Towards a Better Implementation of NEP through the Knowledge Center Initiative

Sanjay D Jain* and Vivek M Nanoti**

The National Education Policy (NEP) – 2020 mentions [page 3, NEP], "The aim must be for India to have an education system by 2040 that is second to none." As the education system of a country builds the foundation of its development, this aim can be rated as one of the best aims the country had since independence. Though NEP is the best concomitant step towards achieving this aim, the policy will face an uphill task in its implementation because of the strong grip of Macaulay's ideas on our education system. Though Macaulay's policy was intended mainly to serve the British interests, years of its continued influence effectively misled people into believing it as 'our' policy.

NEP promises to restore our glorious past by reviving our rich native education that existed before the British rule– education that developed us into a leading economy of the world in the pre-British era [Pitroda (2015), Tharoor (2016)]. However, a lot will depend on how the policy recommendations are implemented in letter and spirit at grass root levels. At present Macaulay's ideas have taken such deep roots in our psyche that the main hurdle in implementing NEP will be our own reluctance in accepting that deeper roots of better education existed in our country before Macaulay.

In order to serve the colonial interests of British rulers, Macaulay's policy constrained education to the rigid structures of marks, grades and degrees that encouraged practices like cramming and rote learning and discouraged original, creative and independent thinking. This led to a gradual deterioration of our education, particularly the higher education. Engineering education stands as a glaring example of this deterioration today as only about 15 per cent of the engineering institutes in the country are accredited; less than 20 per cent of our engineering graduates are employable; and about 50 per cent seats in engineering colleges have been remaining vacant in recent years.

Recently, we have taken a Knowledge Center Initiative (KCI) in our institute [Priyadarshini Institute of Engineering and Technology (PIET)] in an attempt to arrest this deterioration. It is an open, flexible and proactive initiative that facilitates natural and experiential learning based on the ignorance and curiosity of learners through a cafeteria approach that promises their enjoyment, employment, empowerment and enlightenment. The main focus of KCI is on 'uncovering' and 'discovering' the syllabi instead of 'covering' them and on learning for knowledge, skills and wisdom instead of marks, grades and degrees.

Under KCI students can learn any topic of their interest without any anxiety of exams and marks. It follows a simple methodology of arousing the motivation of learners and facilitating their learning through mentoring to accomplish the intended learning goals. The initiative made a remarkable impact in the last 5 years by benefitting large number of students and professionals from PIET as well as beyond it. Table-1 illustrates this growth.

Table-1: Growth of PIET KCI

Session	Status of KCI
2015-16	KCI taken in the Physics Department of PIET (Physics Knowledge Center)
2016 -17	KCI extended to all the First Year students and departments of PIET
2017-18	KCI extended to all the branches and students of all the years of PIET
2018 – 19	KCI extended to any interested learner within and beyond PIET
2019 – 20	Google classroom called 'Learning Center' developed for any interested learner within and beyond PIET

The impact of KCI is evident through the steady cumulative increase in the number of exhibitions, posters, visitors, learners, media reports, articles and papers published, lectures delivered and sessions

** Head, Knowledge Center, Priyadarshini Institute of Engineering and Technology, Hingna road, Nagpur -19, E-mail: sanjaylambade@rediffmail.com*

*** Principal, Priyadarshini Institute of Engineering and Technology, Hingna Road, Nagpur - 19, E-mail: viveknanoti@gmail.com*

conducted under KCI. These data are available in our published papers (included in Table-2) and also on our college website [http://www.piet.edu.in/knowledge_centre.php]. The vision document, extension proposal and the relevant papers/articles are available on the site, https://sites.google.com/site/sjainknowledgecentre/.

As the visits to the physical KC got reduced due to the recent corona pandemic, we made the learning material developed under KCI available on a Google Classroom named, 'Learning Center' (LC) to provide digital access to any interested learner. LC can be accessed by anyone with a valid gmail account. Any learner can join this classroom using the code, 'lmdrx6g' or by requesting for an invitation mail to join the center.

Our encouraging experiences provide us enough motivation and confidence to propose KCI as a grass root initiative that can facilitate a better implementation of NEP and can thus contribute significantly to India's aspiration towards a knowledge society. Being essentially unstructured, KCI can accommodate and implement NEP ideas in a much better way than our rigid structures of education can.

Secondly, initiatives like KCI can be taken in any educational institute or even in any organisation. Thus, if such initiatives are promoted across the country then NEP can be implemented in a much smoother and successful way compared to pushing the monly through the existing schools and colleges. Various aspects of the implementation of NEP through KCI are elaborated in the following sections. The concurrence of NEP ideas with KCI is brought out in Section II. Due to the strong concurrence of NEP and KCI ideas, many of the NEP ideas are already being implemented under KCI. These are elaborated in Section III. Section IV discusses the further scope for implementation and the concluding section highlights the effectiveness of KCI in implementing NEP ideas.

