INCLUSION OF PEDAGOGIES IN HIGHER EDUCATION FOR EFFECTIVE TEACHING AND HIGHER ORDER THINKING

CONTENTFULL FOR POTENT TEACHING METHODOLOGIES

THEME: STUDENT CENTRIC AND STUDENT WELFARE APPROACHES

Kavitha Kotthireddy[1,2*], Aparna Pasula[2], Breg. Dr. RRN. Chowdary[1], Lavanya Nagamalla[1], Srikrishna Devulapally[2], Pramod Kumar Dubey[2]

Department of Chemistry, Hyderabad Institute of Technology and Management (HITAM)[1] , Medchal, Hyderabad, Telangana, India – 502 401 .

Department of Chemistry, Jawaharlal Nehru Technological University Hyderabad[2], College of Engineering, Kukatpally, Hyderabad, Telangana, India - 500 085.

ABSTRACT:

Students of extant have been equipped with high intelligence quotient and embedded with advanced learning capabilities. They need higher level of learning practices and are enthusiastic. Unlike earlier teaching there are different pathways to grab the information due to the technology evaluation. It is obligatory to imbibe theoretical and practical knowledge is to get higher order thinking skills. Hence there is a great need for effective teaching methodologies. In this 'case study', qualitative and quantitative investigations were carried to evaluate the reflections of pedagogies applied. Data and proofs were collected from various pedagogy applications in the learning process. This study aims to explore pedagogical approaches such as collaborative learning, active learning methods and dynamic class room implementation to achieve higher level learning outcomes in blooms taxonomy. Assessment results were shown in rubrics. This article also emphasizes challenges faced and strategies planned to overcome those challenges.

KEY WORDS: Pedagogies, Learning Out Comes, Rubrics, Collaborative Learning, Higher Order Thinking, Jigsaw, Problem Based Learning.

HIGHLIGHTS OF THE ARTICLE:

- Pedagogy based teaching-learning practices for active learning process.
- Exploring various pedagogies applied in the class room for critical thinking skills.

- Learning oriented and student centric methods were demonstrated.
- Collaborative learning is effective for exchange of knowledge among all like minded students.
- Pedagogy is the goal rather than tool to achieve higher order thinking skills and high level of learning outcomes.
- Teacher is facilitator to imbibe active learning process for effective teaching-learning practices.
- Integration of the technology and inclusion of pedagogies will influence cognitive levels of the student which leads to creative and innovative thinking.
- Pedagogy based education is a tool for reawakening of the student to acquire the knowledge.

INTRODUCTION:

21st century students are on the edge of technology out break hence their need of information, thinking patterns, learning levels and knowledge sharing methods are modified. Quality of the millennial teaching is determined by the teaching-learning methods which include the pedagogy implementation in the class room. The output of the higher education is to produce qualified individuals; they are capable to solve technical design problems. The pedagogy as said by "Hans Lohman-Pedagogical Researcher" is the bridge of technology and technical teaching.

Students learn better when they apply their learning in their daily life, hence to improve the learning process in the learner, teacher should help the students to apply the learning in different ways and the best method of application of the learning is the introduction of pedagogies in the teaching-learning process. The traditional teaching method involves the teacher as the knowledge transmitter to the student; in this process of one way teaching, teacher will not be successful in benefiting to meet their educational requirements. Pedagogical methods are teaching learning activities that help the teacher in transferring the knowledge to all students with better understanding. Traditional approaches of teaching may not address the learning preferences of millennial students, teacher should consider, creating learner centred teaching environment in his approach. Gist of possible teaching pedagogies implemented in the class room mentioned in **figure 1.**

