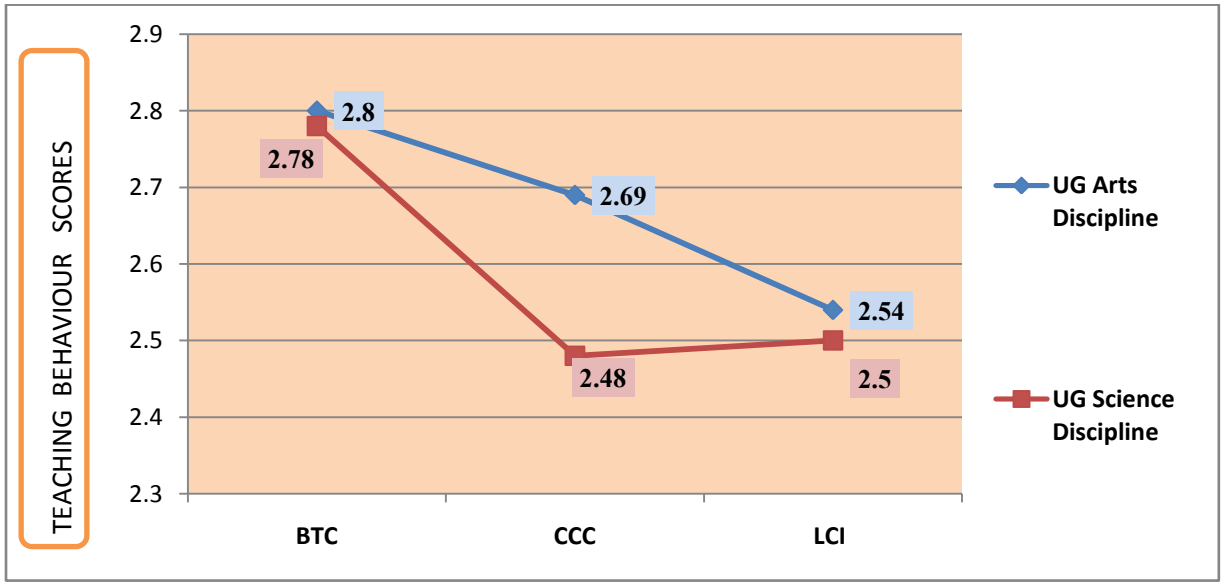
level of significance at 1/1194 df. So, the null hypothesis of no significant effect of discipline on UG students rating of teaching behavior of HEI teachers is rejected at .01 level of significance. This indicates that discipline shows significant effect on TLE Practices of HEI teachers teaching UG students, hence TLE Practices of HEI teachers teaching UG students cannot be said to be independent of teaching category.

The calculated 'F ratio' for effect of teaching category on TLE Practices of teachers teaching at UG level is 310.76 which is greater than the 'F ratio' of 3.00 required for significance against 2 and 1194 df at 0.01 level. So, the null hypothesis of no significant effect of teaching category on UG students rating of teaching behavior of HEI teachers is rejected at .01 level of significance. This shows that teaching category has significant effect on TLE Practices of teachers teaching UG students.

The calculated 'F ratio' for interaction i.e. joint effect of teaching category and discipline for teachers teaching at UG level is 43.19 which is higher than the table value at 2/1194 df. It shows that interaction of discipline and teaching category is significant at 0.01 level of significance. So, the null hypothesis of no significant interactive effect of discipline and teaching category on UG students rating of teaching behavior of HEI teachers is rejected at .01 level of significance. So, it can be concluded that there is significant interactive effect of discipline and teaching category on TLE Practices of teachers teaching UG students. This shows that discipline and teaching category are interdependent to explain the TLE Practices of HEI teachers teaching UG students.

Figure:4.16

Interactive effect of discipline and teaching category on UG students ratings of TLE Practices of HEI teachers



From Figure 4.16 It can be observed that discipline as well as teaching category affects UG students rating of HEI teachers" TLE Practices in interactive form. It can be noticed that the teachers teaching UG arts students scored higher on all the three categories i.e. behaviorist

teacher centric , cognitive concept centric category and learner centric innovative approach than teachers teaching UG science students .The pattern of TLE Practices of UG arts and UG science teachers‟ category wise was found different from each other.

Table: 4.32

Post hoc‘t’ test on UG students rating of TLE Practices on discipline and HEIs mean difference with regard to teaching category in difference pairs.

	M1(BTC) (2.79)	M2(CCC) (2.58)	M3(LCI) (2.53)
M1(BTC) (2.79)	-	0.21	0.26
M2(CCC) (2.58)	-	-	0.05
M3(LCI) (2.53)	-	-	-

The post hoc test of mean difference by use of „t‟ was adopted to study critical mean difference between different pairs of teaching category. The „t‟ values to be significant, difference of mean scores pair were calculated by multiplying SED (0.012) with 2.58 for 0.01 level (.030) and 1.96 for .05 level (.023) with df 1194 respectively. The table of mean pair differences indicated that TLE Practices of UG arts and UG science teachers of HEI category wise revealed that two mean differences were found significant at .01 level. It revealed that behaviouristic teacher centric category teachers score were higher than cognitive concept centric behaviour and innovative category TLE Practices mean scores as per student rating of TLE Practices of UG arts and UG science teachers.

4.2.12 HEI PG students ratings of TLE Practices of teachers in the context of Discipline

Discipline	Teaching Category					
	Behaviourist/ Teacher Centric		Cognitive/ Concept Centric		Constructivist/ Learner Centric Innovative	
Arts students N=100	Mean .085	S.D. 2.38	Mean 2.67	S.D. .22	Mean 2.48	S.D. .21
Science student N=100	2.74	.11	2.64	.26	2.46	.24
Total Arts & Science N=200	1.41	1.33	2.66	.24	2.47	.22

Table 4.33

Summary of 2×3 ANOVA on effect of discipline on PG students' ratings and teaching category on TLE Practices of HEI teachers

S. No.	Source of Variation	SS	df	MS	F	F crit
1.	Discipline	228.22	1	228.22	5914.04*	3.84
2.	Teaching Category	360.11	2	180.05	4665.74*	3.00
3.	Discipline × Teaching Category Interaction	477.04	2	238.52	6180.79*	3.00
4.	Within	46.08	1194	0.04		
	Total	1111.46	1194			

*Significant at 0.01 level of significance.

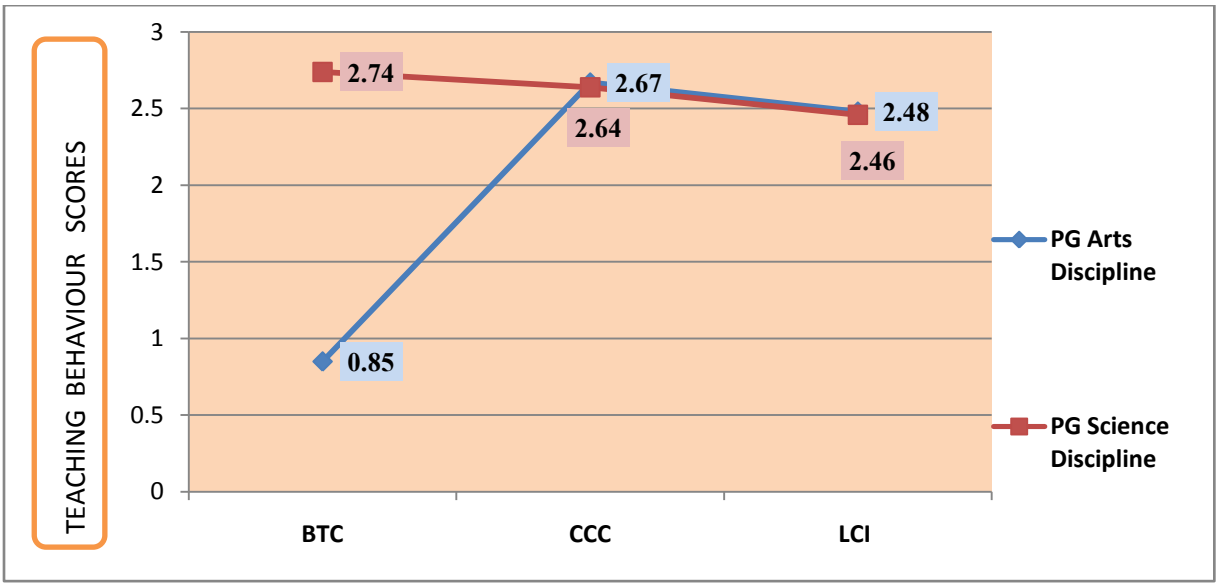
From Table 4.33, it can be observed that the calculated 'F' value on effect of discipline on TLE Practices of HEI teachers teaching PG students is 5914.04 which is significant at 0.01 level of significance at 1/1194 df. So, the null hypothesis of no significant effect of discipline on PG students rating of teaching behavior of HEI teachers is rejected at .01 level of significance. This indicates that discipline shows significant effect on TLE Practices of HEI teachers teaching PG students, hence TLE Practices of HEI teachers teaching PG students cannot be said to be independent of teaching category.

The calculated 'F ratio' for effect of teaching category on TLE Practices of teachers teaching at PG level is 4665.75 which is greater than the 'F ratio' of 3.00 required for significance against 2 and 1194 df at 0.01 level. So, the null hypothesis of no significant effect of teaching category on PG students rating of teaching behavior of HEI teachers is rejected at .01 level of significance. This shows that teaching category has significant effect on TLE Practices of teachers teaching PG students.

The calculated 'F ratio' for interaction i.e. joint effect of teaching category and discipline for teachers teaching at PG level is 6180.79 which is higher than the table value at 2/1194 df. It shows that interaction of discipline and teaching category is significant at 0.01 level of significance. So, the null hypothesis of no significant interactive effect of discipline and teaching category on PG students rating of teaching behavior of HEI teachers is rejected at .01 level of significance. So, it can be concluded that there is significant interactive effect of discipline and teaching category on TLE Practices of teachers teaching PG students. This shows that discipline and teaching category are interdependent to explain the TLE Practices of HEI teachers teaching PG students.

Figure: 4.17

Interactive effect of discipline and teaching category on PG students ratings of TLE Practices of HEI teachers



From Figure: 4.17 It can be observed that discipline as well as teaching category affects PG students rating of HEI teachers‟ TLE Practices in interactive form. It can be noticed that the teachers teaching PG science students scored more at behaviorist teacher centric category as compared to teachers teaching PG arts students whereas the scores for cognitive concept centric category and learner centric innovative approach was higher for PG arts teachers as compared to PG science teachers. The pattern of TLE Practices of PG arts and PG science teachers‟ category wise was found different from each other.

Table: 4.34 Post hoc‘t’ test on PG students of rating teaching behavior of HEIs mean difference with regard to teaching category in difference pairs.

	M1(BTC) (1.41)	M2(CCC) (2.66)	M3(LCI) (2.47)
M1(BTC) (1.41)	-	1.25	1.06
M2(CCC) (2.66)	-	-	0.19
M3(LCI) (2.47)	-	-	-

The post hoc test of mean difference by use of „t‟ was adopted to study critical mean difference between different pairs of teaching category. The „t‟ values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.014) with 2.58 for 0.01 level (.036) and 1.96 for .05 level (.027) with df 1194 respectively. The table of mean pair differences indicated that TLE Practices of PG arts and PG science teachers of HEI category wise revealed that two mean differences were found significant at .01 level . It revealed that cognitive concept centric behaviour teachers score were higher than innovative category and behaviouristic teacher centric

category TLE Practices mean scores as per student rating of TLE Practices of PG arts and PG science teachers. It was also revealed that cognitive concept centric category TLE Practices was not significantly different from Learner centric innovative behaviour of HEI teachers teaching PG arts and science subjects.

4.2.13 College UG students rating of TLE Practices of teachers in the context of discipline

Discipline	Teaching Category					
	Behaviourist/ Teacher Centric		Cognitive/ Concept Centric		Constructivist/ Learner Centric Innovative	
Arts Students N=100	Mean 2.81	S.D. .05	Mean 2.69	S.D. .16	Mean 2.57	S.D. .12
Science Student N=100	2.77	.1	2.45	.26	2.45	.19
Total Arts & Science N=200	2.79	.08	2.57	.25	2.52	.17

Table 4.35

Summary of 2 x 3 ANOVA on effect of discipline on college UG students ratings and teaching category on TLE Practices of college teachers

S. No.	Source of Variation	SS	Df	MS	F	F crit
1.	Discipline	2.83	1	2.83	108.72	3.85
2.	Teaching Category	8.44	2	4.22	161.90	3.01
3.	Discipline × Teaching Category Interaction	.96	2	.48	18.41	3.01
4.	Within	15.48	594	0.03		
	Total	27.72	599			

*Significant at 0.01 level of significance

From Table 4.35, it can be observed that the calculated 'F' value on effect of discipline on TLE Practices of college teachers teaching UG students is 108.72 which is significant at 0.01 level of significance at 1/594 df. So, the null hypothesis of no significant effect of discipline on UG students rating of teaching behavior of college teachers is rejected at .01 level of significance. This indicates that discipline shows significant effect on TLE Practices of college teachers teaching UG students, hence TLE Practices of college teachers teaching UG students cannot be said to be independent of teaching category.

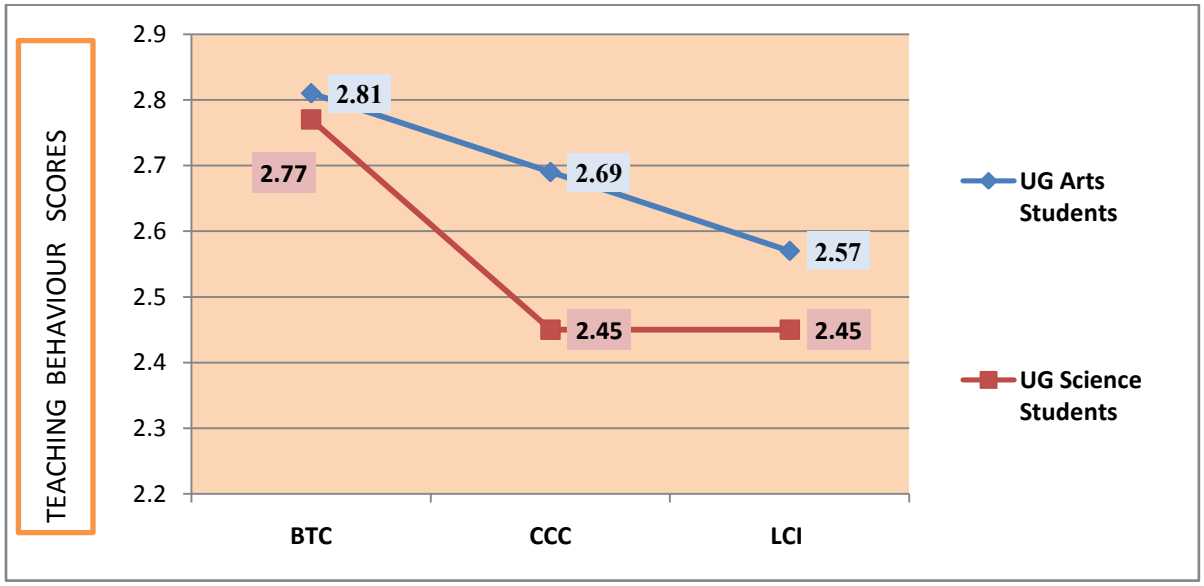
The calculated 'F ratio' for effect of teaching category on TLE Practices of college teachers teaching at UG level is 161.90 which is greater than the 'F ratio' of 3.01 required for

significance against 2 and 594 df at 0.01 level. So, the null hypothesis of no significant effect of teaching category on UG students rating of teaching behavior of college teachers is rejected at .01 level of significance. This shows that teaching category has significant effect on TLE Practices of college teachers teaching UG students.

The calculated 'F ratio' for interaction i.e. joint effect of teaching category and discipline for college teachers teaching at UG level is 18.41 which is higher than the table value at 2/594 df. It shows that interaction of discipline and teaching category is significant at 0.01 level of significance. So, the null hypothesis of no significant interactive effect of discipline and teaching category on UG students rating of TLE Practices of college teachers is rejected at .01 level of significance. So, it can be concluded that there is significant interactive effect of discipline and teaching category on TLE Practices of college teachers teaching UG students. This shows that discipline and teaching category are interdependent to explain the TLE Practices of college teachers teaching UG students.

Figure: 4.18

Interactive effect of level of HE and teaching category on college UG students ratings on TLE Practices of teachers



From Figure 4.18 It can be observed that discipline as well as teaching category affects college UG students rating of teachers‟ TLE Practices in interactive form. It can be noticed that the college teachers teaching UG arts students scored higher on all the three categories i.e. behaviorist teacher centric, cognitive concept centric category and learner centric innovative approach than college teachers teaching UG science students. The pattern of TLE Practices of college UG arts and science teachers‟ was found different from each other category wise.

Table: 4.36

Post hoc‘t’ test on College UG students rating teaching behavior of Discipline HEIs mean difference with regard to teaching category in difference pairs.