NEP and KCI : Concurrence of Ideas

Vision

The NEP's vision of transforming India into a knowledge society and making India a global knowledge superpower has also been addressed under KCI. The work undertaken with this vision has been published in our several research papers and articles. Table-2 includes the details of the major 10 publications among these.

Table 2: Published Papers/Articles based on KCI Vision that Concurs with the NEP Vision

Title of the Published Paper / Article	Publication Details
1. Transforming Engineering Education in India by Seeking Motivations from Bharat	Journal of Engineering Education Transformations, Vol. 33, No.1, July 2019, p. 22-34
2. Knowledge Center Initiative for Contributing to Catalyze the Transformation of Engineering Education in India	Journal of Engineering Education Transformations, Vol. 32 , No. 3, January 2019, p. 78 – 90
3. Knowledge Center as a Grass root Initiative for Making Engineering Education in India Meaningful	4thIEEE Inter. conf. on MITE, held at Madurai from 9th to 10 Dec., 2016.
4. Knowledge Center Initiative for Transforming India into a Knowledge Destination	3rd IEEE Inter. Conf. on MITE held at ACET, Amritsar, 1-2 Oct. 2015, p.52-57
5. Knowledge Center - A New Learning Paradigm for Engineering Education in India	3rd IEEE Inter. Conf. on MITE held at ACET, Amritsar, 1-2 Oct. 2015, p. 58-62
6. Enabling Knowledge Structures for Human Development in India	Inter. Conf. on knowledge management, IBS, Hyderabad, 18-19 April, 2013
7. Role of educational technologies in re-emergence of India as a knowledge society	IEEE Xplore India Conference (INDICON), 2012 7-9 Dec., P. 819 – 822
8. Education Beyond Marks and Degrees	Science Reporter, Vol. 54, No. 2, February 2017, p. 37-40
9. Natural Learning for a Knowledge Based India	Science Reporter, Vol. 53, No. 8, August 2016, p. 23-28
10. Of Science and Scientists Making India Great	Scientific India, Vol. 5, No. 2, March-April 2017, p. 13-15

The titles of the published papers/articles included in Table II bring forth the strong concurrence of vision of NEP with that of KCI. Though our work mainly pertained to transformation of engineering education, the initiative is equally applicable and extendable to all levels of education, in general, and to all streams of higher education, in particular.

Principles and Objectives

There is a strong concurrence between the objectives and principles of NEP and that of KCI. Our primary objective of learning for knowledge, skills and wisdom agrees closely with the NEP observation that the pursuit of knowledge (*Jnan*), wisdom (*Pragyaa*), and truth (*Satya*) was always considered in Indian thought and philosophy as the highest human goal [page 4, NEP]. The emphasis of NEP that pedagogy must evolve to make education more experiential, holistic, integrated, inquiry-driven, discovery-oriented, learner-centred, discussion-based, flexible, and, of course, enjoyable [page 3, NEP] is also well served in our cafeteria approach that promises enjoyment, employment, empowerment and enlightenment of learners. The particular emphasis of NEP on the development of the creative potential of each individual including social, ethical, and emotional capacities and dispositions [page 4, NEP] is properly ingrained in the KCI methodology of facilitating interest based learning.

In particular, the following principles of NEP [page 5-6, NEP] are in very close agreement with KCI.

- no hard separations between different steams / subjects
- multidisciplinarity and holistic learning;
- emphasis on conceptual understanding rather than rote learning and learning-for-exams;
- creativity and critical thinking to encourage logical decision-making and innovation;
- ethics and human & Constitutional values;
- life skills such as communication, cooperation, teamwork, and resilience;
- respect for diversity and the local context;
- full equity and inclusion;
- a rootedness and pride in India

NEP Ideas Already being Implemented under KCI

NEP lays emphasis on learning how to learn; learning about how to think critically and solve problems, how to be creative and multidisciplinary, and how to innovate, adapt, and absorb new material in novel and changing fields [page 3, NEP]. KCI has been implementing these ideas under its aim of uncovering and discovering the syllabi. Many new experiments in this regard helped KC to evolve as a laboratory for research in education [2014]. Some of the ideas that evolved under KCI for improving the effectiveness of learning are as under.

