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Balance of Tension Creates the Melody of Life

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Bringing Home the Inseparable Intimacy between Physics and Mathematics through Experiments

Chinmoy Kumar Ghosh*, Subhash Chandra Samanta**
and Pradipta Panchadhyayee***

An exercise was undertaken by the IAPT Centre for Scientific Culture, Midnapore College under the aegis of the Education for All (EFA) program of Nanritam's Filix School of Education (NFSE) in a remote hamlet, called Para, in the district of Purulia of West Bengal. The objective of the exercise was two-fold: To internalize the role of experiential learning through hands-on practice in physics experiments and that of perceiving mathematics as giving shape to physics, thereby establishing mathematics as the queen of physics outgrowing its common identity of merely being the language of physics. The exercise consisted of conducting three back-to-back workshops involving the teachers and marginalized students of as many as ten remotely located schools (hosted by NFSE). The unique feature of the exercise lay in its departure from the normal trend of winding up after holding one training workshop with one group and not generally caring for its effectiveness as applied to the end-users that is the students.

The paper is based primarily on the feedback received from the teachers and students who attended the workshop, which, though not indicative of any runaway success, gives the impetus to replicate the exercise at other institutions and aim at higher objectives.

Learning science is incomplete without performing hands-on experiments. During the so-called COVID period, some learners got exposed to virtual laboratories, but these were good for demonstration; they could not bring in the fun of experiential learning which happens in a physical laboratory. Further, very few students got such an exposure. As a matter of fact, the performance of practicals, which is so essential for laboratory-based subjects, physics being the prime among them, has unfortunately lost its relative importance in the curriculum. On the other hand, it is ironic that the students keep getting very high marks on the practical examination since the arrangement for such a test is all managed internally – it is a well-known fact and anything happening in the contrary attracts the wrath of the students and their guardians. We become victims of circumstances, where we end up making the meek surrender of our moral and ethical values which are deeply impregnated in the virtue

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of scientific integrity. Further, going back to the pandemic – it has robbed the students of their normal habit of attending regular classes within the portals of an institution, causing significant harm to their attention span and the worst effect is their conduct at the laboratory. A phenomenal revival towards reversing the ongoing trend is essential before it is too late. The exercise performed by the authors was an effort in this direction.

Over and above this, riding on the inputs obtained from the available literature, it was felt that while the students apply a lot of mathematics in physics, most of them end up using it only as a tool without realizing its inherent role in the development of the conceptual framework of physics. Such a tendency stays with them even during their undergraduate and post-graduate studies in physics. It was felt that by way of making the students perform a judiciously selected set of experiments, the objective of driving home the feel about the inseparably intimate nature of the connection between mathematics and physics can be achieved.

Review of Related Literature

In his essay, “The Unreasonable Effectiveness of Mathematics in the Natural Sciences”, published in 1960, Eugene Wigner [1], a renowned physicist and mathematician, expressed his fascination with the inexplicable relationship between mathematics and the natural sciences. The relationship between physics and mathematics is indeed a complex and intertwined one. Mathematical equations and models are used to express physical laws, making them accessible to scientists and enabling them to analyse, solve problems, make predictions, and conduct experiments. These tools include calculus, linear algebra, differential equations, and more. Throughout the history of science, there has been a close collaboration between mathematicians and physicists. For example, Isaac Newton’s development of calculus was essential for his work in physics, and Albert Einstein’s theory of general relativity relied heavily on advanced mathematical concepts. The distinction between physics and mathematics can be seen as somewhat artificial, as both fields aim to uncover fundamental truths about the universe. The relationship between physics and mathematics is intricate and symbiotic. While they may be distinct fields with their own methodologies and objectives, they are deeply interconnected, with mathematics serving as the essential language and

tool for understanding the physical world. This synergy between the two disciplines continues to drive scientific progress and exploration of the fundamental laws governing the universe. As mentioned in the Book, [2] a number of activities are linked with physics teaching and learning:

- Observing and experimenting
- Describing systems (identifying relevant entities and the relations between them)
- Establishing cause-and-effect relationships
- Defining observables and taking measurements
- Analysing relationships between observables in a lab
- Quantifying and mathematizing these relationships (thereby expressing them in a more precise way)
- Analysing the (mathematical) expressions and producing testable statements about the real or at least lab world or even predicting “new” entities in the real world
- Trying to systematize a body of knowledge, presented mathematically, etc.

The epistemology of physics can vary depending on various factors, such as the background of the author, the specific field of physics being discussed, the physicist in question, or the historical context. Despite these variations, there is a common understanding that mathematics and experiments are central components of modern physics. Research in science education, as evidenced by studies like Hegarty-Hazel [3], Leach and Paulson [4], and Lunetta et al. [5], has extensively considered the role of experiments in physics education. These studies likely explore how experiments are used to teach and learn physics, their effectiveness, and their impact on students’ understanding of physical concepts.