	M1(BTC) (2.79)	M2(CCC) (2.57)	M3(LCI) (2.52)
M1(BTC) (2.79)	-	0.22	0.27
M2(CCC) (2.57)	-	-	0.05
M3(LCI) (2.52)	-	-	-

The post hoc test of mean difference by use of „t‟ was adopted to study critical mean difference between different pairs of teaching category. The „t‟ values to be significant ‚difference of mean scores pair were calculated by multiplying SED (0.0173) with 2.58 for 0.01 level (.0446) and 1.96 for .05 level (.034) with df 1194 respectively. The table of mean pair differences indicated that TLE Practices of UG arts and UG science teachers of HEI category wise revealed that three mean differences were found significant at .01 level. It revealed that behaviouristic teacher centric category teachers score were higher than cognitive concept centric behaviour and innovative category TLE Practices respectively as per student rating of TLE Practices of UG arts and UG science teachers of colleges.

4.2.14 College PG students rating of TLE Practices of teachers in the context of discipline

Discipline	**Teaching Category**					
	Behaviourist/ Teacher Centric		**Cognitive/ Concept Centric**		**Constructivist/ Learner Centric Innovative**	
Arts Students N=100	Mean .08	S.D. 2.01	Mean 2.71	S.D. .19	Mean 2.45	S.D. .23
Science Students N=100	2.73	.12	2.60	.28	2.45	.19
Total Arts & Science N=200	1.40	1.33	2.66	.24	2.45	.21

Table 4.37

Summary of 2 x 3 ANOVA on effect of discipline on college PG students' ratings and Teaching Category on TLE Practices of teachers

S. No.	Source of Variation	SS	df	MS	F	F crit
1.	Discipline	106.83	1	106.83	2961.28	3.86
2.	Teaching Category	178.85	2	89.42	2478.87	3.01
3.	Discipline × Teaching Category Interaction	243.05	2	121.52	3368.73	3.01
4.	Within	21.43	594	0.03		
	Total	550.15	599			

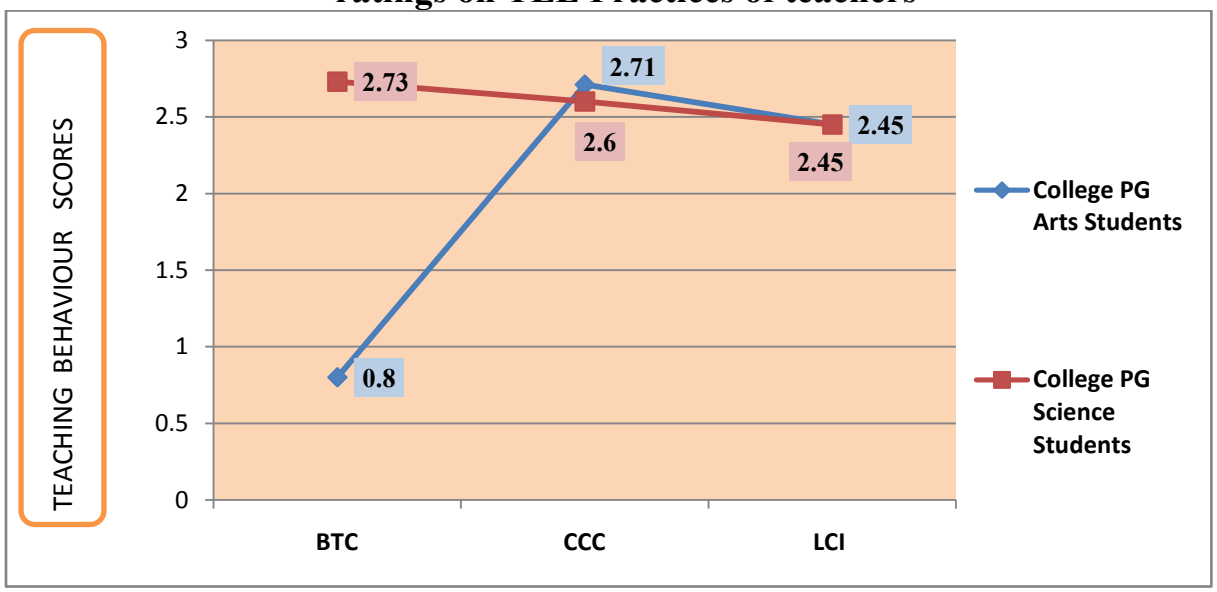
*Significant at 0.01 level of significance.

From Table 4.37, it can be observed that the calculated 'F' value on effect of discipline on TLE Practices of college teachers teaching PG students is 2961.28 which is significant at 0.01 level of significance at 1/594 df. So, the null hypothesis of no significant effect of discipline on UG students rating of TLE Practices of college teachers is rejected at .01 level of significance. This indicates that discipline shows significant effect on TLE Practices of college teachers teaching PG students, hence TLE Practices of college teachers teaching PG students cannot be said to be independent of teaching category.

The calculated 'F ratio' for effect of teaching category on TLE Practices of college teachers teaching at PG level is 2478.87 which is greater than the 'F ratio' of 3.01 required for significance against 2 and 594 df at 0.01 level. So, the null hypothesis of no significant effect of teaching category on UG students rating of teaching behavior of college teachers is rejected at .01 level of significance. This shows that teaching category has significant effect on TLE Practices of college teachers teaching PG students.

The calculated 'F ratio' for interaction i.e. joint effect of teaching category and discipline for college teachers teaching at PG level is 3368.73 which is higher than the table value at 2/594 df. It shows that interaction of discipline and teaching category is significant at 0.01 level of significance. So, the null hypothesis of no significant interactive effect of discipline and teaching category on PG students rating of TLE Practices of college teachers is rejected at .01 level of significance. So, it can be concluded that there is significant interactive effect of discipline and teaching category on TLE Practices of college teachers teaching PG students. This shows that discipline and teaching category are interdependent to explain the TLE Practices of college teachers teaching PG students.

Figure: 4.19
Interactive effect of discipline and teaching category on college PG students' ratings on TLE Practices of teachers



From Figure 4.19 It can be observed that discipline as well as teaching category affects college PG students rating of teachers" TLE Practices in interactive form. It can be noticed that the college PG science teachers scored higher than college PG arts teachers on behaviorist teacher centric category whereas on cognitive concept centric category college PG arts teachers" scores were higher than college PG science teachers. The scores were same on learner centric innovative category for both groups. The pattern of TLE Practices of college PG arts and science teachers" was found different from each other category wise.

Table:4.38

Post hoc't' test on College PG students rating teaching behavior of Discipline HEIs mean difference with regard to teaching category in difference pairs.

	M1(BTC) (1.40)	M2(CCC) (2.66)	M3(LCI) (2.45)
M1(BTC) (1.40)	-	1.26	1.05
M2(CCC) (2.66)	-	-	0.21
M3(LCI) (2.45)	-	-	-

The post hoc test of mean difference by use of „t" was adopted to study critical mean difference between different pairs of teaching category. The „t" values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.0173) with 2.58 for 0.01 level (.0446) and 1.96 for .05 level (.034) with df 1194 respectively. The table of mean pair differences indicated that TLE Practices of college PG arts and college PG science teachers of HEI category wise revealed that three mean differences were found significant at .01 level. It revealed that cognitive concept centric behaviour score were higher than innovative category TLE Practices and behaviouristic teacher centric category teachers behaviour respectively as per student rating of TLE Practices of college PG arts and college PG science teachers.

4.2.15 University UG students rating of TLE Practices of teachers in the context of discipline

Discipline	Teaching Category					
	Behaviourist/ Teacher Centric		Cognitive/ Concept Centric		Constructivist/ Learner Centric Innovative	
Arts Students (N=100)	Mean 2.80	S.D. .06	Mean 2.69	S.D. .17	Mean 2.52	S.D. .16
Science Students N=100	2.79	.08	2.51	.22	2.57	.13
Total Arts & Science N=200	2.80	.07	2.60	.22	2.54	.14

Table 4.39

Summary of 2 x 3 ANOVA on effect of discipline on university UG students rating and teaching category on TLE Practices of teachers

S. No.	Source of Variation	SS	df	MS	F	F crit
1.	Discipline	.35	1	.35	15.19*	3.86
2.	Teaching Category	71.31	2	3.66	158.66*	3.01
3.	Discipline × Teaching Category Interaction	1.50	2	.75	32.62*	3.01
4.	Within	13.69	594	.02		
	Total	22.87	599			

*Significant at 0.01 level of significance

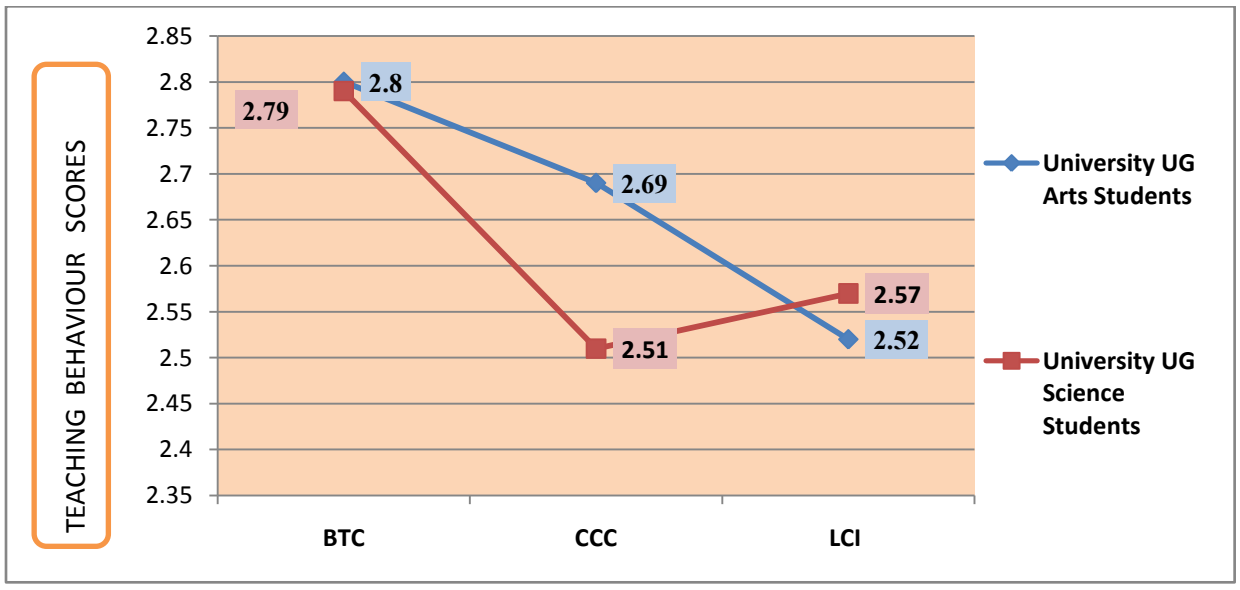
From Table 4.39, it can be observed that the calculated 'F' value on effect of discipline on TLE Practices of university teachers teaching UG students is 15.19 which is significant at 0.01 level of significance at 1/594 df. So, the null hypothesis of no significant effect of discipline on UG students rating of teaching behavior of university teachers is rejected at .01 level of significance. This indicates that discipline shows significant effect on TLE Practices of university teachers teaching UG students, hence TLE Practices of university teachers teaching UG students cannot be said to be independent of discipline.

The calculated 'F ratio' for effect of teaching category on TLE Practices of university teachers teaching at UG level is 158.66 which is greater than the 'F ratio' of 3.01 required for significance against 2 and 594 df at 0.01 level. So, the null hypothesis of no significant effect of teaching category on UG students rating of teaching behavior of university teachers is rejected at .01 level of significance. This shows that teaching category has significant effect on TLE Practices of university teachers teaching UG students.

The calculated 'F ratio' for interaction i.e. joint effect of teaching category and discipline for university teachers teaching at UG level is 32.62 which is higher than the table value at 2/594 df. It shows that interaction of discipline and teaching category is significant at 0.01 level of significance. So, the null hypothesis of no significant interactive effect of discipline and teaching category on UG students rating of TLE Practices of university teachers is rejected at .01 level of significance. So, it can be concluded that there is significant interactive effect of discipline and teaching category on TLE Practices of university teachers teaching UG students. This shows that discipline and teaching category are interdependent to explain the TLE Practices of university teachers teaching UG students.

Figure: 4.20

Interactive effect of discipline and teaching category on University UG students' ratings on TLE Practices of teachers



From Figure 4.20 It can be observed that discipline as well as teaching category affects university UG students rating of teachers" TLE Practices in interactive form. It can be noticed

that the university UG arts teachers‟ scores are higher than UG science teachers‟ scores on behavioristic teaching category and cognitive concept centric category whereas UG science teachers‟ scores are higher than UG arts teachers‟ scores on learner centric innovative category. The pattern of TLE Practices of university UG arts and science teachers‟ category wise was found different from each other.

Table: 4.40

Post hoc‘t’ test on University UG students rating of teaching behavior of discipline HEIs mean difference with regard to teaching category in difference pairs.

	M1(BTC) (2.80)	M2(CCC) (2.60)	M3(LCI) (2.54)
M1(BTC) (2.80)	-	0.20	0.26
M2(CCC) (2.60)	-	-	0.16
M3(LCI) (2.54)	-	-	-

The post hoc test of mean difference by use of „t‟ was adopted to study critical mean difference between different pairs of teaching category. The „t‟ values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.014) with 2.58 for 0.01 level (.036) and 1.96 for .05 level (.027) with df 594 respectively. The table of mean pair differences indicated that TLE Practices of university UG arts and university UG science teachers of HEI category wise revealed that three mean differences were found significant at .01 level. It revealed that behaviouristic teacher centric behaviour score were higher than cognitive concept centric behaviour and innovative category TLE Practices respectively as per student rating of TLE Practices of university UG arts and university UG science teachers.

4.2.16 University PG students rating of TLE Practices of teachers in the context of discipline

Discipline	**Teaching Category**					
	Behaviourist/ Teacher Centric		**Cognitive/ Concept Centric**		**Constructivist/ Learner Centric Innovative**	
Arts Students N=100	Mean .08	S.D. 2.67	Mean 2.63	S.D. .24	Mean 2.50	S.D. .19
Science Students N=100	2.75	.01	2.68	.23	2.47	.27
Total N=200	1.41	1.33	2.65	.23	2.49	.23

Table 4.41

Summary of 2x 3 ANOVA on effect of discipline of university PG students and teaching category on TLE Practices of teachers

S. No.	Source of Variation	SS	df	MS	F	F crit
1.	Discipline	121.64	1	121.64	3045.29*	3.85
2.	Teaching Category	181.36	2	90.68	2270.15*	3.01
3.	Discipline × Teaching Category Interaction	234.47	2	117.23	2934.96*	3.01
4.	Within	23.72	594	.03		
	Total	561.20	599			

*Significant at 0.01 level of significance

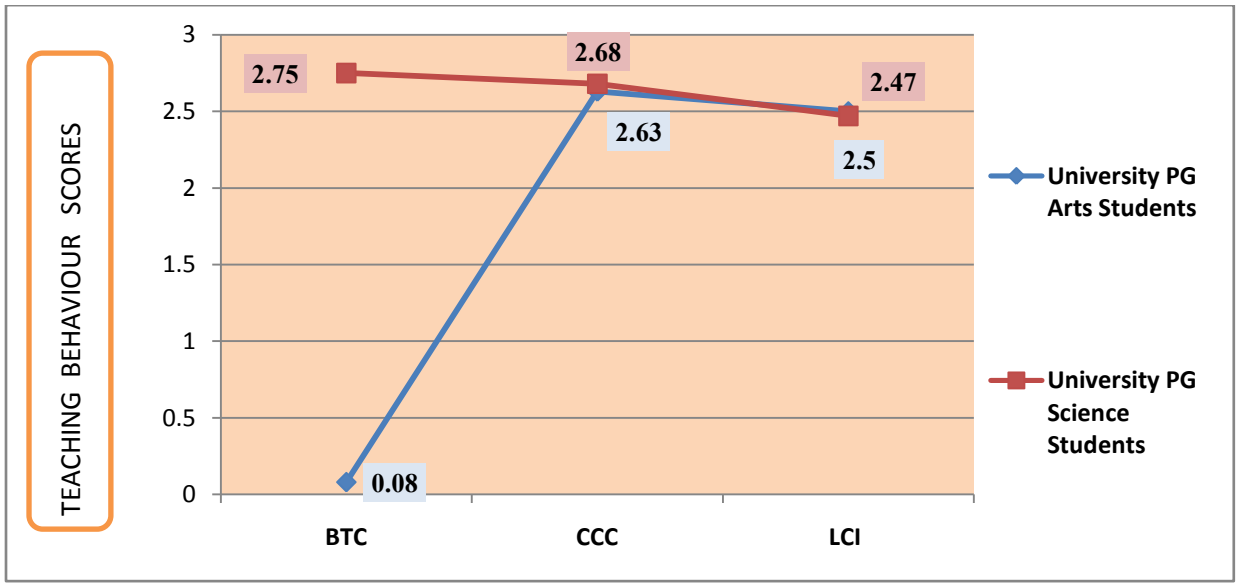
From Table 4.41, it can be observed that the calculated 'F' value on effect of discipline on TLE Practices of university teachers teaching PG students is 3045.29 which is significant at 0.01 level of significance at 1/594 df. So, the null hypothesis of no significant effect of discipline on PG students rating of TLE Practices of university teachers is rejected at .01 level of significance. This indicates that discipline shows significant effect on TLE Practices of university teachers teaching PG students, hence TLE Practices of university teahers teaching PG students cannot be said to be independent of teaching category.