- Learning through Stories
- Learning through Jokes
- Learning through Puzzles
- Learning through Applications - Knowledge for Career Edge
- Learning through Research
- Learning through Failures – Struggle Stories to Success Stories
- Learning by Doing
- Learning through Pictures / Sketches / Diagrams
- Learning through Quotations – Pearls in the Ocean of Wisdom
- Amazing Powers of Knowledge
- Discovering the Joy of Knowledge – Eureka Moments of Scientists
- Curiosity Corner – Knowledge Around You
- Seamless and Holistic Knowledge
- Wonderful and Exciting Knowledge
- Advancing Frontiers of Knowledge

Various learning resources are regularly developed under KCI on these themes. The resources are mainly in the form of posters, articles, research papers and demonstrations. They are regularly displayed in the form of exhibitions. Table-3 enlists the various exhibitions held so far and Table-4 includes the published articles and papers. Many of these resources have been uploaded on the LC for use by any interested learner.

Table 3 Exhibitions Developed under PIET KCI

Theme of Exhibition	Date of inauguration	No. of posters
International Year of light, 2015	28/1/2016	48
Beyond Marks and Degrees - Knowledge, Skills and Wisdom	28/7/2016	42
Education, Science and Engineering in a Gandhian Perspective	30/1/2018	57

Wonderful world of Science, Technology and Engineering	12/3/2018	42
Learning Motivations in Physics	27/7/2018	116
From India to Bharat – A Forward Journey	18/12/2018	45
Knowledge Center at a Glance	8/2/2019	32
MOIL Limited – A Historical Perspective	22/7/2019	25
Creative Writers of Hitavada	21/12/2019	27
Wonderful World of Nanotechnology	5/3/2020	51

Table 4 Articles / Papers published under KCI

Papers

[1] 'Knowledge Based reorientation of Engineering Physics', Journal for Research, May 2017, Vol. 3, Issue 3, p. 14-17

[2] 'Advancing Physics Learning Through Understanding Errors', IJPRET, vol. 2 (9), 2014, pp. 293-299

[3] 'Knowledge world of crystals- atoms in order', IJPRET, vol. 3 (3), 2014, pp. 26-45

[4] 'Teaching Laser', Journal of Research: 'The Bede Athenaeum', Vol, 3, issue 1, 2012, pp. Jain, 56-60

Articles in Magazines

[1] 'Sixty Years of Feynman's Prophesy', Science Reporter, Vol. 56, No. 12, December 2019, p. 30-33

[2] 'Periodic Table and Henry Moseley', Science Reporter, Vol. 56, No. 5, May 2019, p. 19-22

[3] 'The Man who Laid the Foundation of Lasers Hundred Years Back', Science Reporter, Vol. 54, No. 10, October 2017, p. 41-44

[4] 'Is the Tiger Burning Bright', Science Reporter, Vol. 54, No. 7, July 2017, p. 14-19 (published as a cover story)

[5] 'Seeing the World of Eye', Science Reporter, Vol. 53, No. 10, October 2016, p. 21-25

[6] 'Knowledge Center Presents Report "Mahatma Gandhi – Pioneer of the Science of Nonviolence', http://www.bemagazine.org/38654-2/ p. 1-20

[7] 'Wonder Pipes for Digital India - Optical Fibres', Science Reporter, Vol. 53, No. 2, Feb. 2016, pp. 34-37

[8] 'Story of seamless science and engineering', Science Reporter, Vol. 52, No. 10, Oct. 2015, pp. 14-19 (published as a cover story)

[9] 'Decoding the enigma called light', Science Reporter, Vol. 52, No. 5, May 2015, pp. 14-21 (published as a cover story)

[10] 'The story of crystals', Science Reporter, Vol. 51, No. 12, Dec. 2014, pp. 14-19 (published as a cover story)

[11] 'Story of semiconductors- how useless turned useful', Science Reporter, Vol. 51, No. 9, Sept. 2014, pp. 34-37

Articles Series

[1] Series of 25 articles published in the daily, 'Hitavada' on the eve of international year of physics – 2005; 10 of these articles are published in the bulletin of Indian Association of Physics Teachers in 2007

[2] Series of 10 articles published in the daily, 'Hitavada' on the eve of international year of light – 2015

Recent articles

S. No.	Title of the article	Newspaper	Date
1	Timeless wonders	Middle space, Hitavada	17 May 2019
2	Looking for a shade	Middle space, Hitavada	6 June 2019
3	Paradoxes	Middle space, Hitavada	5 July 2019
4	Rains reign our lives	Middle space, Hitavada	7 August 2019
5	Exam of Life	Middle space, Hitavada	20 August 2019
6	Moving in the realm of unknown	Middle space, Hitavada	17 September 2019
7	Appreciating Bharat	Middle space, Hitavada	22 September 2019
8	Run your own race	Middle space, Hitavada	28 September 2019
9	Pondering over the inevitable	Middle space, Hitavada	1 October 2019
10	U in the Universe	Middle space, Hitavada	12 October 2019
11	Last date of improvement	Middle space, Hitavada	18 October 2019
12	Side effects of excellence	Middle space, Hitavada	1November 2019