The role of mathematics in teaching physics is explored by developing a Pedagogical Content Knowledge (PCK) model [6]. PCK refers to the knowledge and skills that teachers need to effectively teach a specific subject, in this case, physics. The theoretical view on the role of mathematics is crucial in shaping the PCK model. There are three roles of mathematics:

- (a) Technical Role - This role refers to the basic mathematical skills and techniques essential for teaching physics. It implies the practical use of mathematics in solving physics problems.

- (b) Structural Role-This role goes beyond the technical aspects and involves a deeper understanding of the structural relationships between mathematical and physics concepts. It may include derivations, deductions, and the exploitation of analogies.
- (c) Mathematics as Language of Physics - This is an intermediate way between technical and structural roles. Mathematics is seen as a language that allows for the representation of physical phenomena. It emphasizes the importance of using mathematical representations effectively in teaching.

It is evident that mathematics has not been a popular field of research until recently, while experiments have received significant attention in physics education research. This suggests that there needs to be more focus on how mathematics is integrated into physics education and its implications for teaching and learning. We take note of a need for more investigation into the interplay between experiments and mathematization in physics. This refers to how mathematics models and describes physical phenomena observed through experiments. Understanding this interplay can be crucial for enhancing physics education.

Researchers have indeed identified math as a significant sticking point in problem-solving. Redish and Kuo [7] presented an argument regarding the challenges students face in understanding physics due to the unfamiliar ways physicists use mathematics to create meaning. For example: “For example, many students, given a problem about test charges and electric fields, will say that changing the magnitude of a test charge changes the magnitude of the electric field it measures. They reason from the equation $E = F/q$ that if q increases, E decreases. The students understand the math involved well, but don’t account for the way the force on a charge changes with the charge – there was a hidden functional dependence which they did not see because physics culture assumes the reader will associate every symbol (in this case, F) to its physical meaning. That would make the functional dependence of F on q clear, but students don’t yet expect to have to find this physical meaning when solving problems. The challenge for educators is to create problems and problem-solving environments that encourage students to search for physical meaning in mathematics.” [8]

Separating qualitative and quantitative problems in education is a common approach that

addresses different aspects of learning and problem-solving [9]. The concept of “symbolic forms,” as described by Sherin [10], refers to a way of understanding and working with mathematical equations that involve a blend of intuition and mathematical formalism. Symbolic forms are conceptual structures that incorporate both intuitive and formal elements. This approach is often used by experts in various fields, including physics, and can also be employed by students as they become more proficient in their studies. In the previous workshops organized by CSC and IAPT we designed a pedagogical method for invoking mathematical treatment, in disguise, during result calculation and data analysis of experiments. Some samples are jotted down in an article published in IAPT Bulletin [11].

Strategy Adopted

A five-fold strategy, as explained below, was adopted.

- The exercise has to be compatible with the very strong recommendation about *Experiential Learning* of the National Education Policy 2020.
- It has to be learner-centric primarily by making use of the pedagogy of Active Teaching Learning Process (ATLP), involving students and teachers of rural remote areas.
- The experiments will not be performed under the controlled condition available at a laboratory, and rather have been so designed that one gets the impression that these could be done *anytime, anywhere* with strikingly inexpensive devices.
- Not one, but three back-to-back workshops would be conducted with progressively higher learning outcomes consistent with a coherent and analytic feedback mechanism.
- Last but not the least, the intimate connection between mathematics and physics should get vividly revealed.

Space And Time Co-Ordinates Pertaining to The Exercise

As stated earlier, the exercise consisted of holding three workshops at the Filix School of Education, Para, District Purulia, quite a remote place in the state of West Bengal. Nine other institutions (Names have been given in Appendix I), which are equally remotely located as the host institution were involved in the workshop, either in

the form of sending both teachers and students or only students.

The workshops were held on the following dates:

- (i) October 29, 30, 31, 2022
- (ii) November 26, 27, 2022
- (iii) March 10, 11, 12, 2022

During the workshops, 19 teachers and 54 students (15 girls and 39 boys) from the ten (nine + one) schools, whose names have been given in Appendix-I had participated.

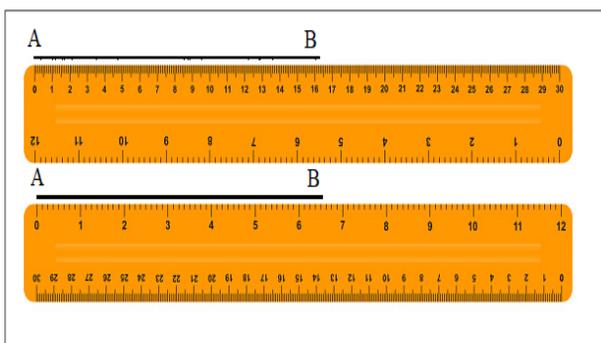
During the first workshop all the experiments (with theory; working procedure; data collection; drawing of graphs, wherever necessary; rudiments of error analysis) were explained threadbare to the participants. Quite a judicious process of selection of the experiments based on the objectives stated above had been undergone before the workshop. A brief about the ten experiments, so selected, is given below:

List of Experiments with Brief Descriptions

Ratio Between 1 inch and 1 cm

Refer to Fig. 1. Draw five straight lines of different lengths. Measure their lengths in inch (x inch) and in cm (y cm) using a scale. Find the mean ratio ($\frac{y}{x}$) to find the relation between inch and centimetre. Also draw a graph by plotting the values of x along x -axis and values of y along y -axis, find the relation between the inch and centimetre from the graph.