The calculated 'F ratio' for effect of teaching category on TLE Practices of university teachers teaching at PG level is 2270.15 which is greater than the 'F ratio' of 3.85 required for significance against 2 and 594 df at 0.01 level. So, the null hypothesis of no significant effect of teaching category on PG students rating of TLE Practices of university teachers is rejected at .01 level of significance. This shows that teaching category has significant effect on TLE Practices of university teachers teaching PG students.

The calculated 'F ratio' for interaction i.e. joint effect of teaching category and discipline for university teachers teaching at PG level is 2934.96 which is higher than the table value at 2/594 df. It shows that interaction of discipline and teaching category is significant at 0.01 level of significance. So, the null hypothesis of no significant interactive effect of discipline and teaching category on PG students rating of TLE Practices of university teachers is rejected at .01 level of significance. So, it can be concluded that there is significant interactive effect of discipline and teaching category on TLE Practices of university teachers teaching PG students. This shows that discipline and teaching category are interdependent to explain the TLE Practices of university teachers teaching PG students.

Figure: 4.21

Interactive effect of level of HE and teaching category on college Science students' ratings on TLE Practices of teachers



From Figure 4.21 It can be observed that discipline as well as teaching category affects university PG students rating of teachers‟ TLE Practices in interactive form. It can be noticed that the university PG science teachers‟ scores are higher than PG arts teachers scores on behavioristic teaching category and cognitive concept centric category whereas for Learner centric innovative category university PG arts teachers‟ scores are higher than PG science teachers scores. The pattern of TLE Practices of university PG arts and science teachers‟ category wise was found different from each other.

Table: 4.42

Post hoc't' test on University PG students rating of teaching behavior of discipline HEIs mean difference with regard to teaching category in difference pairs.

	M1(BTC) (1.41)	M2(CCC) (2.65)	M3(LCI) (2.49)
M1(BTC) (1.41)	-	1.24	1.08
M2(CCC) (2.65)	-	-	0.16
M3(LCI) (2.49)	-	-	-

The post hoc test of mean difference by use of„t‟ was adopted to study critical mean difference between different pairs of teaching category. The „t‟ values to be significant

,difference of mean scores pair were calculated by multiplying SED (0.017) with 2.58 for 0.01 level (.044) and 1.96 for .05 level (.033) with df 594 respectively. The table of mean pair differences indicated that TLE Practices of university PG arts and university PG science teachers of HEI category wise revealed that three mean differences were found significant at .01 level. It revealed that cognitive concept centric behaviour score were higher than innovative category TLE Practices and behaviouristic teacher TLE Practices of university PG arts and university PG science teachers.

Objective-3

To study the main and interactional effects of teaching category on classroom TLE Practices of HEI teachers in the context of discipline and nature of institutions (based on researcher observation)

4.3 Effect of teaching category on classroom TLE Practices of HEI teachers in the context of discipline and level of HE (based on researcher observation)

4.3.1 Researcher observation of classroom TLE Practices of HEI Arts subject teachers in the context of level of HE (UG & PG)

S. No.	Level of HE	Teaching Category					
		Behaviourist/ Teacher Centric		Cognitive/ Concept Centric		Constructivist/ Learner Centric Innovative	
1.	UG N=20	Mean 1.77	S.D. .1	Mean 1.43	S.D. .24	Mean 1.56	S.D. .22
2.	PG N=20	1.8	.07	1.37	.26	1.6	.16
	Total N=40	1.80	.1	1.4	.24	1.6	.19

Table 4.43 Summary of 2×3 ANOVA on Effect of level of HE (UG & PG) and teaching category on classroom TLE Practices of HEI teachers teaching Arts subject (Based on researcher observation)

Source of Variation	SS	Df	MS	F	Fcrit
Level of HE	.004	1	.004	.10	3.92
Teaching Category	3.13	2	1.57	40.60*	3.07
Level of HE ×Teaching Category Interaction	.08	2	.04	.99	3.07

Within	4.4	114	.04		
Total	7.62	119			

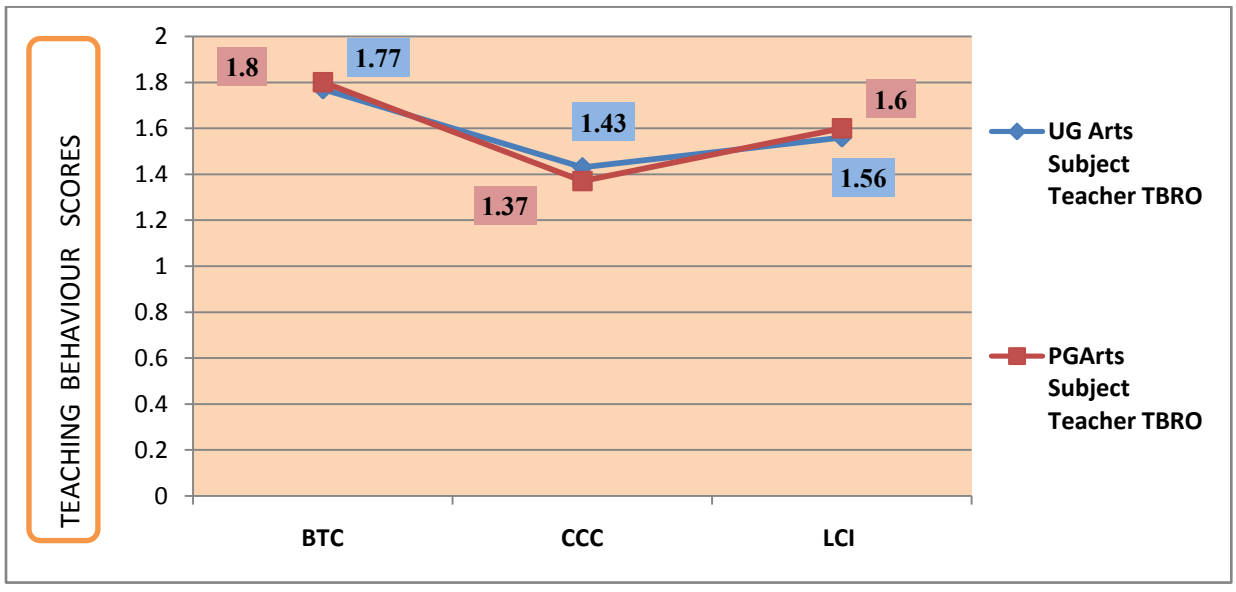
Note: *Significant at 0.01 level of significance.

It can be observed from the Table 4.43 that the calculated 'F' value on effect of discipline on classroom TLE Practices of HEI teachers teaching arts subject is 0.10, which is not significant at 0.01 level of significance. So, the null hypothesis of no significant effect of level of HE on researcher observation of TLE Practices of HEI teachers teaching UG classes is accepted at .01 level of significance. So, we can say that TLE Practices of HEI teachers teaching arts subject is independent of level of HE.

In case of effect of teaching category on classroom TLE Practices of HEI teachers teaching arts subjects the 'F' value is 40.60 which is greater than the 'F' ratio of 3.07 required for significance against df 2/114 at 0.01 level. So, the null hypothesis of no significant effect of teaching category on researcher observation of teaching behavior of HEI teachers teaching arts subjects is rejected at .01 level of significance. This means that teaching category shows significant effect on classroom TLE Practices of HEI teachers teaching arts subjects.

In case of interactive effect of level of HE and teaching category interaction on classroom TLE Practices of HEI teachers teaching arts subject is found to be 0.99 which is not significant at 0.01 level of significance with df 2/114. So, the null hypothesis of no significant interactive effect of level of HE and teaching category on researcher observation on teaching behavior of HEI teachers is accepted at .01 level of significance. This is indicative of fact that effect of level of HE and teaching category are independent of each other to explain classroom TLE Practices of HEI teachers teaching arts subjects.

Figure: 4.22 Interactive effect of level of HE and teaching category on classroom TLE Practices of HEI arts teachers



From Figure 4.22 It can be observed that level of HE as well as teaching category do not affects undergraduate arts teachers TLE Practices in interactive form as per researcher observation. It can be noticed that PG arts teachers scores are higher than UG arts teachers‟ on behavioristic teacher centric and Learner centric innovative category whereas UG arts teachers scores are higher than PG arts teachers‟ on cognitive concept centric category.

Table:4.44

Post hoc 't' test on arts subjects teachers of teaching behavior of level of HE mean difference with regard to teaching category in difference pairs.

	M1(BTC) (1.80)	M2(CCC) (1.40)	M3(LCI) (1.60)
M1(BTC) (1.80)	-	0.40	0.20
M2(CCC) (1.40)	-	-	0.20
M3(LCI) (1.60)	-	-	-

The post hoc test of mean difference by use of „t‟ was adopted to study critical mean difference between different pairs of teaching category. The „t‟ values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.0258) with 2.62 for 0.01 level (.068) and 1.98 for .05 level (.051) with df 114 respectively. The table of mean pair differences indicated that TLE Practices of UG and PG arts teachers‟ category wise revealed that three mean differences were found significant at .01 level. It revealed that behaviouristic teacher centric category TLE Practices mean scores were higher than learner centric innovative category and cognitive concept centric TLE Practices of UG and PG arts teachers.

4.3.2

Researcher observation of classroom TLE Practices of HEI Science subject teachers in the context of level of HE (UG & PG)

S. No.	level of HE	Teaching Category					
		Behaviourist/ Teacher Centric		Cognitive/ Concept Centric		Constructivist/ Learner Centric Innovative	
1.	UG N=20	Mean 1.78	S.D. .11	Mean 1.47	S.D. .22	Mean 1.61	S.D. .20
2.	PG N=20						

		1.88	.08	1.5	.24	1.5	.18
	Total N=40	1.8	.11	1.5	.23	1.5	.20

Table 4.45

Summary of 2×3 ANOVA on Effect of Level of HE and Teaching Category on Science Teachers TLE Practices of HEIs

Source of Variation	SS	Df	MS	F	Fcrit
Level of HE	.01	1	.01	.41	3.92
Teaching Category	3.70	2	1.85	54.53*	3.07
Level of HE ×Teaching Category Interaction	.32	2	.16	4.84*	3.07
Within	3.87	114	.03		
Total	7.91	119			

Note: *Significant at 0.01 level of significance

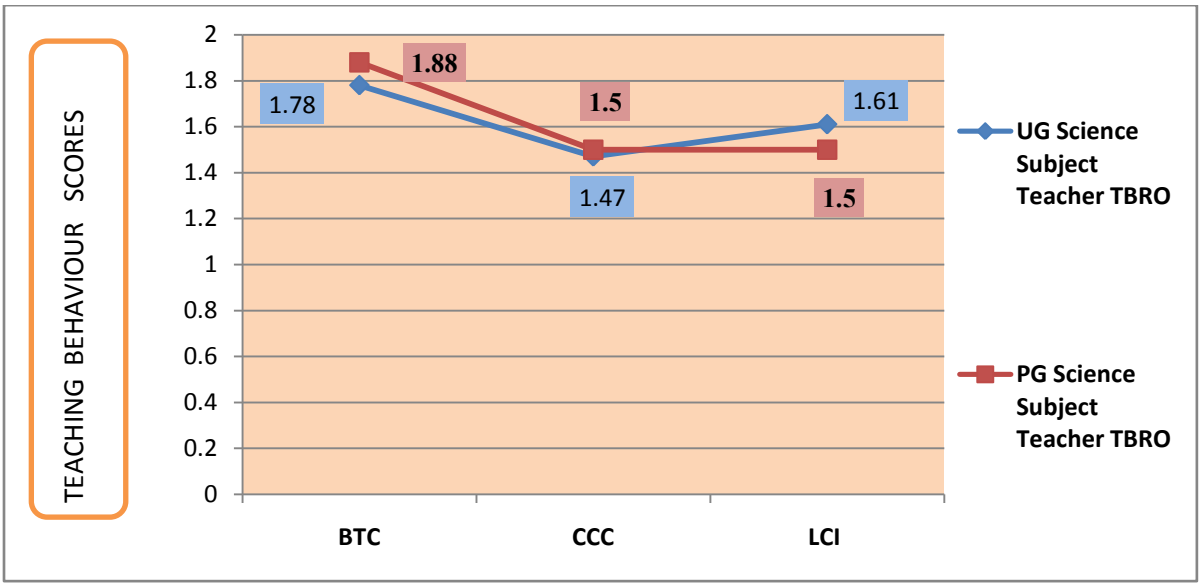
It can be observed from the Table 4.45 that the calculated 'F' value on effect of discipline on classroom TLE Practices of HEI teachers teaching science subject is 0.41, which is not significant at 0.01 level of significance. So, the null hypothesis of no significant effect of level of HE on researcher observation of TLE Practices of HEI teachers teaching science subjects is accepted at .01 level of significance. So, we can say that TLE Practices of HEI teachers teaching science subjects is independent of level of HE.

In case of effect of teaching category on classroom TLE Practices of HEI teachers teaching science subjects the 'F' value is 40.60 which is greater than the 'F' ratio of 3.07 required for significance against df 2/114 at 0.01 level. So, the null hypothesis of no significant effect of teaching category on researcher observation of teaching behavior of HEI teachers teaching science subjects is rejected at .01 level of significance. This means that teaching category shows significant effect on classroom TLE Practices of HEI teachers teaching science subjects.

In case of interactive effect of level of HE and teaching category interaction on classroom TLE Practices of HEI teachers teaching science subjects is found to be 4.84 which is significant at 0.01 level of significance with df 2/114. So, the null hypothesis of no significant interactive effect of level of HE and teaching category on researcher observation on teaching behavior of HEI teachers is rejected at .01 level of significance. This is indicative of fact that effect of level of HE and teaching category are dependent on each other to explain classroom TLE Practices of HEI teachers teaching science subjects.

Figure: 4.23

Interactive effect of level of HE and teaching category on classroom TLE Practices of HEI science teachers



From Figure 4.23 It can be observed that level of HE as well as teaching category affects HEI science teachers TLE Practices in interactive form as per researcher observation. It can be noticed that the PG science teachers scores are higher than UG science teachers‟ scores on behavioristic teacher centric category and cognitive concept centric category whereas UG science teachers scores are higher than scores of PG science teachers scores on learner centric innovative category. The pattern of TLE Practices of UG and PG science teachers‟ category wise was found different from each other.

Table: 4.46

Post hoc ‘t’ test on science subjects teachers TLE Practices of level of HE mean difference with regard to teaching category in difference pairs.

	M1(BTC) (1.80)	M2(CCC) (1.50)	M3(LCI) (1.50)
M1(BTC) (1.80)	-	0.30	0.30
M2(CCC) (1.50)	-	-	0.0
M3(LCI) (1.50)	-	-	-

The post hoc test of mean difference by use of „t‟ was adopted to study critical mean difference between different pairs of teaching category. The „t‟ values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.022) with 2.62 for 0.01 level (.057) and 1.98 for .05 level (.043) with df 114 respectively. The table of mean pair differences indicated that TLE Practices of PG and UG science teachers category wise revealed that two mean differences were found significant at .01 level. It revealed that behaviouristic teacher centric category TLE Practices mean scores were higher than cognitive concept centric and learner centric innovative category TLE Practices of UG and PG science teachers. It was also revealed that cognitive concept centric category TLE Practices was not different from Learner centric innovative behaviour of UG and PG science teachers of HEI

4.3.3 Researcher observation of TLE Practices of HEI teachers in UG classes in the context of discipline

S. No.	Discipline	Teaching Category					
		Behaviourist/ Teacher Centric		Cognitive/ Concept Centric		Constructivist/ Learner Centric Innovative	
1.	Art N=20	Mean 1.77	S.D. 0.1	Mean 1.43	S.D. 0.24	Mean 1.55	S.D. 0.22
2.	Science N=20	1.77	0.1	1.47	0.22	1.60	0.2
	Total N=40	1.77	0.1	1.45	0.22	1.58	0.2

Table 4.47

Summary of 2×3 ANOVA on effect of discipline and Teaching Category on classroom TLE Practices of HEI Teachers

(Based on researcher observation of UG classes)

S. No.	Source of Variation	SS	df	MS	F	F crit
1.	Discipline	0.03	1	0.03	0.86	3.92
2.	Teaching Category	2.09	2	1.04	27.15*	3.07
3.	Discipline × Teaching Category Interaction	0.02	2	0.007	0.19	3.07
4.	Within	4.39	114	0.039		
	Total	6.53	119			

Note: *Significant at 0.01 level of significance.