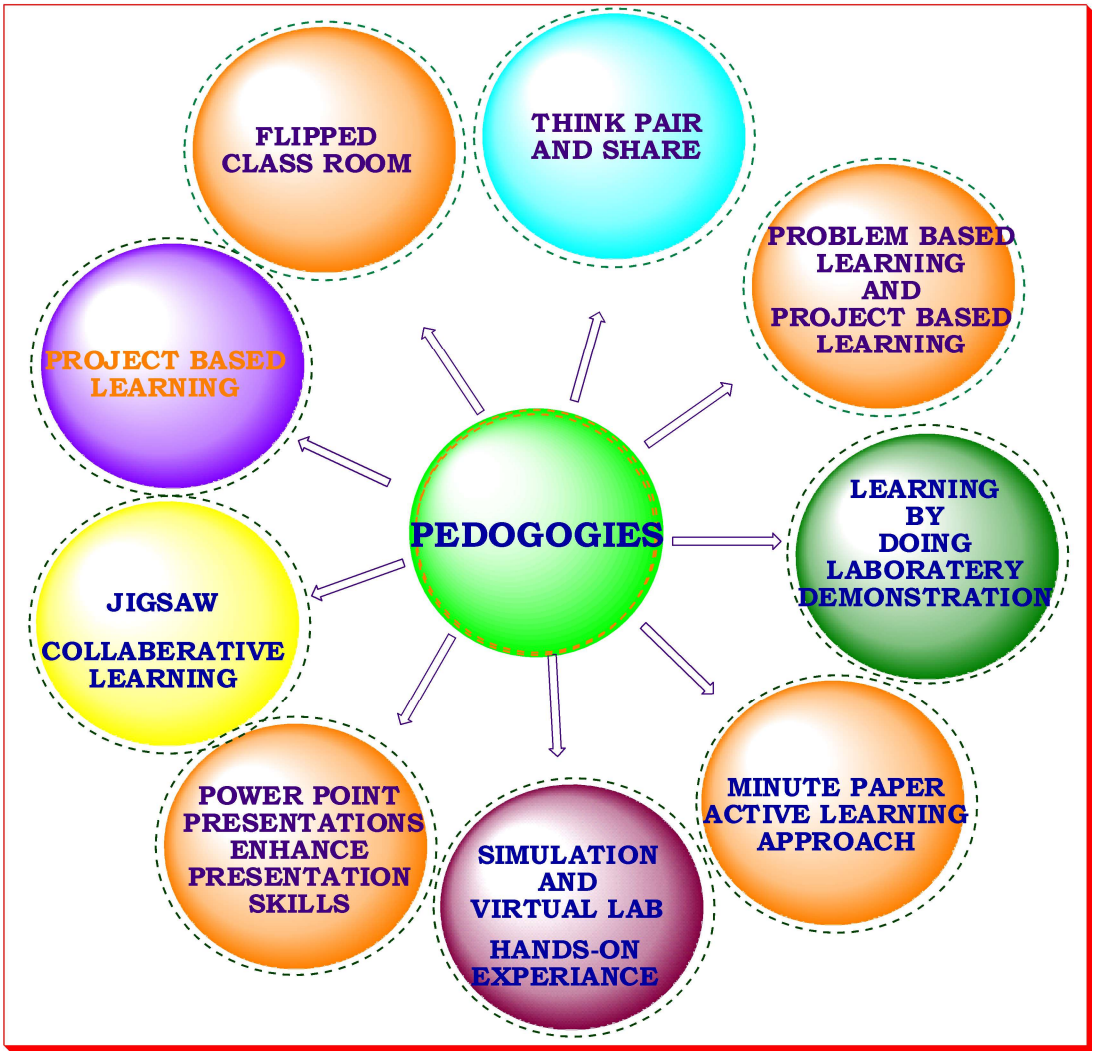

Figure 1: Pedagogies of high significance in higher order thinking.

LITERATURE SURVEY- CURRENT STATUS ON TEACHING METHODS:

Literature review is carried in order to understand the current status of pedagogy inclusion based education in higher education.

Branch et al. delineated[1] the exploration of ethnic identity in education by investigating social teachers. The assistance of the teachers to learn about their ethnic groups with existing subject matter is mentioned. Hussein et al. reported[2] the practical knowledge of primary school teachers in educational system in terms of subject knowledge, pedagogy applications, class room management, teaching-learning practices, subject curriculum and environment. Atman et al. narrated[3] the impact of ICT use in education to screen teachers and student integration with technology. Marz et al.

mentioned[4] the qualitative analysis of teachers in their initial stage of teaching. They emphasized the transformation of training to teach in their early career. They also focused on social networking in respect of people, groups and organizations contacts. Jennifer et al. reported[5] their own experience on the one year teaching internship program and observations made in their course period. Some discussions were carried in the class room and he observed that the students are energetic and well talented in delivering the content. Pamela Hadges et. al reported[6] the review and analysis of physical education pedagogies including research approach on teaching, teacher education and curriculum. Weimer editor of news-letter, et. al reported[7] the review of pedagogical journals and his own experience about pedagogy knowledge of teachers and students at Pen State. Philip et. al. reported[8] the publication trends in the Journal of Teaching in physical education by a decade. They examined that female scholars have achieved editorship, editorial membership in JTPE board. Jane L. Berge reported[9] the inclusion of teaching pedagogies in distance education. They reviewed the reflections of teaching pedagogies in ten years duration from 1990-1999. Min et. al. delivered[10] the research report of 869 publications from three journals in the period of 2003-2007. They analyzed that more publications are received from Science teachers with great research interest. Jonas et. al reported[11] the publications are indicators of intellectual proclivities. They also analyzed about class room socialization practices. Brain Jones et. al reported[12] the enterprise education with respect to pedagogical point of view. They analyzed concepts and serves from entrepreneurship education and for business start-up. Stephen et. al reported[13] the journal quality by physical education faculty members. They analyzed the web-based education survey, rating of journal quality, factors influencing rating, demographic measures etc. Alison Lee et.al reported[14] that publication writing patterns should be systematically addressed with doctorial pedagogy. They mentioned in current trends there is a great demand for publications during and after their doctorial studies. Tzu et. al. reported[15] results of three research topics including students learning, Science teaching, students conceptual learning. They reviewed 990 papers published in the International Journal of Science education. Hill et. al. reported[16] the educational differences between urban and suburban boundaries and discomfort to the teachers when urban students joined in suburban region. Matthew et.al. reported[17] that teaching subject not only requires content but also technology and pedagogy. They introduced a framework for conceptualizing content knowledge with effective technological and pedagogical integration. Joanna et. al reported[18] an international study of the effect of pedagogy implementation in English language teaching. Academics voices were collected from Canada, US,