13	Happiness leads to humanity	Middle space, Hitavada	9 November 2019
14	Bitter truths – better truths	Middle space, Hitavada	22 November 2019
15	Learning to be proactive	Middle space, Hitavada	13 December 2019
16	The most complicated machine	Middle space, Hitavada	27 December 2019
17	Exploring the room at the bottom	Pastime, Hitavada	29 December 2019
18	Learning through jokes	Middle space, Hitavada	12 January 2020
19	Dream, hope and reality	Middle space, Hitavada	29 January 2020
20	Sportsmanship	Middle space, Hitavada	6 February 2020
21	Greatness of small deeds	Middle space, Hitavada	9 February 2020
22	Knowledge Pyramid	Middle space, Hitavada	16 February 2020
23	Common salt, uncommon knowledge	Middle space, Hitavada	13 March 2020
24	Live in resonance	Middle space, Hitavada	27 March 2020
25	Work from home	Middle space, Hitavada	5April 2020
26	Corona wisdom	Middle space, Hitavada	18 April 2020
27	Surgery and poetry	Creative Dimension Blog	28 April 2020
28	My experiments with education	Creative Dimension Blog	1 May 2020
29	Vision 2020 in corona perspective	Middle space, Hitavada	7 May 2020
30	Mothers learn and let learn naturally	Pastime, Hitavada	10 May 2020
31	Jain therapy for Covid 19	Lokmat Times	12 May 2020
32	Liking and Loving Learning	Middle space, Hitavada	17 May 2020
33	I don't mean to say	Middle space, Hitavada	28 May 2020
34	Making India Bharat Again	Middle space, Hitavada	16 June 2020
35	Unmasked	Oasis, Deccan Herald	19 June 2020
36	World as a corona laboratory	Creative Dimension Blog	20 June 2020
37	Learning through middles	Middle space, Hitavada	5 July 2020
38	From win-one to win-all	Middle space, Hitavada	23 July 2020
39	Who is to tell who is an animal!	Opinion page, Tribune	6 August 2020
40	Personification of courage	Middle space, Hitavada	1 September 2020
41	Jainism – the Science of Self	Website of Yong Jains of America	15 September 2020
42	Turning vegetarian	Middle space, Hitavada	1 October 2020
43	Can NEP help us forget Macaulay	Online news platform, 'Indian Observer Post'	5 October 2020
44	We must save other species to ensure the survival of human species	Online platform, 'counterview. org'	13 October 2020
45	A meeting of different type	Middle space, Hitavada	15 October 2020
46	Connecting to Engineering	Pastime, Hitavada	2 November 2020

These resources help arouse learning motivations of the KC visitors by igniting their curiosity, widening their learning horizons and developing their wisdom.The titles of these publications bring forth the vast diversity of learning motivations possible with KCI. They effectively address the emphasis laid by NEP on aspects such as Environmental education, Value-based education, Forest and wildlife conservation,

Scientific temper and Importance of 'doing what's right'. Table-5 includes a few specific examples of how different learning ideas are served by appropriate resources.

Table-5: Resources Created for Different Learning Ideas

Learning theme / idea	Learning resources
(i) Holistic Learning	Posters based on holistic and seamless aspects of learning are regularly developed and displayed under KCI. A compilation of these efforts was published in the form of an article in Science reporter. [Table IV, No (8) under Articles in magazines]. The article brought forth the holism in nature and the world of work through several examples.
(ii) Enjoyable Learning	Learning is made enjoyable under KCI through several interesting regular features like learning through stories, jokes, pictures, etc. The resources created are in the form of posters and articles.
(iii) Learning having rootedness and pride in India	An exhibition on the theme, 'From India to Bharat – A Forward Journey' has been developed under KCI with the following subthemes: 1. British Rule – An Era of De-development 2. Systematic Destruction of Education System of India 3.Knowledge Centers of Bharat 4.Scholars of Bharat 5. Inventions and Innovations Various posters about 'LokVidya', i.e., important vocational knowledge developed in India, have also been developed under KCI. A paper about how Engineering education in India can be transformed by seeking motivations from Bharat is published in an education journal (paper 1 in Table II) and a few relevant articles are published in dailies.