It can be observed from the Table 4.47, that the calculated 'F' value on effect of discipline on classroom TLE Practices of HEI teachers teaching UG classes is 0.86, which is

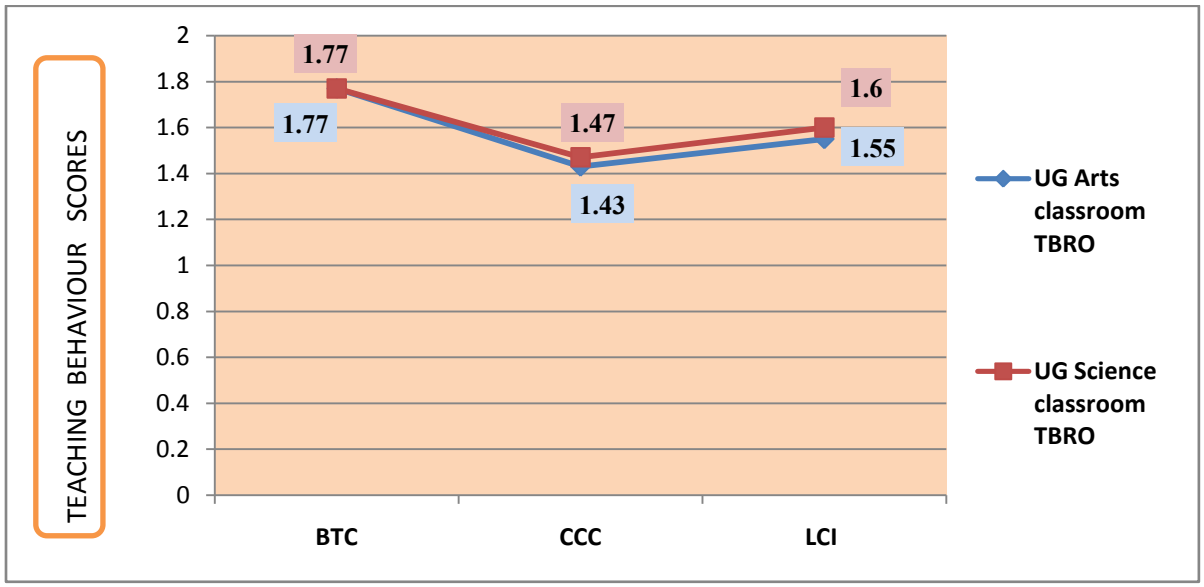
not significant at 0.01 level of significance. So, the null hypothesis of no significant effect of discipline on researcher observation of TLE Practices of HEI teachers teaching UG classes is accepted at .01 level of significance. So, we can say that TLE Practices of HEI teachers teaching UG classes is independent of discipline.

In case of effect of teaching category on classroom TLE Practices of HEI teachers teaching UG classes the 'F' value is 27.15 which is greater than the 'F' ratio of 3.07 required for significance against df 2/114 at 0.01 level. So, the null hypothesis of no significant effect of teaching category on researcher observation of teaching behavior of HEI teachers teaching UG classes is rejected at .01 level of significance. This means that discipline shows significant effect on classroom TLE Practices of HEI teachers teaching UG classes.

In case of interactive effect of discipline and teaching category interaction on classroom TLE Practices of HEI teachers teaching UG classes is found to be 0.19 which is not significant at 0.01 level of significance with df 2/114. So, the null hypothesis of no significant interactive effect of discipline and teaching category on researcher observation on teaching behavior of HEI teachers is accepted at .01 level of significance. This is indicative of fact that effect of discipline and teaching category are independent of each other to explain classroom TLE Practices of HEI teachers teaching UG classes

Figure: 4.24

Interactive effect of discipline and teaching category on TLE Practices of HEI teachers in UG classes



From Figure 4.24, It can be observed that discipline as well as teaching category do not affects undergraduate teachers TLE Practices in interactive form as per researcher observation. It can be noticed that UG science teachers scores and UG arts teachers‟ scores are same on behavioristic teacher centric category, for cognitive concept centric and Learner centric innovative category UG science teachers score is higher than UG arts teachers score.

Table: 4.48

Post hoc 't' test on researcher observation of UG classroom teaching behavior and discipline of teachers in HEIs mean difference with regard to teaching category in difference pairs

	M1(BTC) (1.77)	M2(CCC) (1.45)	M3(LCI) (1.58)
M1(BTC) (1.77)	-	0.32	0.19
M2(CCC) (1.45)	-	-	0.13
M3(LCI) (1.58)	-	-	-

The post hoc test of mean difference by use of „t" was adopted to study critical mean difference between different pairs of teaching category. The „t" values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.0254) with 2.62 for 0.01 level (.066) and 1.98 for .05 level (.05) with df 114 respectively. The table of mean pair differences indicated that TLE Practices of UG arts and science teachers category wise revealed that three mean differences were found significant at .01 level. It revealed that behaviouristic teacher centric category TLE Practices mean scores were higher than cognitive concept centric and learner centric innovative category teaching learning activities of UG teachers.

4.3.4

Researcher observation of classroom TLE Practices of HEI teachers teaching PG classes in the context of discipline

S. No.	Discipline	Teaching Category					
		Behaviorist/ Teacher Centric		Cognitive/ Concept Centric		Constructivist/ Learner Centric Innovative	
1.	Arts Teachers N=20	Mean 1.8	S.D. 0.07	Mean 1.37	S.D. 0.26	Mean 1.59	S.D. 0.17
2.	Science Teacher N=20	1.9	0.08	1.5	0.47	1.47	0.17
	Total Teachers N=40	1.85	0.08	1.44	0.26	1.54	0.17

Table 4.49

Summary of 2×3 ANOVA on effect of Discipline and Teaching Category on Classroom TLE Practices of HEI Teachers (Based on Observation of PG Classes)

S. No.	Source of Variation	SS	df	MS	F	F crit
1.	Discipline	0.01	1	0.01	0.41	3.92
2.	Teaching Category	3.70	2	1.85	54.53*	3.07
3.	Discipline × Teaching Category Interaction	0.32	2	0.16	4.84*	3.07
4.	Within	3.87	114	0.03		
	Total	7.91	119			

*Significant at 0.01 level of significance.

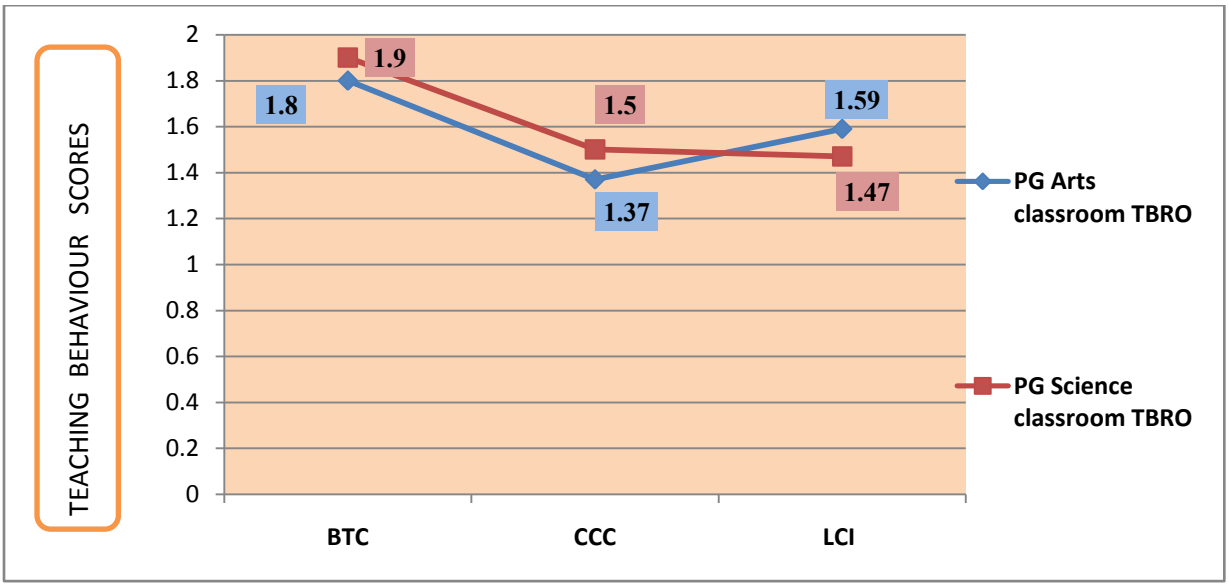
From Table 4.49, it can be observed that the calculated 'F' value on effect of discipline on classroom TLE Practices of HEI teachers teaching PG classes is 0.41 which is not significant at 0.01 level of significance at df 1/114. So, the null hypothesis of no significant effect of discipline on researcher observation of TLE Practices of HEI teachers teaching PG classes is accepted at .01 level of significance. We can say that classroom TLE Practices of teachers teaching PG classes is independent of discipline.

The calculated F ratio for effect of teaching category on classroom TLE Practices of HEI teachers teaching PG classes is 54.53 which is far higher than the tabulated value 3.07 at 2/114 df. It means this F ratio is significant at 0.01 level of significance. So, the null hypothesis of no significant effect of teaching category on researcher observation of teaching behavior of HEI teachers teaching PG classes is rejected at .01 level of significance. Thus, classroom TLE Practices of HEI teachers is dependent on teaching category.

The calculated 'F' ratio for interaction of discipline and teaching category is 4.84 which is more than the table value of 3.07 required for significance at 2 and 114 df at 0.01 level. So, the null hypothesis of no significant interactive effect of discipline and teaching category on researcher observation of teaching behavior of HEI teachers teaching PG classes is rejected at .01 level of significance. It can be concluded that there is significant interactive effect of discipline and teaching category on classroom TLE Practices of HEI teachers teaching PG classes. This means that discipline and teaching category are dependent upon each other to explain classroom TLE Practices of HEI teachers teaching PG level.

Figure: 4.25

Interactive effect of discipline and teaching category on classroom TLE Practices of HEI teachers in PG classes



From Figure 4.25, It can be observed that discipline as well as teaching category affects postgraduate teachers TLE Practices in interactive form as per researcher observation. It can be noticed that the PG science teachers scores are higher than PG arts teachers‟ scores on behavioristic teacher centric category and cognitive concept centric category whereas PG arts teachers scores are higher than scores of PG science teachers scores on learner centric innovative category. The pattern of TLE Practices of arts and science teachers‟ category wise was found different from each other.

Table:4.50

Post hoc‘t’ test on researcher observation of PG classroom teaching behavior and discipline of teachers of HEIs mean difference with regard to teaching category in difference pairs.

	M1(BTC) (1.85)	M2(CCC) (1.44)	M3(LCI) (1.54)
M1(BTC) (1.85)	-	0.41	0.31
M2(CCC) (1.44)	-	-	0.10
M3(LCI) (1.54)	-	-	-

The post hoc test of mean difference by use of „t" was adopted to study critical mean difference between different pairs of teaching category. The „t" values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.022) with 2.62 for 0.01 level (.058) and 1.98 for .05 level (.043) with df 114 respectively. The table of mean pair differences indicated that TLE Practices of PG science and arts teachers category wise revealed that three mean differences were found significant at .01 level. It revealed that behaviouristic teacher centric category TLE Practices mean scores were higher than cognitive concept centric and learner centric innovative category TLE Practices of science and art teachers.

Objective 4

To study the main and interactional effects of teaching category on teaching learning activities in the context of discipline and nature of institutions (Based on interview of students)

4.4 Effect of Teaching category on teaching learning activities in the context of discipline and Level of HE (Based on Interview of students)

4.4.1 HEI arts students' response on teaching-learning activities in the context of level of HE (Based on Interview of students)

S. No.	Level of HE	Teaching Category					
		Behaviourist/ Teacher Centric		Cognitive/ Concept Centric		Constructivist/ Learner Centric Innovative	
1.	UG Arts students N=50	Mean 1.58	S.D. .20	Mean 1.59	S.D. .23	Mean 1.42	S.D. .29
2.	PG Arts sudents N=50	1.53	.24	1.65	.20	1.49	.31
	Total UG and PG arts students N=100	1.56	.22	1.62	.22	1.45	.3

Table 4.51

Summary of 2×3 ANOVA on effect of level of HE and teaching category on teaching learning activities in arts subjects (Based on Interview of students)

Source of Variation	SS	Df	MS	F	Ferit
Level of HE	.05	1	.05	.82	3.87
Teaching Category	1.38	2	.69	10.85*	3.02
Level of HE × Teaching Category Interaction	.25	2	.12	1.94	3.02
Within	18.64	294	.06		
Total	20.31	299			

*Significant at 0.01 level of significance.

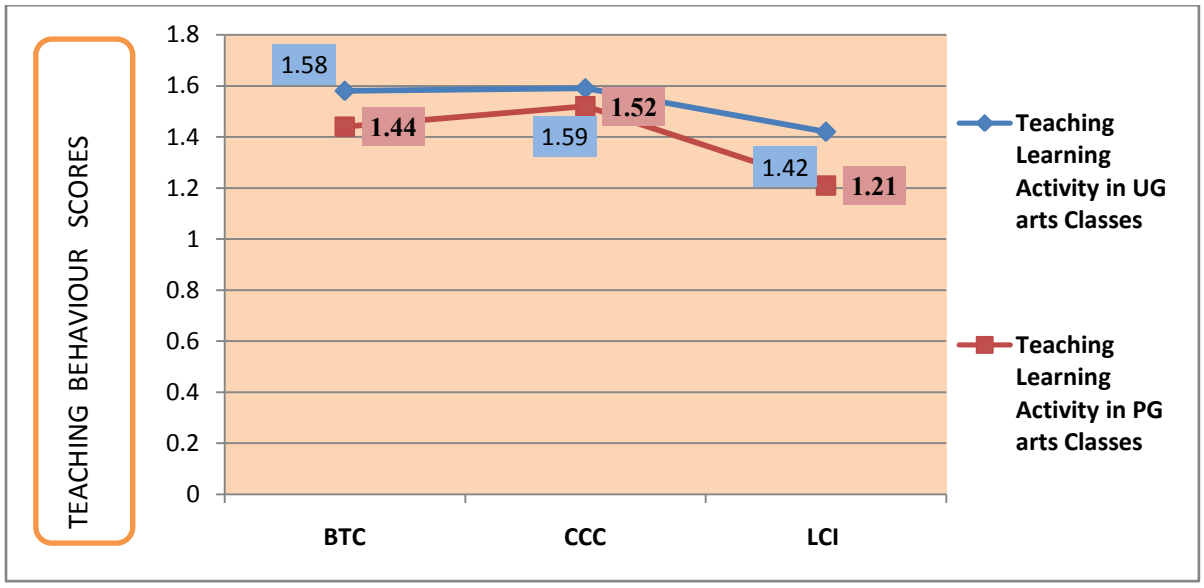
It can be observed from the Table 4.51, that the calculated 'F' value on effect of level of HE on teaching learning activities of HEI teachers teaching arts subjects is .82 which is less than the F ratio of 3.87 required for 0.01 level of significance at df 1/294. So, the null hypothesis of no significant effect of students" reaction on teaching learning activities of HEI teachers teaching arts subjects is accepted at .01 level of significance. It can be said that teaching learning activities of HEI teachers teaching arts subjects is independent of level of HE.

In case of effect of teaching category on teaching learning activities of HEI teachers teaching arts subjects, calculated 'F' value is 10.85 which is more than table value 3.02 at 0.01 level of significance with df 2/294. So, the null hypothesis of no significant effect of teaching category on students reaction on teaching learning activities of arts teachers is rejected at .01 level of significance. We can say that teaching learning activities of HEI teachers teaching arts subject is not independent of level of HE.

The calculated 'F' ratio for effect of interaction of level of HE and teaching category on teaching learning activities of HEI teachers teaching science subjects is 1.94 at df 2/294 which is not significant at 0.01 level of significance. So, the null hypothesis of no significant interactive effect of level of HE and teaching category on students response on teaching learning activities of HEI teachers teaching arts subject is accepted at .01 level of significance. This indicates that effect of level of HE and teaching category are independent of each other to explain teaching learning activities of HEI teachers teaching arts subjects.

Figure: 4.26

Interactive effect of level of HE of arts students and teaching category on teaching-learning activities of HEI teachers



From Figure: 4.26 It can be observed that level of HE as well as teaching category do not affects undergraduate teachers TLE Practices of teachers‟ in interactive form as per interview of students. It can be noticed that UG arts teachers scores are higher than PG arts teachers scores on all the three categories i.e. behavioristic teacher centric, cognitive concept centric and Learner centric innovative. The pattern of TLE Practices of UG and PG arts teachers‟ category wise was not found different from each other.

Table: 4.52

Post hoc‘t’ test on level of HE of arts students of teaching learning activities of teaching behavior mean difference with regard to teaching category in difference pairs.

	M1(BTC) (1.56)	M2(CCC) (1.62)	M3(LCI) (1.45)
M1(BTC) (1.56)	-	0.06	0.11
M2(CCC) (1.62)	-	-	0.17
M3(LCI) (1.45)	-	-	-

The post hoc test of mean difference by use of „t" was adopted to study critical mean difference between different pairs of teaching category. The „t" values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.019) with 2.59 for 0.01 level (.051) and 1.97 for .05 level (.03) with df 294 respectively. The table of mean pair differences indicated that teaching learning activities of PG and UG arts teachers category wise revealed that three mean differences were found significant at .01 level. It revealed that cognitive concept centric teaching learning activities mean scores are higher than behaviouristic teacher centric category scores and learner centric innovative category scores of UG and PG arts teachers.