UK, Hankong etc. They observed that there should be a balance between critical action and reflection among the student and teacher. Kelsey et. al. reported[19] theory to practice inclusion of active pedagogies. They discussed about project based, problem based, inquiry based and case study based learning. Makoelle et.al. reported[20] the inclusion of Pedagogy in teaching-learning process. Qualitative study and interviews conducted with selected practitioners about inclusion of pedagogies in teaching-learning process. Liisa et.al. outlined[21] the impact of pedagogical training in higher education. They observed the pedagogy training program conducted by University of Helsinky to various teaching professionals. This article focus on conceptual learning methods with suitable pedagogies, student efficacy centred learning and self-awareness about pedagogy teaching in teaching fraternity. Kivonza et.al. reported[22] transformation of teachers in to effective teachers in this 21st century by the innovative pedagogies in higher education. They sorted out there should be integrity among the nations, policy makers and in association with higher education stream to include educational up skilling, high-stakes state and prominence to learning outcomes. Donna et.al. reported[23] the importance of Simulation pedagogies in the higher education with special focus on health professionals. They emphasized that simulations are the overpass for the higher education and professional practices. They well deliberated the relation between simulations and potential of unarticulated professional formation. Evrim et.al. reported[24] the higher education transformations by interconnecting, participating and finally learning the things. This article ascent the urgency of transformations in higher education pedagogies and opportunities provided by social media tools in education. They highlighted the notability of social media channels removing boundaries of educational barriers. Herrington et.al. manifested[25] inclusion of new technologies, new pedagogies and mobile learning in higher education in this contemporary scenario. They made a list of requirements of current education incorporated with faculty development for new technologies, digital teaching in adult education, early childhood education on online mode, Information and Technology in revised curriculums and reflective learning paradigms. Gilly Salmon et. al. delineated[26] the strategic innovations in e-learning and pedagogy based education in higher education institutions. Hundreds of institutes in national level and millions of organizations world-wide are focusing on teaching-learning transformations to achieve new location of development. They specified four-quadrant model of e-learning strategy. Bozalek et.al. reported[27] Pasthumanism, critical thinking skills, effective turn in pedagogies effect in higher education. They described the reflections given by feminist thinkers and emphasized the harmony among Human-non-human, Body-mind,

Subject-object, Nature-culture, Matter-meaning, Continuity-discontinuity, beginning-returning and Creation-renewal in teaching-learning process. Shiva Anand et.al. deliberated[28] inclusion of new Geographic Information Science pedagogies in higher education in wide range of disciplines. They reviewed the inclusion of GIS pedagogies in context to the higher learning out comes in higher educational institutions. They monitored the reflections of implicative applications of multiple pedagogies in the flexible learning and efficient knowledge sharing. Nashravan et.al. manifested[29] the impact of incorporation of Social Bookmarking Technology pedagogy in higher education stream. They analysed the improvement in educational and learning approaches in research intensive university in North of England. They focused on 5 main strategies1. Social Bookmarking Technology Literacy, 2. Social Bookmarking benefits, 3. Social Bookmarking costs, 4. Social Bookmarking Pedagogy, 5. Social Bookmarking alternatives. Lauren et.al. reported[30] scoping review of inclusive pedagogies in higher education to assimilate conceptualized findings of pedagogy outcomes and correlation with performative and market-driven trends. They used 5 data bases to review the reflections of inclusive pedagogies in education system. But the topic remains philosophically contested matter after the observations.

Based on all the above reflections it is essential to apply new and innovative pedagogies in the class room to meet the requirements of cognitive, competitive, potential and critical thinking skills in the student.

RESULTS AND DISCUSSIONS:

In this case study of my own experience in the class room, I applied various pedagogies for different topics in Engineering Chemistry. There is a quest for the suitability of the pedagogy for selected topic to achieve better learning outcomes and to reach higher blooms level. For each and every unit we planned pedagogy based learning for selected topics. We faced two major challenges in the selection and implementation of the pedagogies in the class room. One among those is Engineering Chemistry is the subject in Engineering first year common to all branches, students will gather from different geographic regions, from different levels and methods of education, different family and educational back grounds and different understanding levels. Grouping these students and expecting similar results and learning outcomes from all the members of class is the bigger challenge. And the succeeding one is evaluation of their learning outcomes based on performance,

communication skills, team coordination, impressive presentation and team wise as well as individual measurement of learning outcomes.

TOPIC SELECTION AND PEDAGOGY APPLIED:

Selection of the topic plays a vital role in pedagogy based education. There is a list of topics and relevant pedagogy implemented in my class room for Engineering Chemistry subject was mentioned in the **Table 1**. Learning pyramid is displayed in **Figure 2**. Justification for the suitability of pedagogy was also discussed here.