Those learning under KCI have full flexibility of learning so that they have the ability to choose their learning trajectories and programmes, and thereby choose their own paths in life according to their talents and interests, as envisaged in NEP [page 5]. Optimum student's involvement in learning is ensured through active learning methods like self-study, exploration and interactive discussions; there are no monologue lectures in KC.

Examples of learners who pursued their natural propensities to achieve excellence in their chosen fields are available on LC and also on http://www.piet.edu.in/knowledge_centre.php. Thus the ideas emphasized in NEP [page 3] such as interest based, inquiry-driven, discussion-based, interactive, creative and explorative learning are very well implemented in KCI. However, KCI doesn't restrict only to these ideas but keeps evolving newer ones for continual improvement. For example, recently we added the new themes, 'learning through middles' and 'learning from animals' to this list.

Further Scope for implementation

In addition to the implementation of many NEP ideas discussed in the last section, a lot of scope has also emerged for undertaking further work under KCI on the ideas envisioned in NEP. Table-6 enlists those NEP ideas which are consistent with KCI and thus can be effectively implemented.

Table 6: NEP Ideas Which are Consistent with KCI and can thus be Effectively Implemented

NEP idea	Remark about Implementation under KCI
Public and school libraries will be significantly expanded to build a culture of reading across the country. -- book clubs -- to facilitate and promote widespread reading.	KCI can promote this culture well
-- to facilitate multiple pathways to learning involving both formal and non-formal education modes --- to allow alternative models of education, --- Other models for schools will also be piloted	KCI can be one such effective mode / model.
Teaching and learning --- in a more interactive manner; questions will be encouraged --- more fun, creative, collaborative, and exploratory activities for students for deeper and more experiential learning. ---- hands-on learning, --- , story-telling-based pedagogy	KCI follows this methodology.

Those students that show particularly strong interests and capacities in a given realm must be encouraged to pursue that realm beyond the general school curriculum.	Interest based learning is the backbone of KCI. It also provides the required ambience for such learning
Teachers will aim to encourage students with singular interests and/or talents in the classroom by giving them supplementary enrichment material and guidance and encouragement.	KC is an appropriate place to get such material, guidance and encouragement
Faculty will have the capacity and training to be able to approach students not just as teachers, but also as mentors and guides.	There is no teacher in KC. Faculty is a mentor / guide / senior learner.
Faculty will be given the freedom to design their own curricular and pedagogical approaches ---- Empowering the faculty to conduct innovative teaching, research, and service --- a key motivator and enabler	This spirit is the foundation of KCI.
internships with local industry, businesses, artists, etc.,--research internships with faculty and researchers--so that students may actively engage with the practical side of their learning.	This spirit is in tune with KCI.

There is also a wide scope for future work related to NEP ideas like project/activity on 'The Languages of India', innovative methods of computational thinking, baglessand internship period for students, Indian Knowledge Systems and exposure to activities outside school through visits to places (KC can be the appropriate choice for such visits).

Conclusion

The encouraging experiences of our initiative motivate us to extend and expand it as a proactive grass root initiative for making the learning pursuits of our youth directional and purposeful. KCI may be developed in any educational institute as a compensatory mechanism to overcome the lacunae of the present education system. Administrative bodies like UGC and AICTE can also encourage institutes to develop such initiatives through appropriate policy reforms, strategies and support.

KCI may also be developed in any organisation. For example, such initiatives in industry may enroll only that number of learners, which they will employ after providing them the necessary knowledge and skills. Thus enrolled learner in such centers will not be passed or failed on the basis of some final exam but his / her employment will begin when the industry is convinced about the learner acquiring the required knowledge and skills. This will discourage the present practice of 'earn a degree and search for a job'. A convincing relevant example is the Hathkargha project launched by Mahakavi Pandit Bhuramal social cooperative Hathkargha training center, Dongargarh (MP), with the inspiration of Jain Aacharya Shree Vidyasagarji Maharaj. The project enables learning of the skill of handloom weaving by any interested learners without any cost and they start earning immediately after completing the training.

KCIs thus promise to pump a whip of fresh air in today's grim education scenario. As they can be launched on a large number of platforms and can attract youth due to their inherent freedom and flexibility, they can open the floodgates of knowledge, skills and wisdom to our demographically favourable young population. Thus they can multiply the opportunities for our aspiring youth by fostering innovative ideas of smooth career selection and can lead to a resonant matching between the interest spectrum of our youth and the development demands of our country that can truly usher us in an era of revolution. Such initiatives can also harness the rich variety of our natural and indigenous knowledge and skills and give us the confidence and determination of achieving back our glorious status of education that prevailed before the British rule.

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