4.4.2
HEI science students rating of teaching-learning activities in the context of level of HE (Based on Interview of students)

S. No.	Level of HE	Teaching Category					
		Behaviourist/ Teacher Centric		Cognitive/ Concept Centric		Constructivist/ Learner Centric Innovative	
1.	UG science students N=50	Mean 1.44	S.D. .18	Mean 1.52	S.D. .23	Mean 1.21	S.D. .25
2.	PG science students N=50	1.48	.20	1.57	.20	1.29	.31
	Total UG and PG science students N=100	1.46	.19	1.54	.19	1.25	.28

Table 4.53 Summary of 2×3 ANOVA on Effect of level of HE and teaching category on teaching learning activities in science subjects (Based on Interview of students)

Source of Variation	SS	Df	MS	F	Ferit
Level of HE	.21	1	.21	3.79	3.87
Teaching Category	4.52	2	2.26	41.38*	3.03
Nature of Institution× Teaching Category Interaction	.03	2	.015	.27	3.03
Within	16.05	294	.05		
Total	20.81	299			

*Significant at 0.01 level of significance.

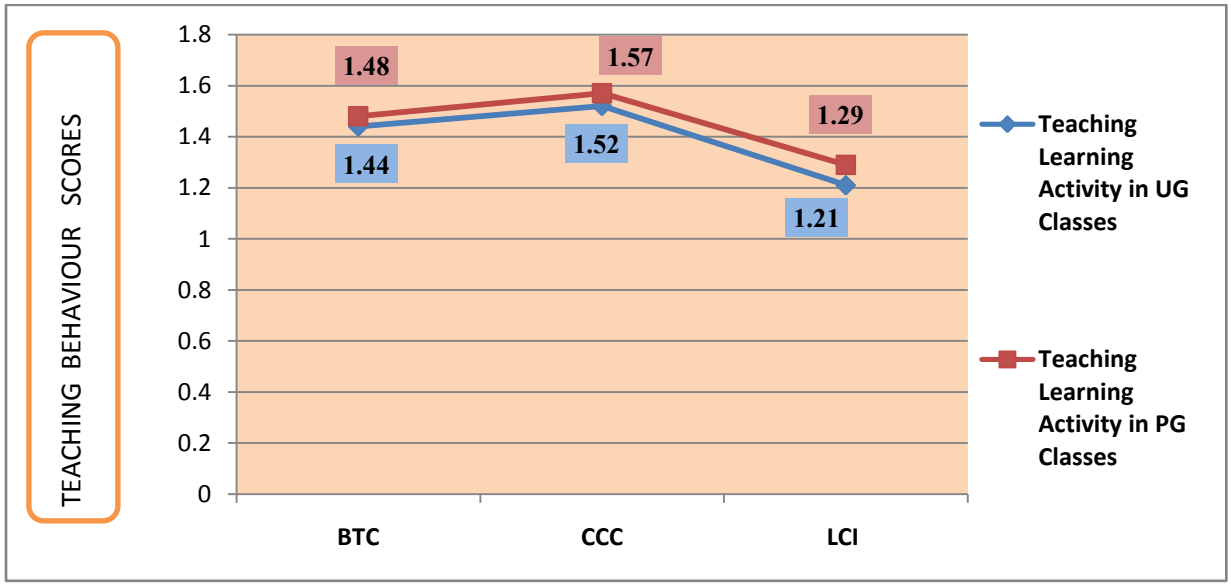
It can be observed from the Table 4.53 , that the calculated 'F' value on effect of level of HE on teaching learning activities of HEI teachers teaching science subjects is 3.79 which is less than the F ratio of 3.87 required for 0.01 level of significance at df 1/294. So, the null hypothesis of no significant effect of students reaction on teaching learning activities of HEI teachers teaching science subjects is accepted at .01 level of significance. It can be said that teaching learning activities of HEI teachers teaching science subjects is independent of level of HE.

In case of effect of teaching category on teaching learning activities of HEI teacher teaching science subjects, calculated 'F' value is 41.38 which is more than table value 3.03 at 0.01 level of significance with df 2/294. So, the null hypothesis of no significant effect of teaching category on students reaction on teaching learning activities of science teachers is rejected at .01 level of significance.We can say that teaching learning activities of HEI teachers teaching science subject is not independent of level of HE.

The calculated 'F' ratio for effect of interaction of level of HE and teaching category on teaching learning activities of HEI teachers teaching science subjects is .27 at df 2/294 which is not significant at 0.01 level of significance. So, the null hypothesis of no significant interactive effect of level of HE and teaching category on students response on teaching learning activities of HEI teachers teaching science subject is accepted at .01 level of significance. This indicates that effect of level of HE and teaching category are independent of each other to explain teaching learning activities of HEI teachers teaching science subjects.

Figure: 4.27

Interactive effect of level of HE of science students and teaching category on teaching learning activities of HEIs teachers.



From Figure: 4.27, It can be observed that level of HE as well as teaching category do not affects undergraduate and postgraduate teachers teaching learning activities in interactive form as per students‟ interview. It can be noticed that PG science teachers scores are higher than UG science

teachers scores on all the three categories i.e. behavioristic teacher centric, cognitive concept centric and Learner centric innovative. The pattern of TLE Practices of UG and PG science teachers‟ category wise was not found different from each other.

Table: 4.54

Post hoc‘t’ test on level of HE of science students of teaching learning activities of teaching behavior mean difference with regard to teaching category in difference pairs.

	M1(BTC) (1.46)	M2(CCC) (1.54)	M3(LCI) (1.25)
M1(BTC) (1.46)	-	0.08	0.21
M2(CCC) (1.54)	-	-	0.29
M3(LCI) (1.25)	-	-	-

The post hoc test of mean difference by use of „t‟ was adopted to study critical mean difference between different pairs of teaching category. The „t‟ values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.0181) with 2.59 for 0.01 level (.0468) and 1.97 for .05 level (.16) with df 294 respectively. The table of mean pair differences indicated that TLE Practices of PG and UG science teachers category wise revealed that three mean differences were found significant at .01 level. It revealed that cognitive concept centric teaching learning activities mean scores are higher than behaviouristic teacher centric category scores and learner centric innovative category scores of UG and PG science teachers.

.4.4.3 HEI UG students response on teaching-learning activities in the context of discipline (Based on Interview of students)

S. No.	Discipine	Teaching Category					
		Behaviourist/ Teacher Centric		Cognitive/ Concept Centric		Constructivist/ Learner Centric Innovative	
1.	Arts Students N=50	Mean 1.58	S.D. .20	Mean 1.59	S.D. .23	Mean 1.42	S.D. .29
2.	Science students N=50	1.44	.18	1.52	.23	1.21	.25
	Total UG students N=100	1.51	.23	1.55	.20	1.31	.29

Table 4.55 Summary of 2×3 ANOVA on effect of discipline and teaching category on teaching learning activities in UG classes (Based on Interview of students)

Source of Variation	SS	Df	MS	F	F crit
Discipline	1.41	1	1.42	26.00*	3.87
Teaching Category	3.24	2	1.62	29.71*	3.02
Discipline × Teaching Category Interaction	.27	2	.13	2.43	3.02
Within	16.04	294	.05		
Total	20.97	299			

*Significant at 0.01 level of significance.

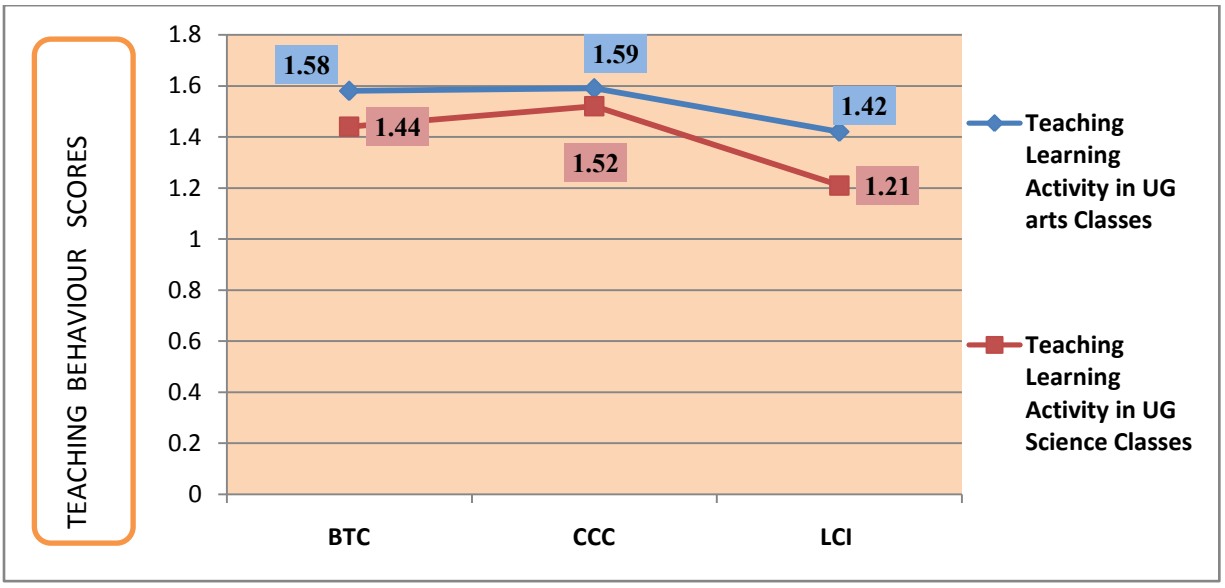
It can be observed from the Table 4.55, that the calculated 'F' value on effect of discipline on teaching learning activities of HEI teachers teaching UG classes is 26 which is more than the F ratio of 3.87 required for 0.01 level of significance at df 1/294. So, the null hypothesis of no significant effect of discipline on students‟ reaction on teaching learning activities of HEI teachers teaching UG classes is rejected at .01 level of significance. It can be said that teaching learning activities of HEI teachers teaching UG classes is dependent on discipline.

In case of effect of teaching category on teaching learning activities of HEI teachers teaching UG classes, calculated 'F' value is 29.71 which is more than table value 3.02 at 0.01 level of significance with df 2/294. So, the null hypothesis of no significant effect of teaching category on students‟ reaction on teaching learning activities of UG teachers is rejected at .01 level of significance. We can say that teaching learning activities of HEI teachers teaching UG classes is dependent on teaching category.

The calculated 'F' ratio for effect of interaction of discipline and teaching category on teaching learning activities of HEI teachers teaching UG classes is 2.43 at df 2/294 which is not significant at 0.01 level of significance. So, the null hypothesis of no significant interactive effect of discipline and teaching category on students‟ response on teaching learning activities of HEI teachers teaching UG classes is accepted at .01 level of significance. This indicates that effect of discipline and teaching category are independent of each other to explain teaching learning activities of HEI teachers teaching UG classes.

Figure: 4.28

Interactive effect of discipline of UG students and teaching category on teaching-learning activities of HEIs teachers



From Figure: 4.28, It can be observed that discipline as well as teaching category do not affects undergraduate teachers teaching-learning activities in interactive form as per interview of students. It can be noticed that UG arts teachers scores are higher than UG science teachers scores on all the three categories i.e. behavioristic teacher centric, cognitive concept centric and Learner centric innovative. The pattern of teaching-learning activities of UG arts and science teachers" category wise was not found different from each other.

Table: 4.56 Post hoc 't' test on discipline of UG students of teaching learning activities of teaching behavior mean difference with regard to teaching category in difference pairs.

	M1(BTC) (1.51)	M2(CCC) (1.55)	M3(LCI) (1.31)
M1(BTC) (1.51)	-	0.04	0.20
M2(CCC) (1.55)	-	-	0.24
M3(LCI) (1.31)	-	-	-

The post hoc test of mean difference by use of „t" was adopted to study critical mean difference between different pairs of teaching category. The „t" values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.018) with 2.59 for 0.01 level (.047) and 1.97

for .05 level (.035) with df 294 respectively. The table of mean pair differences indicated that TLE Practices of UG arts and science teachers category wise revealed that three mean differences were found significant at .01 level. It revealed that cognitive concept centric teaching learning activities mean scores are higher than behaviouristic teacher centric category scores and learner centric innovative category scores of UG arts and science teachers.

4.4.4 HEI PG students rating of teaching-learning activities in the context of discipline

S. No.	Discipline	Teaching Category					
		Behaviourist/ Teacher Centric		Cognitive/ Concept Centric		Constructivist/ Learner Centric Innovative	
1.	Arts students N=50	Mean 1.53	S.D. .24	Mean 1.65	S.D. .20	Mean 1.49	S.D. .30
2.	Science students N=50	1.48	.2	1.57	.21	1.29	.31
	Total PG students N=100	1.50	.23	1.61	2.12	1.39	.32

Table 4.57

Summary of 2×3 ANOVA on effect of discipline and teaching category on teaching learning activities in PG classes (Based on Interview of students)

Source of Variation	SS	Df	MS	F	Ferit
Discipline	.93	1	.93	14.65*	3.87
Teaching Category	2.38	2	1.19	18.77*	3.02
Discipline × Teaching Category Interaction	.28	2	.14	2.23	3.02
Within	18.65	294	.06		
Total	22.24	299			

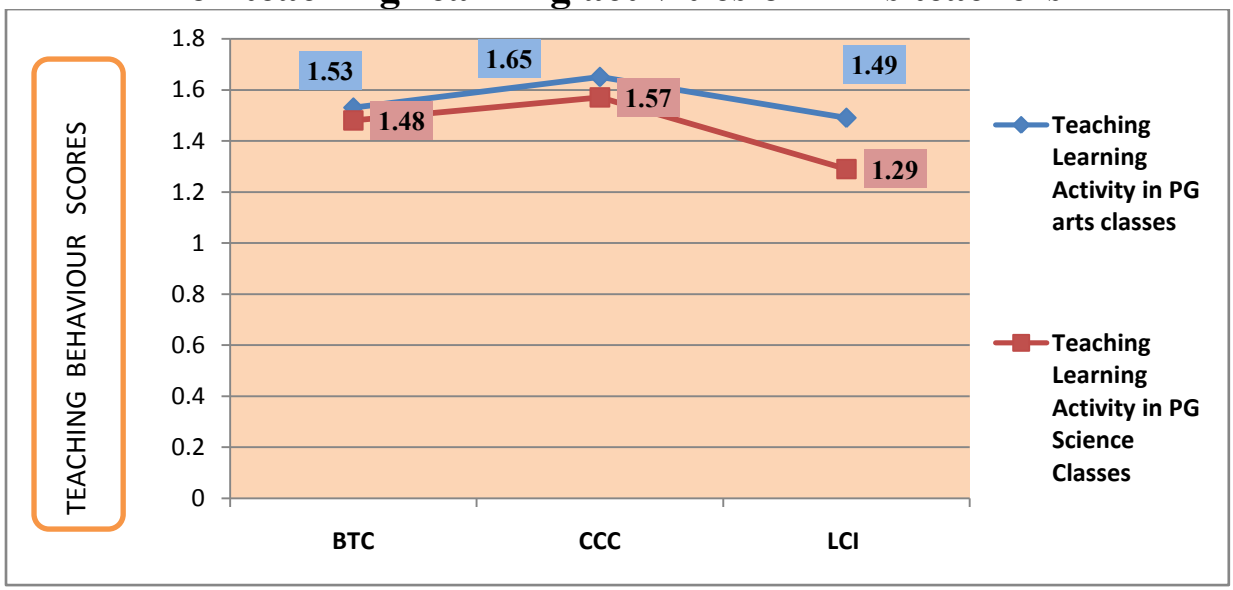
It can be observed from the Table 4.57, that the calculated 'F' value on effect of discipline on teaching learning activities of HEI teachers teaching UG classes is 14.65 which is more than the F ratio of 3.87 required for 0.01 level of significance at df 1/294. So, the null hypothesis of no significant effect of discipline on students‟ reaction on teaching learning activities of HEI teachers teaching PG classes is rejected at .01 level of significance. It can be said that teaching learning activities of HEI teachers teaching PG classes is dependent on discipline.

In case of effect of teaching category on teaching learning activities of HEI teachers teaching PG classes, calculated 'F' value is 18.77 which is more than table value 3.02 at 0.01 level of significance with df 2/294. So, the null hypothesis of no significant effect of teaching category on students‟ reaction on teaching learning activities of PG teachers is rejected at .01 level of significance. We can say that teaching learning activities of HEI teachers teaching PG classes is dependent on teaching category.

The calculated 'F' ratio for effect of interaction of discipline and teaching category on teaching learning activities of HEI teachers teaching PG classes is 2.23 at df 2/294 which is not significant at 0.01 level of significance. So, the null hypothesis of no significant interactive effect of discipline and teaching category on students‟ response on teaching learning activities of HEI teachers teaching PG classes is accepted at .01 level of significance. This indicates that effect of discipline and teaching category are independent of each other to explain teaching learning activities of HEI teachers teaching PG classes.

Figure: 4.29

Interactive effect of discipline of PG students and teaching category on teaching-learning activities of HEIs teachers



From Figure: 4.29 It can be observed that discipline as well as teaching category do not affects postgraduate teachers teaching-learning activities in interactive form as per interview of students. It can be noticed that PG arts teachers scores are higher than PG science teachers scores on all the three categories i.e. behavioristic teacher centric, cognitive concept centric and Learner centric innovative. The pattern of teaching-learning activities of PG arts and science teachers‟ category wise was not found different from each other.