Table-1: Topic selected and Pedagogy applied

S. No.	TOPIC SELECTED FOR THE ACTIVITY	PEDAGOGY APPLIED	JUSTIFICATION
1	Crystal field splitting of Octahedral, Tetrahedral and Square planar complexes (Engineering Chemistry UNIT 1)	Power-point presentation by students	PPT presentation develops the presentation and communication skills, helps in the revision of the entire unit. It comes under teach others hence around 90% learning outcome will be reached.
2	Molecular Structure and Theories of Bonding (Engineering Chemistry UNIT 1)	Role play	Student can learn audio-visual and demonstration through the stage performance which helps in achieving 30% learning outcome on the basis of learning pyramid.
3	Desalination of brackish water by Reverse Osmosis (RO) - One of the best methods of purification(Engineering Chemistry Unit-2)	Plant visit and demonstration which is located in HITAM	Demonstration of RO plant located in our college premises helps in understanding the real time application of the process in their day-to-day life.
4	Electrochemistry and	JIGSAW activity	Develops the collaborative learning

	corrosion (Engineering Chemistry Unit-3)		skills in the student, brings the spirit of team work, self learning access and helps in the revision of the entire unit. Discussion among the group members and with other groups is used to achieve 50% learning outcome.
5	Spectroscopy (Engineering Chemistry Unit-5)	Identification of the compounds by interpretation of spectral data	Correlates theoretical subject with practical knowledge. Learning by doing hence 70% learning outcome will be reached.
6	Stereo Chemistry and Reaction Mechanism (Engineering Chemistry Unit-4)	Think pair and Share activity and 3 Dimensional model presentations.	Active learning practice brings in individual thinking and sharing the ideas among peers. Model presentation imbibes interactive engagement activity; it is the significant learning gain.

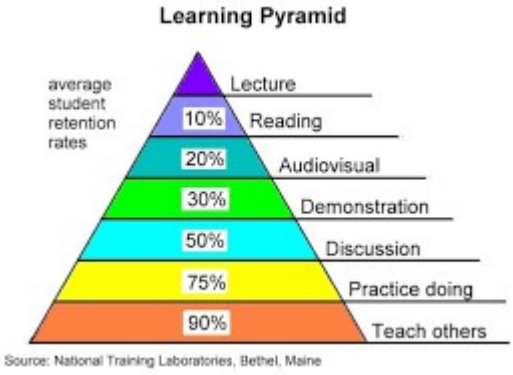

Figure-2: Learning pyramid in accordance with learning strategies.

Apart from these above mentioned pedagogies, minute paper, experimental expo, inquiry based learning by sharing problems, questions and challenges, experimental learning in the laboratory, gap filling, and peer learning are added advantages for effective teaching-learning practices.

GROUP FORMATION:

Groups were framed either homogeneous or heterogeneously based on the topic and interest of the students. Among two possibilities homogeneous groups gave better results in the execution of pedagogy because like minded people will share their content without barriers while gathering the information, framing the concept and during the execution of pedagogy though heterogeneous group have all kind of learning probabilities.

FRAMING OBJECTIVES AND OUT COMES:

Objectives and Out comes plays vital role in the implementation of pedagogy. Course objectives are to bring adaptability to new developments in Engineering Chemistry, to acquire the skills and knowledge in the Engineering Applications. Bridging the concepts of Engineering Chemistry with daily life applications. Engineering Chemistry Course Outcomes mentioned in **Table 2**.

Table-2: CO-PO mapping of EC course

S. No.	CO. No.	PO. No.	Course-Outcome
1	CO1	PO1, PO2	Estimation of amount of hardness of water by suitable method of treatment for industrial and domestic purpose as well.
2	CO2	PO1	Explain the basic principles involved in Electro-Chemistry and potential applications of electrodes and batteries. Finding the ,mechanisms of corrosion and suitable methods of prevention.
3	CO3	PO1, PO2	Describe the mechanism, structure and elucidating their reaction mechanisms.
4	CO4	PO1,PO2	Explain the conceptual learning of spectroscopy and recent era applications in industries and domestic.

PRE-REQUISITS:

Prerequisites required to represent the manuscript are, earlier knowledge on the pedagogies they performed in the class and the benefits with the implementation of diverse pedagogies, types of activities performed and their evaluation. Student is expected to have basic knowledge of Chemistry (Physical, Organic, Inorganic and Analytical Chemistry) in order to stream line with the recent advancements.

PLANNING FOR EXCUTION:

For each unit there is a specific pedagogy which intern brings free knowledge sharing, self gathering of the information from various sources such as Google, study apps, NPTEL courses, standard reference text books and online digital library by student will facilitate the thrust of learning, confidence to learn and improvement of learning standards and capabilities. This is the reason why we are more concerned about pedagogy based and activity based education. For each pedagogy, there is a prior information and announcement in the class room in order to provide sufficient time to gather the information and quality discussions among the peers and for the preparation of teaching aids. It is our pleasure to share that whole class is participating in the activity with enthusiasm and our institution is ICT enabled, equipped with smart class rooms and centralized online digital library facility where free access to most of the international and national journals, reputed text books, other magazines and current trends across the globe to all the students. Students were grouped into different batches each group consist of four members for effective participation, execution and evaluation. Topics assigned to the students and proper guidance is given to them regarding the information sources and segregation of the information and effective team presentation in the class room. Our wards are anxious in these activities and well trained to perform and utilized their free time for adequate implementation of the pedagogy.

METHODOLOGY:

There are selective methodologies for various pedagogies applied in the class room. Gist of pedagogies implemented in my class room was deliberated in detail.

POWER-POINT PRESENTATION: Slide share and content delivery by the student awaken their contingent skills and discussion based learning. Group wise topic allotment is described in **Table 3**.

Table-3: List of students and topic allotted for power point presentation.