Table: 4.58

Post hoc‘t’ test on discipline of PG students of teaching learning activities of teaching behavior mean difference with regard to teaching category in difference pairs.

	M1(BTC) (1.50)	M2(CCC) (1.61)	M3(LCI) (1.39)
M1(BTC) (1.50)	-	0.11	0.11
M2(CCC) (1.61)	-	-	0.22
M3(LCI) (1.39)	-	-	-

The post hoc test of mean difference by use of „t‟was adopted to study critical mean difference between different pairs of teaching category. The „t‟values to be significant ,difference of mean scores pair were calculated by multiplying SED (0.019) with 2.59 for 0.01 level (.051) and 1.97 for .05 level (.039) with df 294 respectively. The table of mean pair differences indicated that TLE Practices of PG arts and science teachers category wise revealed that three mean differences were found significant at .01 level. It revealed that cognitive concept centric teaching learning activities mean scores are higher than behaviouristic teacher centric category scores and learner centric innovative category scores of PG arts and science teachers.

Chapter 5

Findings, Implications and Suggestions

The present chapter deals with presentation of major findings objective wise, cross analysis of findings, major highlights on implications of findings and the suggestions for HEIs with policy orientation.

5.1 Findings of the study

5.1.1 Effects of teaching category (behaviouristic , cognitive and constructivist) on self rating TLE Practices of HEI teachers in the context of discipline, level of courses and nature of institutions

5.1.1.1 Effects of discipline and teaching category on self rating TLE Practices of Total HEI teachers

A -The behaviourist / teacher centric TLE Practices is more dominant in both arts and science stream teachers as compared to cognitive/concept centric and constructivist innovative category respectively as per self rating TLE Practices of teachers of HEIs.

B. Discipline as well as teaching category affects TLE Practices in interactive form. The science teachers scored higher than arts teachers on behaviorist / teacher centric and constructivist/ innovative categories respectively whereas both the groups are same on concept centric category as per self rating of teachers of HEIs.

5.1.1.2 Effects of discipline and teaching category on self rating TLE Practices of college teachers

A- The behaviouristic/ teacher centric TLE Practices is more dominant in arts and science stream teachers of college as compared to cognitive/ concept centric and constructivist innovative TLE Practices respectively as per self rating teaching behavior of teachers of colleges.

B- Discipline as well as teaching category affects college teachers‟ behaviour in interactive form. The science teachers and Arts teachers‟ scores are same on behavioristic teaching category. On concept centric category science teachers score is higher than arts teachers‟ scores whereas for constructivist innovative category arts teachers‟ scores were higher than the science teachers‟ scores.

5.1.1.3 Effects of discipline and teaching category on self rating TLE Practices of university teachers

A. The behaviouristic teacher centric category TLE Practices is more dominant in university Arts and Science stream teachers as compared to cognitive concept centric and constructivist innovative category TLE Practices as per self rating teaching behavior of university teachers of HEIs.

B. Discipline as well as teaching category affects university teachers‟ TLE Practices in interactive form. The arts teachers‟ scores are higher than science teachers on behavioristic teaching category and constructivist innovative categories respectively whereas for the cognitive concept centric category science teachers‟ scores are higher than arts teachers‟ scores.

5.1.1.4 Effects of institution and teaching category on self rating TLE Practices of Total HEI arts teachers

A. The behaviouristic teacher centric category TLE Practices is more dominant in university and college arts teachers as compared to cognitive concept centric and constructivist innovative TLE Practices as per self rating teaching behavior of teachers of HEIs.

B. Nature of institutions as well as teaching category affects HEI arts teachers‟ TLE Practices in interactive form. University arts teachers‟ scores are higher than college arts teachers on behavioristic teaching category and constructivist innovative categories respectively whereas for the cognitive concept centric category college arts teachers‟ scores are higher than university arts teachers.

5.1.1.5 Effects of institution and teaching category on self rating TLE Practices of HEI science teachers

A. The behaviouristic teacher centric category TLE Practices is more dominant than cognitive concept centric and constructivist innovative category TLE Practices of university and college science teachers as per self rating teaching behavior of teachers of HEIs.

B. Nature of institution as well as teaching category affects HEI science teachers‟ TLE Practices in interactive form. The college science teachers‟ scores are higher than university science teachers on behavioristic teaching category and cognitive concept centric categories respectively whereas the constructivist innovative category scores were less for college science teachers as compared to university science teachers.

5.1.2 Effect of teaching category on students ratings of TLE Practices of HEI teachers in the context of discipline, level of courses and nature of institutions

5.1.2.1 Effect of level of HE and teaching category on students ratings of TLE Practices of Total HEI arts teachers -

A. The cognitive concept centric TLE Practices is more dominant in university and college arts teachers as compared to constructivist / innovative category and Behaviouristic teacher centric category respectively as per HEI students rating of TLE Practices .

B. Level of HE as well as teaching category affects arts students rating of HEI teachers‟ TLE Practices in interactive form. The teachers teaching UG students scored higher at all the three categories- behaviorist teacher centric, cognitive concept centric and constructivist innovative approach as compared to teachers teaching at PG level.

5.1.2.2 Effect of level of HE and teaching category on students ratings of TLE Practices of college arts teachers -

A. Cognitive concept centric TLE Practices is more dominant in college UG arts and college PG arts teachers as compared to innovative category TLE Practices and Behaviouristic teacher centric category teachers TLE Practices respectively as per student rating of TLE Practices .

B. Level of HE as well as teaching category affects college arts students rating of teachers‟ TLE Practices in interactive form. The college UG teachers‟ scores are higher than PG teachers on behavioristic teaching category and constructivist innovative categories respectively whereas for the cognitive concept centric scores college PG teachers‟ scores are higher than UG teachers.

5.1.2.3 Effect of level of HE and teaching category on students ratings of TLE Practices of university arts teachers -

A. Cognitive concept centric TLE Practices was more dominant in university UG arts and university PG arts teachers as compared to constructivist innovative and Behaviouristic teacher centric TLE Practices respectively as per student rating of TLE Practices of university UG arts and university PG arts teachers.

B Level of HE as well as teaching category affects university arts students rating of teachers‟ TLE Practices in interactive form. The university UG arts teachers‟ scores are higher than PG teachers‟ scores on behavioristic teacher centric, cognitive concept centric and Constructivist innovative categories.

5.1.2.4 Effect of nature of institutions and teaching category on students ratings of TLE Practices of undergraduate arts teachers -

A Behaviouristic teacher centric TLE Practices is more dominant in college UG arts and university UG arts teachers as compared to cognitive concept centric TLE Practices and innovative category TLE Practices respectively as per student rating.

B Nature of institutions as well as teaching category affects arts students rating of UG teachers‟ TLE Practices in interactive form. The university UG arts teachers‟ scores and college UG arts teachers‟ scores are same on behavioristic teaching category. In case of cognitive concept centric category university UG arts teachers‟ scores are higher than college UG arts teachers‟ scores whereas college UG arts teachers‟ scores are higher than university UG arts teachers scores for constructivist innovative categories.

5.1.2.5 Effect of nature of institutions and teaching category on students ratings of TLE Practices of Postgraduate arts teachers -

A Cognitive concept centric TLE Practices is more dominant in university PG arts teachers and college PG arts teachers as compared to constructivist innovative category and Behaviouristic teacher centric TLE Practices respectively as per student rating.

B Nature of institutions as well as teaching category affects postgraduate arts students rating of teachers‟ TLE Practices in interactive form. The college PG arts teachers‟ scores are higher than university PG arts teachers‟ scores on behavioristic teaching category and cognitive concept centric category whereas for constructivist innovative categories university PG arts teachers score is higher than college PG arts teachers‟ scores.

5.1.2.6 Effect of level of HE and teaching category on students ratings of TLE Practices of science teachers -

A. Behaviouristic teacher centric TLE Practices is more dominant in UG science and PG science teachers as compared to cognitive concept centric TLE Practices and innovative category TLE Practices respectively as per student rating.

B. Level of HE as well as teaching category affects science students rating of HEI teachers‟ TLE Practices in interactive form. The teachers teaching UG science students scored higher on behaviorist and constructivist innovative categories but on cognitive concept centric category PG science teachers scored higher than UG science teachers.

5.1.2.7 Effect of level of HE and teaching category on students ratings of TLE Practices of college science teachers

A. Behaviouristic teacher centric category teachers TLE Practices is more dominant in college UG science and college PG science teachers as compared to cognitive concept centric and constructivist innovative category TLE Practices respectively as per student rating.

B. Level of HE as well as teaching category affects college science students rating of teachers‟ TLE Practices in interactive form. The college UG teachers‟ scores are higher than PG teachers on behavioristic teaching category whereas the cognitive concept centric scores are more for college PG science teachers group. Constructivist Innovative category scores are same for both the groups.

5.1.2.8 Effect of level of HE and teaching category on students ratings of TLE Practices of university science teachers

A. Behaviouristic teacher centric TLE Practices is more dominant in university UG science and university PG science teachers as compared to cognitive concept centric and constructivist innovative category TLE Practices respectively.

B. level of HE as well as teaching category affects university science students rating of teachers‟ TLE Practices in interactive form. The university UG science teachers scores and PG science teachers‟ scores on behavioristic teaching category are same. In case of cognitive concept centric category PG science teachers scores are higher than UG science teachers‟ scores whereas UG science teachers score is more than PG teachers on constructivist innovative categories.

5.1.2.9 Effect of nature of institutions and teaching category on students ratings of TLE Practices of undergraduate science teachers

A Behaviouristic teacher centric TLE Practices scores are higher than innovative category and cognitive concept centric TLE Practices scores respectively as per student rating of TLE Practices of college UG science and university UG science teachers. The cognitive concept centric category TLE Practices is not significantly different from constructivist innovative TLE Practices of college UG science and university UG science teachers.

B Nature of institutions as well as teaching category affects UG science students rating of teachers‟ TLE Practices in interactive form. The university UG science teachers scores are higher than scores of college UG science teachers‟ on all the three categories i.e. behavioristic teacher centric, cognitive concept centric and constructivist innovative.

5.1.2.10 Effect of nature of institutions and teaching category on students ratings of TLE Practices of postgraduate science teachers

A. Behaviouristic teacher centric TLE Practice is more dominant in college PG science and university PG science teachers as compared to cognitive concept centric and constructivist innovative category TLE Practices respectively as per student rating.

B. Nature of institutions as well as teaching category do not affects postgraduate science students rating of teachers‟ TLE Practices in interactive form. The university PG science teachers scores are higher than scores of college PG science teachers‟ on all the three categories i.e. behavioristic teacher centric, cognitive concept centric and constructivist innovative.

5.1.2.11 Effect of discipline and teaching category on students ratings of TLE Practices of undergraduate teachers

A. The Behaviouristic teacher centric TLE Practices is more dominant in UG arts and UG science teachers as compared to cognitive concept centric and constructivist innovative category TLE Practices scores respectively.

B. Discipline as well as teaching category affects UG students rating of HEI teachers‟ TLE Practices in interactive form. The teachers teaching UG arts students scored higher on all the three categories i.e. behaviorist teacher centric, cognitive concept centric category and constructivist innovative approach than teachers teaching UG science students.

5.1.2.12 Effect of discipline and teaching category on students ratings of TLE Practices of postgraduate teachers

A. Cognitive concept centric TLE Practices is more dominant in PG arts and PG science teachers as compared to innovative category and Behaviouristic teacher centric category as per student rating of TLE Practices.

B. Discipline as well as teaching category affects PG students rating of HEI teachers‟ TLE Practices in interactive form. The teachers teaching PG science students scored more at behaviorist teacher centric category as compared to teachers teaching PG arts students whereas the scores for cognitive concept centric category and constructivist innovative approach was higher for PG arts teachers as compared to PG science teachers.

5.1.2.13 Effect of discipline and teaching category on students ratings of TLE Practices of college UG teachers

A. Behaviouristic teacher centric category TLE Practices is more dominant in UG arts and UG science teachers of colleges as compared to cognitive concept centric and constructivist innovative category TLE Practices respectively as per student rating.

B. Discipline as well as teaching category affects college UG students rating of teachers‟ TLE Practices in interactive form. The college teachers teaching UG arts students scored higher on all the three categories i.e. behaviorist teacher centric, cognitive concept centric category and constructivist innovative approach than college teachers teaching UG science students.

5.1.2.14 Effect of discipline and teaching category on students ratings of TLE Practices of college PG teachers

2. 14.A. Cognitive concept centric teacher TLE Practices is more dominant in college PG arts and college PG science teachers as compared to constructivist innovative and behaviouristic teacher centric category respectively as per student rating of TLE Practices.

B. Discipline as well as teaching category affects college PG students rating of teachers‟ TLE Practices in interactive form .The college PG science teachers scored higher than college PG arts teachers on behaviorist teacher centric category whereas on cognitive concept centric category college PG arts teachers‟ scores are higher than college PG science teachers. The scores are same on constructivist innovative category for both groups.

5.1.2.15 Effect of discipline and teaching category on students ratings of TLE Practices of university UG teachers

A. Behaviouristic teacher centric TLE Practices is more dominant in university UG arts and university UG science teachers as compared to cognitive concept centric and constructivist innovative category TLE Practices respectively as per student rating.

2.15. B Discipline as well as teaching category affects university UG students rating of teachers‟ TLE Practices in interactive form. The university UG arts teachers‟ scores are higher than UG science teachers‟ scores on behavioristic teaching category and cognitive concept centric category whereas UG science teachers‟ scores are higher than UG arts teachers‟ scores on constructivist innovative category.

5.1.2.16 Effect of discipline and teaching category on students ratings of TLE Practices of university PG teachers

2.16.A Cognitive concept centric TLE Practices is more dominant in university PG arts and university PG science teachers as compared to constructivist innovative category and Behaviouristic teacher centric category TLE Practices respectively as per student rating..

2.16.B Discipline as well as teaching category affects university PG students rating of teachers‟ TLE Practices in interactive form. The university PG science teachers‟ scores are higher than PG arts teachers scores on behavioristic teaching category and cognitive concept centric category whereas for constructivist innovative category university PG arts teachers‟ scores are higher than PG science teachers scores.

5.1.3 Effect of teaching category on classroom TLE Practices of HEI teachers in the context of level of HE and discipline (as per researcher observation)

5.1.3.1 Effect of level of HE and teaching category on classroom TLE Practices of HEI arts teachers

A. The Behaviouristic teacher centric category TLE Practices is more dominant in both PG and UG arts teachers than constructivist innovative category and cognitive concept centric TLE Practices as per researcher observation of HEIs.

B Level of HE as well as teaching category do not affects undergraduate arts teachers TLE Practices in interactive form as per researcher observation. PG arts teachers scores are higher than UG arts teachers‟ on behavioristic teacher centric and constructivist innovative category whereas UG arts teachers scores are higher than PG arts teachers‟ on cognitive concept centric category.

5.1.3.2 Effect of level of HE and teaching category on classroom TLE Practices of HEI science teachers

A. Behaviouristic teacher centric category TLE Practices are more dominant in both PG and UG science teachers than cognitive concept centric and constructivist innovative category TLE Practices. Cognitive concept centric category TLE Practices was not different from Constructivist innovative TLE Practices of UG and PG science teachers of HEI as per researcher observation.

B Level of HE as well as teaching category affects HEI science teachers TLE Practices in interactive form as per researcher observation. It can be noticed that the PG science teachers scores are higher than UG science teachers‟ scores on behavioristic teacher centric category and cognitive concept centric category whereas UG science teachers scores are higher than scores of PG science teachers scores on constructivist innovative category.

5.1.3.3 Effect of discipline and teaching category on classroom TLE Practices of HEI - UG teachers

3.3.A The Behaviouristic teacher centric category TLE Practices is more dominant in arts and science subject teachers teaching UG classes than cognitive concept centric and constructivist innovative category TLE Practices as per researcher observation of HEIs.

3.3.B Discipline as well as teaching category do not affects undergraduate teachers TLE Practices in interactive form as per researcher observation. UG science teachers scores and UG arts teachers‟ scores are same on behavioristic teacher centric category. For cognitive concept centric and constructivist innovative category UG science teachers score is higher than UG arts teachers score.

5.1.3.4 Effect of discipline and teaching category on classroom TLE Practices of HEI - PG teachers

A The Behaviouristic teacher centric category TLE Practices is more dominant in arts and science subject teachers teaching PG classes than cognitive concept centric and constructivist innovative category TLE Practices as per researcher observation of HEIs.

B Discipline as well as teaching category affects PG teachers TLE Practices in interactive form as per researcher observation. The PG science teachers scores are higher than PG arts teachers‟ scores on behavioristic teacher centric category and cognitive concept centric category whereas PG arts teachers scores are higher than scores of PG science teachers scores on constructivist innovative category.

5.1.4 Effect of Teaching category on TLE activities in the context of discipline and Level of HE (Based on Interview of students)

5.1.4.1 Effect of level of HE and Teaching category on TLE activities of arts subjects teachers

A. The cognitive concept centric TLE activities are more dominant in UG and PG arts teachers than Behaviouristic teacher centric and constructivist innovative TLE activities as per students response in interview.

.B Level of HE as well as teaching category do not affects UG and PG arts teachers TLE activities in interactive form as per interview response of students. UG arts teachers scores are higher than PG arts teachers scores on all the three categories i.e. behavioristic teacher centric, cognitive concept centric and constructivist innovative.

5.1.4.2 Effect of level of HE and Teaching category on TLE activities of science subjects teachers

A. The cognitive concept centric TLE activities are more dominant in UG and PG science teachers than Behaviouristic teacher centric and constructivist innovative TLE activities as per students response in interview.

B. Level of HE as well as teaching category do not affects UG and PG science teachers TLE activities in interactive form as per students‟ response on interview. PG science teachers‟ scores are higher than UG science teachers scores on all the three categories i.e. behavioristic teacher centric, cognitive concept centric and constructivist innovative,

5.1.4.3 Effect of discipline and Teaching category on TLE activities of UG teachers

A. The cognitive concept centric TLE activities are more dominant in UG arts and science teachers than behaviouristic teacher centric category scores and constructivist innovative TLE activities of UG arts and science teachers as per students response in interview.

B. Discipline as well as teaching category do not affects UG arts and science teachers teaching-learning activities in interactive form as per interview of students. UG arts teachers scores are higher than UG science teachers scores on all the three categories i.e. behavioristic teacher centric, cognitive concept centric and constructivist innovative.

5.1.4.4 Effect of discipline and Teaching category on TLE activities of PG teachers

4.4.A The cognitive concept centric TLE activities are more dominant in PG arts and science teachers than Behaviouristic teacher centric category and constructivist innovative TLE activities of teachers as per students response in interview.

4.4.B Discipline as well as teaching category do not affects PG teachers teaching-learning activities in interactive form as per interview of students. PG arts teachers scores are higher than PG science teachers scores on all the three categories i.e. behavioristic teacher centric, cognitive concept centric and constructivist innovative.

5.2 Cross analysis of Major findings of the study

Table 5.1

Findings on HEI Arts subject TLE Practices according to teachers' self rating, students rating and observers' rating

S. No.	Rating of HEI arts teacher behaviour by respondents	Most Prominent	Prominent	Less Prominent
1	Teachers' self Rating	Behaviouristic Teacher Centric	Cognitive Concept Centric	Constructivist Innovative
2	Student's Rating	Cognitive Concept Centric	Constructivist Innovative	Behaviouristic Teacher Centric
3	UG Arts Students Rating	Behaviouristic Teacher Centric	Cognitive Concept Centric	Constructivist Innovative
4	PG Arts Students Rating	Cognitive Concept Centric	Constructivist Innovative	Behaviouristic Teacher Centric
5	Observers' Rating	Behaviouristic Teacher Centric	Constructivist Innovative	Cognitive Concept Centric

The Behaviouristic/teacher centric TLE Practices is found to be most prominent in HEI arts' subject teachers as per teachers' self rating, UG arts students ratings as well as observers' ratings whereas according to students rating and PG students rating cognitive concept centric TLE Practices is most prominent among arts teachers.

The innovative learner centric TLE Practices has been found neglected among arts teachers of HEI as per teachers self rating and researcher"s observation. It reveals that among HEI arts teachers constructivist innovative learners centric teaching TLE Practices have not been promoted in the NAAC rated high quality institution.

Table 5.2 Findings on HEI Science Subject TLE Practices according to teachers' self rating, students rating and observers rating

S. No.	Rating of HEI Science teacher behaviour by respondents	Most Prominent	Prominent	Less Prominent
1	Teachers' self Rating	Behaviouristic Teacher Centric	Cognitive Concept Centric	Constructivist Innovative
2	Students' Rating	Behaviouristic Teacher Centric	Cognitive Concept Centric	Constructivist Innovative
3	UG Science Students Rating	Behaviouristic Teacher Centric	Constructivist Innovative	Cognitive Concept Centric
4	PG Science Students Rating	Behaviouristic Teacher Centric	Cognitive Concept Centric	Constructivist Innovative
5	Observers' Rating	Behaviouristic Teacher Centric	Cognitive Concept Centric	Constructivist Innovative

The Behaviouristic teacher Centric TLE Practices is found to be most prominent in HEI science subject teachers as per teachers' self rating, students' rating, UG & PG students ratings and observers' rating. It is followed by the average rating of cognitive concept centric teaching TLE Practices by teachers, students and observer except UG level science students who rated constructivist teaching behaviour as average.

The constructivist/learner centric innovative TLE Practices has been found neglected among science teachers in ratings of teachers, students and the observers. It reveals that among HEI science teachers constructivist/ learner centric innovative TLE Practices have not been promoted in the NAAC rated high quality institutions.

Table 5.3 Findings on HEI College level TLE Practices according to teachers self rating, students rating and observers rating

S. No.	Rating of College teacher behaviour by respondents	Most Prominent	Prominent	Less Prominent
1	Teachers' self Rating	Behaviouristic Teacher Centric	Cognitive Concept Centric	Constructivist Innovative
2	College UG Students	Behaviouristic Teacher Centric	Cognitive Concept Centric	Constructivist Innovative
3	College PG Students	Cognitive Concept Centric	Constructivist/ Innovative	Behaviouristic Teacher Centric
4	College Science Students	Behaviouristic Teacher Centric	Cognitive Concept Centric	Constructivist Innovative
5	College Arts Students	Cognitive Concept Centric	Constructivist/ Innovative	Behaviouristic Teacher Centric

This has been noted that at college level the teachers and students gave high rating to projection of Behaviouristic dimensions of teaching TLE Practices. This has been found most prominent as per ratings of college level UG students, especially in science subject areas. The constructivist learner centric TLE Practices has been found neglected in the ratings of teachers and students of colleges especially in UG level and science subject areas. The cognitive concept centric teaching TLE Practices has got average rating by college teachers and students except at PG level.

Table 5.4 Findings on HEI University level TLE Practices according to Teachers self rating, students rating and observers rating

S. No.	Rating of University teachers' TLE Practices by respondents	Most Prominent	Prominent	Less Prominent
1	Teachers' self Rating	Behaviouristic Teacher Centric	Cognitive Concept centric	Constructivist Innovative
2	University UG Students	Behaviouristic Teacher Centric	Cognitive Concept centric	Constructivist Innovative
3	University PG Students	Cognitive Concept Centric	Constructivist Innovative	Behaviouristic Teacher Centric
4	University Science Students	Behaviouristic Teacher Centric	Cognitive Concept centric	Constructivist Innovative
5	University Arts Students	Cognitive Concept Centric	Constructivist Innovative	Behaviouristic Teacher Centric

This has been noticed that at university level the teachers and students gave high rating to projection of behavriouristic dimensions of teaching TLE Practices. This has been found most prominent as per ratings of university level UG students especially in science subject areas.

The constructivist learner centric TLE Practices has been found neglected in the ratings of teachers and students of university especially in UG level and science subject areas. University PG students and arts subject students rated constructivist- Innovative TLE Practices as average while UG students, science subject students and university teachers gave average ratings to cognitive concept centric TLE Practices.

Table 5.5 Findings for HEI UG and PG level TLE Practices according to teachers self rating, students rating and observers' rating

S. No.	Rating of Teacher TLE Practices by respondents in the context of level of HE (UG & PG)	Most Prominent	Prominent	Less Prominent
1	HEI Teachers (Total UG & PG) self Rating	Behaviouristic Teacher Centric	Cognitive Concept Centric	Constructivist/ Innovative
2	HEI PG Students	Cognitive Concept Centric	Constructivist Innovative	Behaviouristic Teacher Centric
3	HEI UG Students	Behaviouristic Teacher Centric	Cognitive Concept Centric	Constructivist innovative
4	Observers' Ratings for UG Classes	Behaviouristic Teacher Centric	Cognitive Concept Centric	Constructivist Innovative
5	Observers' Rating for PG Classes	Behaviouristic Teacher Centric	Cognitive Concept Centric	Constructivist/ Innovative

The Behaviouristic teacher centric TLE Practices is found to be most prominent in HEI teachers both in UG and PG teachers' self rating, UG students rating and observers' ratings for UG and PG classes except PG level students ratings who rated cognitive concept centric TLE Practices as prominent.

The cognitive concept centric TLE Practices was rated average except PG students average rating to learner centric TLE Practices. The constructivist-innovative/ learner centric TLE Practices has been found neglected among HEI teachers as per UG & PG teachers self rating, UG and PG students ratings and researcher observation of UG and PG classes. It reveals that among HEI teachers constructivist/ innovative learner centric teaching TLE Practices have not been promoted in the NAAC rated high quality institution.

5.3 Highlights on the major Findings of the study and Implications for quality enhancement of Teaching Learning and Evaluation process of HEIs

5.3.1 Role of HEIs in Internal Quality Enhancement Mechanism on Teaching learning process:

This is a matter of great concern that the NAAC did not take into cognigence the process dimensions of teaching learning and evaluation of HEIs. The Internal Quality Assurance Cell (IQAC) are established in each NAAC accredited HEI. The findings of the present study hint at lack of serious involvement of IQAC in promoting Innovative leaner participatory approaches in teaching learning system of HEIs. This is implied that IQAC must involve stakeholders on decision making of quality oriented teaching learning system. It must identity the curricular objectives which demand constructivist learner oriented curricular transaction approaches in each programme at UG and PG level. Such activities must form integral component of Quality initiatives of HEIs.

Orienting teachers on such areas, developing handbooks for teachers, monitoring innovative practices, assessing their impact and recognising worthy innovative practices by the teachers must be continuous function of IQAC. Moreover, reporting the innovative practices and disseminating the results of such practices to other teachers and institutions can establish quality culture in the HEIs. The IQAC must focus on planning implementing and monitoring innovative teaching learning and evaluation practices. The experiences must be disseminated to that teachers of the own institutions through suitable networking and collaboration strategies.

5.3.2 Leadership orientation to Innovative teaching learning practices.

Autonomy of institutions and teachers in curriculum design and innovative teaching learning programmes must be encouraged through institutional leaders. Open and creative academic climate of HEIs must be promoted and nurtured by leaders of the institution. Their commitment to quality need to be reflected in collaborative functioning of academia at institution level. Moreover giving autonomy to generate learning resources, provision of available, resources support to teachers, encouraging collaborative institutional projects and sharing of resources, exchange programmes of teachers, learner participation projects, group based

innovative learning practices, encouraging students participation in academic decision making etc. can be possible only when leadership is prone to such features of quality orientation.

There should be provisions for encouraging teachers and students to initiate and implement innovative programmes at different course level. This must be considered for professional development measures of teachers as well as assessment of learners in different courses. Suitable leadership can make it a part of institution culture by promoting autonomy among teachers and students of HEIs.

5.3.3 Curriculum for Teacher Development Programme on Teaching Learning System

The study revealed that teaching learning and evaluation at HEIs cutting across the institution level, discipline and stages of higher education is mostly dominated by traditional teacher centric and content centric TLE Practices of HEI teachers. Quality Higher education institutions have not paved the way for learner centric constructivist models of teaching learning and evaluation. Teaching at HEI stage cannot be left to experiential exposition of teachers having least concern for pedagogical principles. Teaching learning at formal institutions must be integrated with theoretical background of teaching learning and development.

The teachers TLE Practices not related to pedagogical principles may create hindrance in achievement of objectives of higher education programmes. In this context, It is imminent to introduce formal teacher development courses on pedagogical principles and applications at HEIs. Teacher inputs quality is directly linked with teaching process and learning outcome of students. Hence, this is high time to educate the teachers of HEIson pedagogical principles and practices. As a whole, the behaviouristic teacher centric practices dominate arts subject teaching in universities as well as colleges. The innovative learner centric practices are negligible everywhere.

5.3.4 Arts Teachers orientation: The findings of the study in the context of disciplines indicate that the science stream teachers are higher than that of their Arts streams teacher counterparts on teacher centric as well as learner centric teaching learning evaluation dimensions.

1. This implies that the arts teachers need to be oriented more on learner centric innovative teaching learning practices.

This has been noticed that the Arts teachers are less prone to learner centric innovative approaches at university as well as college level. Hence, irrespective of institutional background their acquaintance with innovative practices is called for on priority basis. Of course, with regard to differences obtained on institutional effect on concept oriented teaching the university arts teachers are lagging behind their college level counterparts.

2. The university arts teachers‟ orientation is also essential on concept oriented teaching learning practices.

5.3.5 Science Teachers orientation

The college level science teachers are lagging behind their university level counterparts on learner centric innovative practices.

3. Special emphasis be laid on orientation of evaluation practices in science teaching.

5.3.6 University teachers' orientation- The University teachers teaching were of highly Behaviouristic and cognitive nature than that of their college teacher counterparts .However their no differences on constructivist, innovative and learner centric teaching practices. It indicates low level innovations in HEIs irrespective of their institutional status. Teachers of all the categories of HEIs need orientation on this domain.

5.3.7 College teachers' orientation:

At college level, the arts teachers were more dominated by learner centric teaching learning practices than that of their science teacher counterparts, even though the Behaviouristic factors dominated both group teachers TLE Practices. The science teachers of colleges were predominant in concept oriented teaching than that of their arts counterparts.

It is imperative that the college level science teachers need specific orientation on learner centric innovative practices, whereas their arts counterparts need high orientation on concept based cognitive approaches of teaching learning and evaluation.

5.3.8 PG teachers' orientation:

The students perception revealed that the UG level teachers teaching learning practices in all the three domains of teaching were higher than that of their PG level teachers performance.

- As per students findings it is imperative that the university teachers‟ orientation on teaching learning and evaluation is more imminent.
- As per student perception in general the science teachers at PG level are lagging behind their Arts counterparts on innovative practices, hence they need special orientation on learner centric innovative teaching learning and evaluation practices.

5.3.9 PG college teachers' orientation:

- As per students perception, the college level PG science teaching were lagging behind their Arts counterparts on cognitive concept orientation practices. Therefore, college level PG science teachers need more acquaintance with cognitive orientation of teaching learning and evaluation.

5.3.10 UG Arts teachers' orientation:

The students perceived college level UG arts teachers were lagging behind their UG science counterparts on innovative teaching learning and evaluation practices. The UG arts teachers need special orientation on innovative teaching learning and evaluation practices.

5.3.11 University PG teachers' orientation:

The university level PG teacher teaching learning practices were lagging behind their UG teacher counterparts on different domains of teaching as per students‟ perception. It implies that the university level PG teachers be more sensitive to teaching, with special reference to constructivist innovative and cognitive of teaching learning evaluation system.

5.3.12 University PG Science teachers' orientation:

As per students perception, special attention should be paid to orientation of PG level science teachers orientation on innovative teaching learning practices as per their poor performance in this domain than that of their UG level counterparts.

5.4 Implications on classroom teaching learning practices observation and interviews with students: The observation indicates that the learner centric he practices in Arts and science subjects prevailed cutting across UG and PG level. Of course, the findings were more proved towards concept oriented teaching learning evaluation practices. Such findings did not corroborate large scale questionnaire surveys.

The common findings emerge that in none of the categories of teachers (discipline wise, stage wise and institution wise) the NAAC best rated institutions gave priority to learner oriented constructivist teaching learning evaluation practices. Special attention be given to this domain of teaching cutting across disciplines, level of programmes and level of institutions.

5.5 Implications on Curriculum reform in HEI programmes:

Innovations in teaching learning and evaluation practices reflect on curriculum quality. Curricular objectives of HEIs irrespective of institutional and discipline background demand learner centric innovative teaching learning practices in different programmes. There must be explicit statements on high order objectives of Cognitive, Affective and Skill domains and linking them with different kinds of constructive, learner centric innovative teaching learning and evaluation practices in different programmes cutting across different disciplines. Curriculum developers must be oriented about such aims and objectives promoting innovative teaching learning and evaluation practices.

Academic Autonomy must be encouraged at institutional level through involvement of stakeholders in decision making on curricular objectives curriculum transaction strategies at college and university level. The poor status of best rated HEIs by NAAC regarding innovative teaching learning process indicates lack of orientation of curriculum developers and teachers on the core issues of innovative curriculum transaction and evaluation. The must be provision for academic deliberations among stakeholders on curriculum objectives and curriculum transaction strategies involving innovative teaching learning practices in the HEIs.

5.6 Implications for workplace based Professional development programmes of teachers of HEIs

The workplace based professional development programmes should be supported by HEIs with a view to introduce need based innovative teaching learning practices in different courses. Teachers must be encouraged to undertake problem specific curriculum transaction projects in the context of curricular objectives, course context and learners involvement learner participation based activities need to be planned through co-operative efforts of teachers, students and the institution. Resource centre based teaching learning practices can be implemented on the basis of scientific principles and humanistic experiences. Teachers participatory efforts at department level be incorporated as a strategy of professional development of teachers of HEIs. The general orientation courses and subject specific refresher

courses must have pedagogic components and scope for sharing experiences on innovative teaching learning practices by the practitioner teachers of HEIs.

The subject specific and institution specific professional development programmes must be supported by the Institutional authorities, UGC and other agencies with a view to enable teachers to make context specific efforts for innovations in teaching learning system at institutional level on continuous basis. There is a prime need to empower HEI teachers to link day to day teaching with constructive, learner oriented creative teaching learning and evaluation strategies. Teacher research must be considered as an integral component of quality teaching at HEIs. Collaborative and participatory action research projects must be encouraged as a component of professional programmes.