HYDERABAD INSTITUTE OF TECHNOLOGY AND MANAGEMENT

Pedagogy: Power Point Presentation

S. No	Roll. No.	Topic
1	-420	**MOT of N_2, O_2, F_2**
2	-422	
3	-423	
4	-404	**CFT of Octahedral complexes**
5	-407	
6	-424	
7	-418	**MOT of N_2 and F_2**
8	-419	
9	-434	
10	-408	
11	-409	**Postulates of MOT**
12	-417	
13	-427	
14	-416	**N-type and P-type of semiconductors**
15	-403	
16	-436	
17	-405	**Semiconductors**
18	-415	
19	-433	
20	-421	**Band theory**
21	439	
22	435	
23	-413	**Quantam numbers**
24	-414	
25	-426	
26	-432	**CFT of square planar compounds**
27	-430	
28	-446	
29	-441	**CFT of tetrahedral complexs**
30	-422	
31	-425	
32	-437	**CFT of tetrahedral**
33	-438	

34	-440	**complexes**
35	-412	**CFT of octahedral, tetrahedral and square planar complexes**
36	-429	
37	-433	
38	-438	**Pi MOT of 1,3 buta diene and benzene**
39	-439	
40	-440	
41	-441	

However, power point presentation activity in the class room is assessed based on rubrics framed on three key criteria (**Table-4**) on group coordination, summary writing and presentation skills. Overall information of different categories of students is displayed in **Table-5**. This evaluation is also represented in graphical form (**Figure-3**). The main challenge while implementation of the Power point presentation of entire unit is time availability. We overcome this problem by working on the content beyond the college working hours.

Rubrics for the Power-Point presentation

Table-4: Sample rubrics for the assessment of power point presentation activity.

S. No.	Criteria	Excellent	V. Good	Good	Fair
1	Group Coordination	4-3	3-2	2-1	1-0
2	Summary writing	4-3	3-2	2-1	1-0
3	Presentation skills	4-3	3-2	2-1	1-0

Table-5: Categorization of students based on 3 Criteria

S. No.	Rubrics	Criteria-1	Criteria-2	Criteria-3

		Group coordination	Presentation skills	Summary Writing
1	**Excellent**	28	13	0
2	**V good**	13	14	28
3	**Good**	0	13	13
4	**Fair**	0	0	0

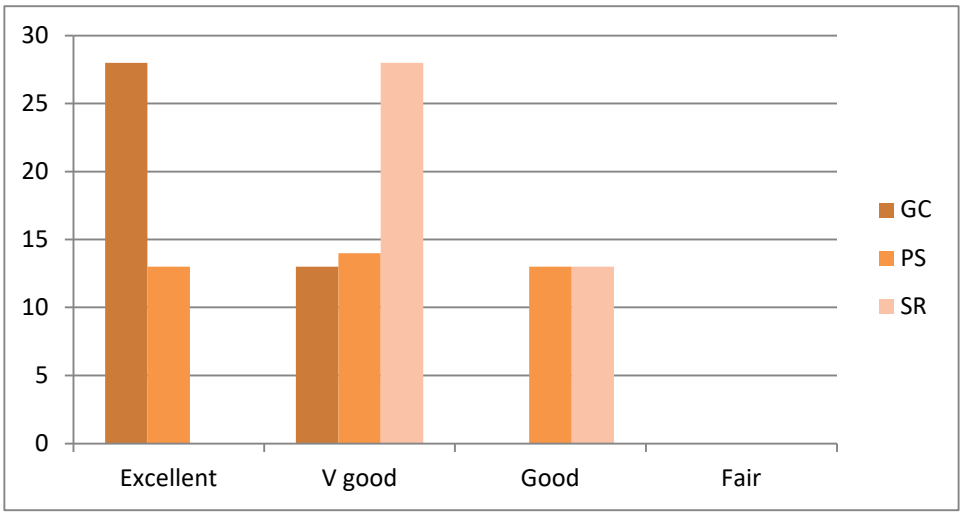

Figure-3: Categorization of students based on 3 Criteria.

1. **ROLE PLAY ACTIVITY:**

Role play activity is applied for molecular structure and theories of bonding. Group of students choose the topic themselves, they play the role of topic selected such as d-orbitals, splitting patterns, excitation of orbitals and energy differences etc. and assessment of activity by specific rubrics mentioned in **Figure 4**.

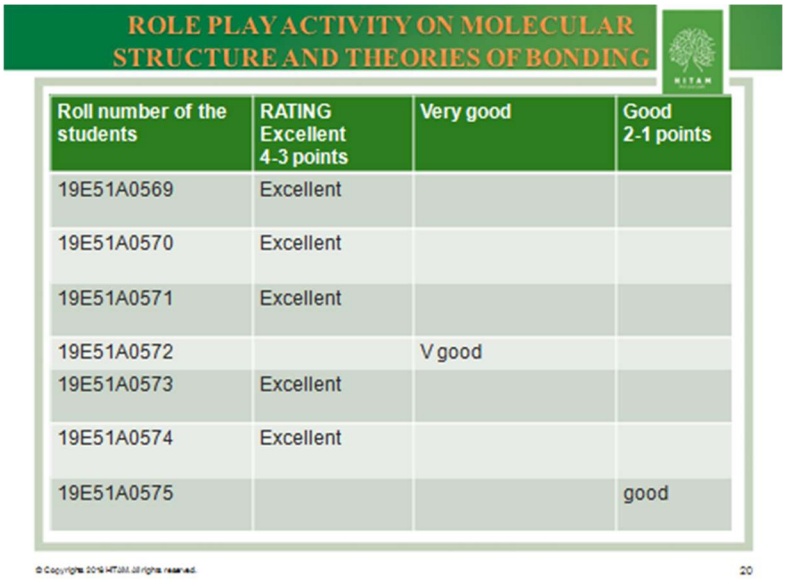

Figure-4: Rubrics for the assessment of role play activity.

DEMONSTRATION BY REVERSE OSMOSIS PLANT VISIT:

Students visited Ross boilers Reverse Osmosis plant located in HITAM campus and observed the major components of instrument, method of purification and significance of RO system in domestic water purification (**Figure 5**). This will develop the interest on the topic due to getting real time working process of the instrument.

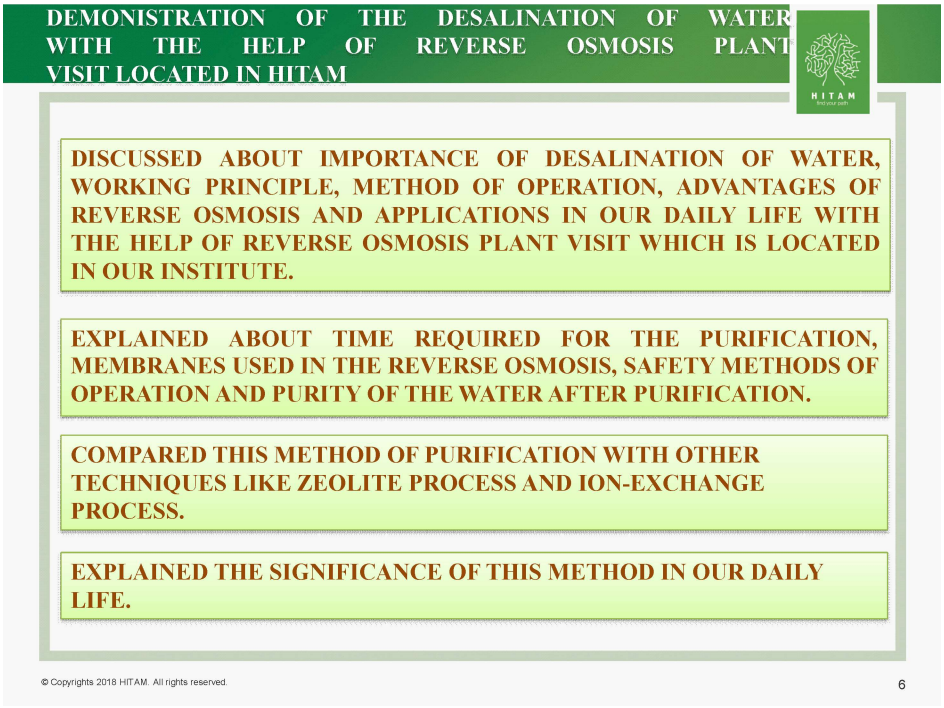

Figure-5: RO plant visit and demonstration of mechanism of action

Suggestions to slow Learners:

- Develop confidence it will improve the knowledge
- Participate actively in the activities it will simplify the concepts and amplify the learning.
- Be attentive and give the responses and practice will improve the efficiency
- Be regular to the class so that there will be continuity in teaching-learning.

Challenges:

Lack of time for effective execution and evaluation. This problem overcame by sharing of work among the team members and prior information.

No. Of Students Participated: Entire class room.

No. Of Batches Made: Five in the class

Student Feedback:

1. Satisfied-10

2. Good-25

3. Excellent-10

Mode Of Feedback:

Oral

JIGSAWACTIVITY:

Jigsaw is the potent collaborative activity used to inculcate team spirit among the peers. It will develop the self-exploration ability in the student. He is able to search, access, and collaborate with peers, teachers, experts and other modes where he get relevant information and finally integrate in a meaningful order and present it. Slides representing objectives of JIGSAW and evaluation were shown in **Figure 6**.