5.7 Implications for ICT based orientation on Innovative teaching practices at HEIs.

There have been formal programmes for orienting teachers through ICT mode. There is a need to develop innovative models of teaching practices to be disseminated amongst teachers of HEIs. The data base on teaching should be created for collecting case studies on Innovative practices. Sharing the experiences of such practices by innovative teachers, study on impact of such practices on learning outcome of students, institution based innovations and learning environment etc. can be presented on a portal for open access of teachers. The platform must be created for promotion of innovative programmes for teachers‟ of HEIs. Continuous interaction of teachers must be sustained through ICT platform on teaching.

Networking of institutions on sharing institutional practices must be promoted at national as well as global level. It needs planned efforts of national bodies like UGC, NAAC,CEC, IGNOU and University system. The role of teacher education institutional on development suitable academic programmes for MOOC must be well appreciated. The formal attendance of teacher orientation programmes has marginal linkage with teachers teaching competencies and innovative teaching practices in real situations. Moreover no follow up is made to motivate innovative teachers of HEIs by organisations like Universities and UGC. This is high time to promote ICT based teacher development programmes on competency development of teachers of HEIs on constructive curriculum and innovations in teaching learning and evaluation process.

5.8 Suggestions:

On the basis of above presentation on implications of the findings, the following suggestions are highlighted:

1. It is imminent to introduce formal teacher development courses on pedagogical principles and applications at HEIs.
2. The arts teachers need to be oriented more on learner centric innovative teaching learning practices.
3. The university arts teachers‟ orientation is also essential on concept oriented teaching learning practices
4. Special emphasis be laid on orientation of evaluation practices in science teaching
5. The college level science teachers need specific orientation on learner centric innovative practices, whereas their arts counterparts need high orientation on concept based cognitive approaches of teaching learning and evaluation.

6. As per students findings it is imperative that the university teachers‟ orientation on teaching learning and evaluation is more imminent.
7. As per student perception in general the science teachers at PG level are lagging behind their Arts counterparts on innovative practices, hence they need special orientation on learner centric innovative teaching learning and evaluation practices.
8. Therefore, college level PG science teachers need more acquaintance with cognitive orientation of teaching learning and evaluation.
9. The UG arts teachers need special orientation on innovative teaching learning and evaluation practices.
10. The university level PG teachers be more sensitive to teaching, with special reference to constructivist innovative and cognitive of teaching learning evaluation system.
11. Special attention should be paid to orientation of PG level science teachers orientation on innovative teaching learning practices as per their poor performance in this domain than that of their UG level counterparts
12. Constructivist teaching learning evaluation practices. Special attention be given to this domain of teaching cutting across disciplines, level of programmes and level of institutions.
13. IQAC must involve stakeholders on decision making of quality oriented teaching learning system. It must identity the curricular objectives which demand constructivist learner oriented curricular transaction approaches in each programme at UG and PG level.
14. There is a prime need to empower HEI teachers to link day to day teaching with constructive, learner oriented creative teaching learning and evaluation strategies. Teacher research must be considered as an integral component of quality teaching at HEIs.
15. The data base on teaching should be created for collecting case studies on Innovative practices. Sharing the experiences of such practices by innovative teachers, study on impact of such practices on learning outcome of students, institution based innovations and learning environment etc.
16. ICT based teacher education needs planned efforts of national bodies like UGC, NAAC, CEC, IGNOU and University system.

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Appendices

Appendix-I

Teacher Behavior Self Reflection Inventory

(TBSRI)

P.K.Sahoo & D.Yadav
Department of Education
University of Allahabad

Name ……..……..M/F…….
Subject…… Faculty……
University/College……
Address ……

Dear Sir/Madam,

You are a teacher of higher education institution and you go to class to teach the subject knowledge. You teach with various class behaviors which impact on your students learning. Behavior of teachers demonstrate in various task like- inductive, deductive, inquiry, memory, information processing, advance organizer, constructive, creative thought, feedback, simulation, questioning, body language, narration, students participation, dramatization, classroom management etc. In this inventory all items have prepared on the bases of above dimensions with two points i.e. yes and No. Each item read carefully and put the tick ( ) on front of items in column yes or No which you understand best for your side. These item neither right nor wrong and this is not your test also, that is why without any hesitations you give the response on all items. Your information will have kept confidential and this will use only for research purpose.

Please start your response.

Teacher Self Rating of Teaching Behaviour

S.N.	ITEM	Highly Agree	Agree	Least Agree
1	I would like to engage students to collect relevant information (data) from various sources related to the topic.			
2	I would like to help students to arrive at hypothesisation on different problems			
3	I would like to explain with examples for creating their independent thinking.			
4	I would like to engage students to explain the causes by applying existing principles/ laws of concerning phenomenon.			
5	I would like to create problematic situation in front of students and engage them to explore the causes.			
6	I would like to give opportunity to students for expression their thoughts.			
7	I would like to help students by linking new concept with known words/associated names.			
8	I would like to use analogies to see familiar things in unfamiliar way to develop new understanding.			
9	I would like to provide study materials to students to identifying defining attributes.			
10	I would like to prompt student‘s awareness to act on problematic situation.			
11	I would like to make presentation of learning material in logical order.			
12	I would like to use principles of integration of ideas.			
13	I would like to familiar with learner in term of language and ideas.			
14	I would like to discuss on ideas by organizing learning material/ lecture/ photos/ videos etc.			
15	I would like to anchor new learning material to strengthen existing cognitive structure of students.			
16	I would like to interact with students to identify the set of ideas present in study material.			
17	I would like to ask to students for difference between different aspects of concept.			
18	I would like to create life-like situation related to issues and problems to be tackled by students.			
19	I would like to encourage students to work with heterogeneous group.			
20	I would like to encourage student’s prior knowledge based discussion in class.			
21	I would like to motivate students to reflect on own ideas.			
22	I would like to encourage students for generating own ideas while			

	listening to others' ideas.			
23	I would like to provide opportunity to students to compare their ideas with that of other students/teachers and expert ideas.			
24	I would like to guide students for preparing action plan and work on them.			
25	I would like to supply resources/feedback/vocabulary to remove the misconception and clarify them.			
26	I would like to guide students to formulate hypothesis on problematic issues.(repeat)			
27	I would like to give emphasis to evidence based investigation.			
28	I would like to ask students to describe and share self experiences/events as they exist now in concern content.			
29	I would like to encourage verities of ideas in open manner in class.			
30	I would like to give feedback to students for improving their performance.			
31	I would like to create simulation situation hypothetically in problematic form.			
32	I would like to interact with students for remedial suggestions.			
33	I would like to put students in a situation to play the role with a view to attain a clear understanding.			
34	I would like to ask questions for developing content during teaching.			
35	I would like to give prompts to seek proper response of students.			
36	I would like to ask questions for checking and further clarifications.			
37	I would like to give appropriate beginning statement for start the topic.			
38	I would like to give appropriate concluding remark for close the topic.			
39	I would like to do movement, gesture and posture during the teaching.			
40	I would like to change in interaction pattern during teaching.			
41	I would like to engage students for physically participation in various activities.			
42	I would like to use vice modulation while communicating the content in classroom teaching.			
43	I would like to use appropriate language while teaching the content.			
44	I would like to use all types of reinforcement to motivate the student's responses.			
45	I would like to allow to students for interaction in class with verity of modes as teacher-class, as teacher – student, as student-student.			
46	I would like to take care of synchronization of voice and gestures during teaching.			
47	I would like to prefer either monologue or dialogue during class teaching.			
48	I would like to prefer conversational language during teaching.			
49	I would like to teach with rapport of students and call students by their name.			
50	I would like to follow classroom norms during teaching.			
51	I would like to give clear direction/ information to the students.			
52	I would like to manage the electronic gadgets according to content needs.			

Teacher Self Rating of Teaching Behaviour

Cognitive	Behaviouristic	Constructivist
1,2,3,9,15,16,17,27,34	7,8,11,12,13,14,20,21, 25,26,31,32,35,36-52	4,5,6,10,18,19,22,23,24,28,29,33.

Appendix-II

Higher Education Teacher Behavior Scale

For students.

(HETBS)

P.K.Sahoo & D.Yadav
Department of Education
University of Allahabad

Name …….UG/PG……..M/F……
Class…… Faculty……
Subject……..
University/ College …….
Address ……

Dear Student,

You are a student of higher education institution and you go to class to learn the subject knowledge. Your teachers teach you with various class behaviors which impact on your learning. Behavior of teachers demonstrate in various task like- inductive, deductive, inquiry, memory, information processing, advance organizer, constructive, creative thought, feedback, simulation, questioning, body language, narration, students participation, dramatization, classroom management etc. In this scale all items have prepared on the bases of above dimensions with three points i.e. ALWAYS, SELDOM and NEVER. Each item read carefully and put the tick ( ) on front of items in column always or seldom or never which you understand best for your side. These item neither right nor wrong and this is not your test also, that is why without any hesitations you give the response on all items. Your information will have kept confidential and this will use only for research purpose.
Please start your re

Students Rating of Teacher Behaviour

S.N.	ITEM	ALWAYS	SOMETIME	LEAST
1	Teacher engages you to collect relevant information (data) from various sources, concerning the course.			
2	Teacher engages you for thinking about attributes of a concept in during teaching.			
3	Teacher encourages you explain the causes of any even by applying existing theory/principles/law/rule in concerning issues.			
4	Teacher engages you to explore the causes of any problem by using discourse and literature study.			
5	Teacher engages you to analyze the content/ data from various sources.			
6	Teacher gives opportunity you to do practice of skill for sustaining long term recall.			
7	Teacher helps you by link the new concept with known concept.			
8	Teacher helps you to remember abstract concept by encouraging to linking appropriate visuals and symbols.			
9	Teacher helps you to explore the phenomenon by using alternatives means.			
10	Teacher provides study material to you to identify/ defining attributes/ facts etc.			
11	Teacher uses context specific examples in particular order during classroom teaching.			
12	Teacher prompts your awareness to act on problematic situation.			
13	Teacher organizes the ideas explicitly of content matter for you during classroom teaching.			
14	Teacher makes presentation of content material in systematic/ logical order for you during classroom teaching.			
15	Teacher uses principles of ideas in the concerned content for you during classroom teaching.			
16	Teacher discuss with your group to identify the set of ideas present in the content material.			
17	Teacher asks you to summarize the content which wastaught.			
18	Teacher seeks your response on linkage of supplied learning material with concepts.			
19	Teacher creates life-like situation on related issues and problems.			
20	Teacher encourages you to work in small heterogeneous group.			
21	Teacher encourages you to link your experiences with the topic/ lesson for discussion.			
22	Teacher motivates you to explain the thought on different ideas.			
23	Teacher encourages you to record relevant point and make presentation accordingly.			
24	Teacher gives you opportunity to listen to others ideas and make			

	reflection on them.			
25	Teacher guides you to prepare action plan of project/topic/lesson.			
25	Teacher supplies resources to remove the misconception.			
26	Teacher guides you to formulate hypothesis on problematic issues.			
27	Teacher gives emphasis to evidence based investigation.			
28	Teacher asks you to describe and share your experiences/events as they exist now in concern content.			
29	Teacher encourages verities of ideas in open manner in class.			
30	Teacher gives you feedback to improve your performance.			
31	Teacher motivates your classmates to give feedback on your performance.			
32	Teacher creates simulation situation hypothetically in problematic form.			
33	Teacher interacts with you for remedial suggestions.			
34	Teacher puts you in a situation to play the role with a view to attain a clear understanding.			
35	Teacher asks questions for developing content during teaching.			
36	Teacher gives prompts to seek proper response of students.			
37	Teacher asks questions for checking and further clarifications.			
38	Teacher gives appropriate beginning statement for start the topic.			
39	Teacher gives appropriate concluding remark forclose the topic.			
40	Teacher's movement, gesture and posture are appropriate during the teaching.			
41	Teacher changes interaction pattern during teaching.			
42	Teacher engages students physically for participation in various activities.			
43	Teacher uses voice modulation while communicating the content in classroom teaching.			
44	Teacher uses appropriate language while teaching the content.			
45	Teacher uses all types of reinforcement to motivate the student's participation in teaching learning.			
46	Teacher allows students for interaction in class with verity of modes ; teacher-class, as teacher – student, as student-student.			
47	Teacher takes care of synchronization of voice and gestures during teaching.			
48	Teacher prefers either monologue or dialogue during classteaching ?			
49	Teacher prefers conversational language during teaching.			
50	Teacher teaches with rapport and call students by their name.			
51	Teacher follows classroom norms during teaching.			
52	Teacher gives clear direction/ information to the students.			
53	Teacher mange the electronic gadgets according to content needs.			

	Students Rating of Teacher Behaviour			
	Cognitive – 1,2,3,5,10,13,18,24,26,35 **Behaviouristic- 6,7,8,11,12,14,15,23,25,30,31,32,33,36 to53** **Constructivist- 9,16,17,19, 20, 21, 22, 25, 27, 28,29**			

Appendix-III

Teaching Behaviour Observation Scale for Researchers

		Often	Seldom	Never
1.	Teacher uses the trigger to introduce new topic.			
2.	Teacher engages student to participate in group activities and co-operative task.			
3.	Student expresses their views freely in discussion session.			
4.	Teacher makes proper use of white/blackboard during the lecture			
5.	Teacher uses the LCD projector for presentation of PPT during the lecture.			
6.	Teacher expresses proper body language to make student attentive throughout the lecture.			
7.	Student remains attentive throughout the lecture.			
8.	. Students take notes of the lecture			
9.	Teacher provides handouts / lecture outline.			
10.	Teacher integrates discussion during lecture.			
11.	Teacher demonstrates the experiment prior to practical.			
12.	Demonstration of real object, figures, model, map etc. done as a part of regular lecturing.			
13.	Teacher uses various techniques for providing real life situation.			
14.	Student participates in demonstration as per instructions by teacher.			
15.	Teacher encourages student's participation in			

	simulated situation.			
16.	Students take active part in role playing			
17.	Teacher clarifies rules of simulation and gaming.			
18.	Teacher participates in team teaching as shared by more than one teacher.			
19.	Teacher gives special attention to slow learners			
20.	Tutorial classes are held to clarify individual problem (in case of large size classroom).			
21.	Student participates in workshops to plan project, prepare tools, organize field activities etc.			
22.	Teacher organizes workshop as mode of experiential learning.			
23.	Teacher uses audio-visual or computer trigger for sensitization			
24.	Teacher uses small group dialogues as a part of course actively.			
25.	Students generate novel ideas through dialogue practice.			
26.	Teacher summarizes important points at the end of dialogue			
27.	Teacher integrates his presentation with ICT.			
28.	Teacher monitors use of e-learning resource by the learners for clarifications of content, project activities etc.			
29.	Teacher maintains the laboratory facilities as per course requirement.			
30.	Teacher is attentive to all students for respective lab work.			
31.	Teacher provides feedback on regular basis.			

32.	Teacher gives feedback after assessment of the student's performance in assignment.			
33.	Student- teacher interaction on lab performance is done regularly.			
34.	Students and teachers interact regularly on their lab work/ experimental work/projects/assignments.			

Cognitive	Behaviouristic	Constructive
1,7,8,16,21	4,5,6,9,11,12,13,14,15,17, 18.19,20,28-35	2,3,10,24,25,27

Teaching Activities Observation Tool for researchers

Appendix-IV

Teaching Learning Activities Interview Schedule for Students

		Often	Seldom	Never
1.	1. Do you consult library for (A) Assignment (B) Preparing project work (C) Examination preparation (D)As a hobby or literary interest			
2.	Do you prepare seminar papers/ group discussion etc with the support library work?			
3.	Whether your library is equipped with library books?			
4.	Are you self-confident in library consultation?			
5.	Do you get encouragement by your teachers to do library studies?			
6.	Does your teacher direct you to do self-study of relevant courses like books, journals, newspapers etc.?			
7.	Do you come prepared to the classes by consulting relevant study materials?			
8.	Does the self-study help you for active participation in group activities?			
9.	Do you use ICT resources more frequently as a part of learning activity?			
10.	Does teacher motivate you to use e-resources?			
11.	Do you participate in the planning for field activities?			
12.	Do you actively participate in organizing the field			

	activities?			
13.	Do you discuss experiences from field work?			
14.	Do you participate voluntarily in co-curricular activities?			
		YES	No	
15.	Do you make interaction with senior class students and hostel mates to make the co-curricular activities /events successful?			
16.	Does every subject teacher conduct internal tests?			
17.	Do you take self-feedback after end of the performance during laboratory work, co-curricular activities etc.?			
18.	Do you seek feedback from your friends and co-leaners during your performance in practical and other group activities?			
19.	Does you get feedback by the mentor to overall performance?			
20.	Do you get feedback by the expert teacher after practical examination /viva-voce, evaluation of the project etc.?			
21.	Your mentor teachers take tutorial session in the hostels?			

Teaching Learning Activities Interview Schedule for Students

Cognitive	Behaviourism	Constructivism
Item no 1,5,6,7,16,17,20	Item no 2,4,8,9,14,15,18,19	Item no 3,10,11,12,13