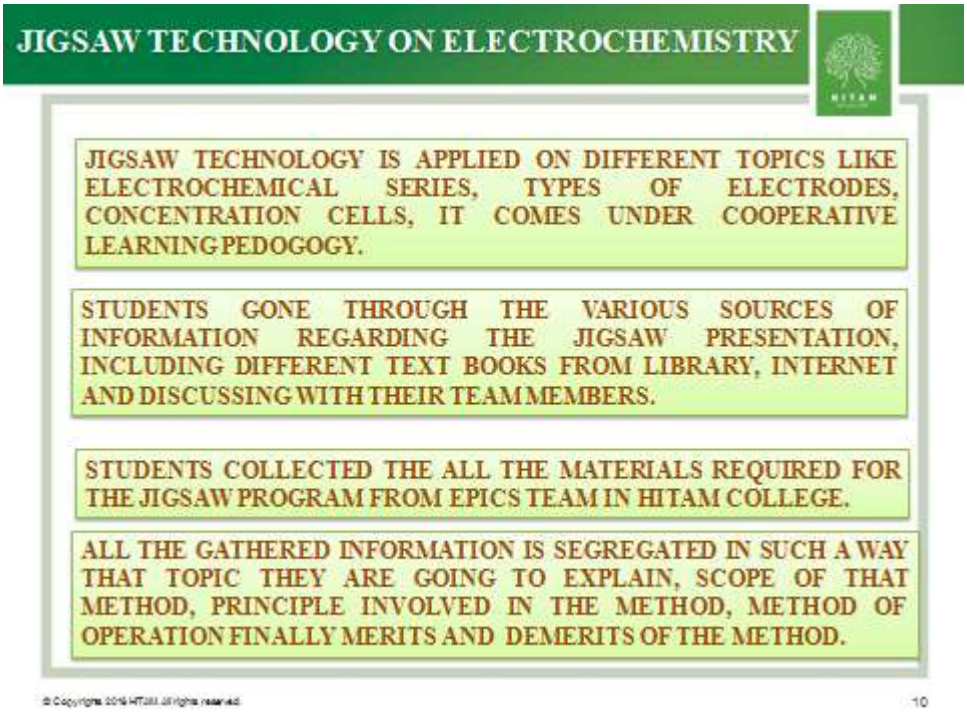

Figure 6: Jigsaw activity in the class room

Evaluation of Jigsaw activity based on rubric points as mentioned in the Table-6.

Table-6: Rubrics for the Jigsaw activity

Roll number of the students	RATING Excellent 4 points	Very good 3 points	Good 2 points
19E51A0569	Excellent		
19E51A0570	Excellent		
19E51A0571	Excellent		
19E51A0572		V good	
19E51A0573	Excellent		
19E51A0574	Excellent		
19E51A0575			good

Think Pair And Share Activity:

It is the type of active learning pedagogy. During the class room delivery of content 5 minutes stretch is given to the students and two members sat adjacent will be allowed to discuss about the topic just delivered and explains on the black board. They represent the topics in their own view. This activity will make the students alert about the subject and avoid the monotony of continuous listening and they can express their own ideology about the content. This is the actual practice of students centric or learner centric education.

Reflective Report:

In this modern era of education student learning is the primary object and higher order thinking skills, practice based education, problem solving ability, improvement of communication skills, presentation skills in front of peers, concept based education and skillful knowledge are the essential requirements to compete with global level demands. Hence inclusion of pedagogies in higher education sector is constitutive and result reports of each pedagogy reflect the improvement in above mentioned skills in the student. Traditional restricted class room teaching destroys student creative skills as young brains have capability of adopting new techniques very easily. Not only rubric based assessment but also traditional continuous internal evaluation (CIE) by conducting midterm exams and summative assessment by conducting term end examination we observed tremendous changes in the learning levels in the students (**Table-7**). Pedagogy education enables unfolded, uplifted and ample scope for the future education. It is the cutting edge technology bridges the vacuum between passive learning to active learning.

Table-7: Midterm examination marks of I B. Tech course

SNO	H.T NO	Subjective (10 M)				Objective (10 M)			Assignment (5 M)			Total (25 M)
		Q1(5 M)	Q2(5 M)	Q3(5 M)	Q4(5 M)				Q1	Q2	Q3	
62	19E51A0561	5	4			1	2.5	3	2	3	1	21.5
63	19E51A0562		4	5		1	1.5	3	2	3	1	20.5
64	19E51A0563		4	5		1	1.5	3	2	3	1	20.5
65	19E51A0564		5	5		1.5	2	4	2	3	1	23.5
66	19E51A0565	**5**	**5**			**2.5**	**2.5**	**2.5**	2	3	1	23.5
67	19E51A0566	**3**	**4**			**2**	**2.5**	**1.5**	2	3	1	19
68	19E51A0567		5			1	2	2.5	2	3	1	16.5
69	19E51A0568		2		5	1	2	2	2	3	1	18
70	19E51A0569		5		5	2	2	2	2	3	**1**	**22**
71	19E51A0570		4		2	2	1.5	2	2	3	1	17.5
72	19E51A0571	3	2			2.5	2	2.5	2	3	1	18
73	19E51A0572		4	5		1	2.5	3	2	**3**	**1**	**21.5**
74	19E51A0573		5	5		1.5	2	3	2	3	1	22.5

Acknowledgements: Authors tends to exert sincere gratitude towards "Hyderabad institute of Technology and Management" (HITAM) for providing platform to execute various pedagogies in the class room and we are grateful to utilize ICT enabled class rooms in the campus. Authors wish to extend their acknowledgements towards JNTU College of Engineering Hyderabad, JNTUH, for the support and help in preparation of this article.

"Pedagogy based education is Conventional, Conceptual and Convergent for the contemporary Education"

References:

1. A. E. Branch, Promoting ethnic identity development while teaching subject matter content: A model of ethnic identity exploration in education. *Teaching and Teachers Education.* 87, 2020, 102918, 1-11.
2. Hossein Chaharbashloo, K. Gholami, M.Aliasgari, H Talebzadeh, N. Mousapour, Analytical reflection on teachers practical knowledge: A case study of exemplary teachers in an educational reform context. *Teaching and Teacher Education*. 87, 2020, 102931, 1-15.
3. N. U. Atman Y. Kocak. Predicting technology integration based on a conceptual framework for ICT use in education technology, *Pedagogy and education.* 2019. 1-15.
4. Virgine Mearz, Geert Kelchatermans, The networking teacher in action: A qualitative analysis of early career teachers induction process. *Teaching and Teacher Education,* 87, 2020, 102933-102946.
5. Jennifer Vanderheide and Ashley Johnson, examining preservice teachers narratives of teaching dialogically. 87, 2020, 102946-102956.
6. K. Pamela Hodges, K. Scrabis-Fletcher, Stephen, S. Philips and Stephen silverman. A decade of Research Literature in Physical Education Pedagogy. *J. Teach Phys Educ.* 28, 2009, 119-140.
7. Maryellen Weimer, The Disciplinary Journals on Pedagogy, Change: *The Magazine of Higher Learning,* 25(6), 1993, 44-51.
8. Philip Ward, Bomna Ko, Publication Trends in the Journal of Teaching in Physical Education from 1981 to 2005. *Journal of Teaching in Physical Education*, 25, 2006, 266-280.
9. Zane L. Berge, Susan Mrozowski, Review of Research in Distance Education, 1990-1999. *American Journal of Distance Education.* 15(3), 2001, 5-19.

10. M. Lee, Y. Wu, C. Tsai, Research Trends in Science education from 2003-2007. A content analysis of publications in selected journals. *International Journal of Science Education*. 31(15), 1999-2020.
11. Jonas Hagmann, T. J. Biersteker, Beyond the Published Discipline: Toward a Critical Pedagogy of International Studies, *European Journal Of International Relations*, 20(2), 2014, 291-315.
12. Brain Jones, Normal Iredale, and Enterprise Education as Pedagogy. *Education+Training,* 52(1), 2010, 7-19.
13. Stephen Silverman, Physical Education pedagogy faculty perceptions of Journal Quality. *Journal of Teaching in Physical Education*, 33, 2014, 134-154.
14. Alison Lee, Barbara Kamler, Bringing Pedagogy to Doctorial Publishing, *Teaching in Higher Education*, 13(5), 2008, 511-523.
15. L. Tzu-Chiang, L. Tzung-Jin, T. Chin-Chung. Research Trends in Science Education from 2008-2012: A Systematic Content Analysis of Publications in Selected Journals. *International Journal of Science Education,* 36, 2014, 1346-1372.
16. Hill, K. Dhara, Historical Analysis of desegregation and Racism in a Racially Polarized Region: Implications for the Historical Construct, a Diversity Problem, and Transforming Teacher Education towards Culturally Relevant Pedagogy. *Urban Education*, 44, 2009, 106-139.
17. J. Matthew, K. PunyaMishra, K. Yahya, Tracing the development of teacher knowledge in a design seminar: Intigrating Content, *Pedagogy and Technology. Computers and Education,* 49, 2007, 740-762.

18. J. J. Joanna and Tony Harland, Transforming Teaching and Learning in English language teaching through critical pedagogy. An international study. *Journal of Transformative Education,* 12, 2014, 343-355.
19. Kelsey Hood Cattaneo, Telling Active Learning Pedagogies Apart: from theory to practice. *Journal of new approaches in educational research*. 6, 2017, 144-152.
20. T M Makoelle, Pedagogy Inclusion: A quest for the inclusion in Teaching and Learning. *Mediterranean J. of Social Sciences*. 5, 2014, 1259-1267.
21. Liisa Postareff, Sari Lindblom-Ylanne and Anne Nevgi, The effect of pedagogical training on teaching in higher education, *Teach. Teach. Educ.,* 23, 2007, 557-571.
22. Kivunja, Charles. Innovative Pedagogies in Higher Education to Become Effective Teachers of 21st Century Skills: Unpacking the Learning and Innovations Skills Domain of the New Learning Paradigm. *Int. J. High. Educ.*3, 2014, 37-48.
23. Donna Rooney, Nick Hopwood, David Boud and Michelle Kelly, The Role of Simulation in Pedagogies of Higher Education for the Health Professions: Through a Practice-Based Lens. *Vocat. Learn.* 8, 2015, 269-285.
24. Evrim Baran, Connect, Participate and Learn: Transforming Pedagogies in Higher Education. Bull. IEEE. *Tech. Comm. Learn. Technol.* 15, 2013, 9-12.
25. Herrington, A., Herrington, J. and Mantei, J. Design principles for mobile learning. In J. Herrington, A. Herrington, J. Mantei, I. Olney, & B. Ferry (Eds.), New technologies, *new pedagogies: Mobile learning in higher education Wollongong:* University of Wollongong. 2009, 129-138.

26. Gilly Salmon, Flying not flapping: a strategic framework for e-learning and pedagogical innovation in higher education institutions, *Research in Learning Technology*, 13, 2016, 201-218.

27. V. Bozalek, M. Zembylas and M. Zembylas, Critical posthumanism, new materialisms and the affective turn for socially just pedagogies in higher education. *South African Journal of Higher Education,* 30, 2016, 193-200.

28. Shivaanand Balram, Teaching and Learning Pedagogies in Higher Education Geographic Information Science. *Advances in Geographic Information Science*, 2019, 1-8.

29. Nashrawan Taha, Social Bookmarking Pedagogies in Higher Education: A Comparativestudy. 2016, Professional Development and Workplace Learning, Methodologies, Tools, and Applications, edited by Information Resources Management Association. *IGI Global,* 2016, 1420-1433.

30. Lauren Stint ford, George Koutsouris, What are inclusive pedagogies in higher education? A systematic scoping review, *Studies in Higher Education,* 2020, 1-17.