Fig. 1: Inch and Centimetre Scales

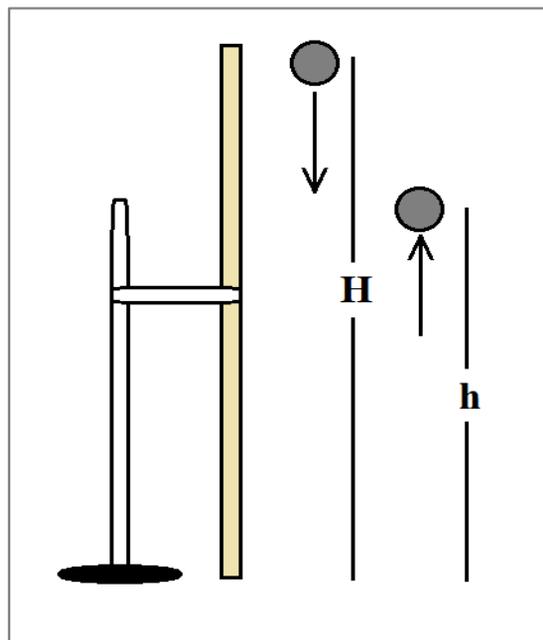


Determination of Coefficient of Restitution

Determination of Coefficient of Restitution (E) and Acceleration Due to Gravity (G)

Let us refer to Fig. 2. A plastic ball is allowed to fall from a height H . If the ball rises to a height h , then

Fig. 2: A Plastic Ball Falling from a Height



$$e = \sqrt{h/H}$$

For a given H , one has to find many values of h . Finally, the mean value of h has to be used in the above formula to find e .

If the time interval between the first and sixth collision of the ball with floor is T second then,

$$T = \sqrt{\frac{8H}{g}} (e + e^2 + e^3 + e^4 + e^5) = \sqrt{\frac{8H}{g}} (f),$$

where $f = (e + e^2 + e^3 + e^4 + e^5)$.

If few pairs of (T, H) are taken to find the mean value of $(\frac{T^2}{H})$ then by applying the formula: $\frac{T^2}{H} = \frac{8f^2}{g}$, it is possible to find g , as e has already been determined.

(A measuring tape has to be used to find H and h , and a stop watch in a mobile phone for measuring T)

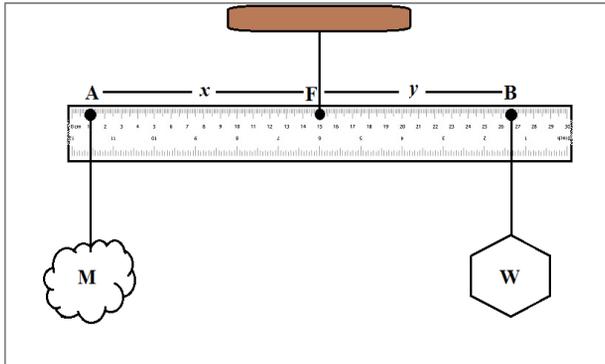
Preparation of the Device for Measuring Mass

Preparation of a device for measuring mass using a plastic scale as a first-class lever and performance of some experiments using the device is explained here.

A 0-30 cm scale is suspended from its 15 cm

mark (F). The scale becomes horizontal. Then F is the centre of gravity of the scale as well as the fulcrum of the first-class lever and the scale is the lever rod (Fig. 3a may be seen). It has been assumed that the scale has uniform linear mass distribution.

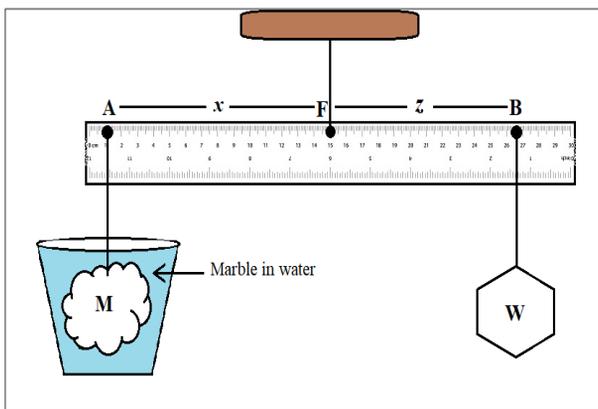
Fig. 3a: A Plastic Scale held Horizontal with Two Weights



A small piece of marble of mass M gm is suspended from point A on the scale to the left of F , so that $FA = x$ cm. To restore the equilibrium of the scale a weight W gm is suspended from a point B to the right of F , such that, $FB = y$ cm, then according to the principle of the lever, $Mx = Wy$, so that, $M = \left(\frac{y}{x}\right)W$ gm.

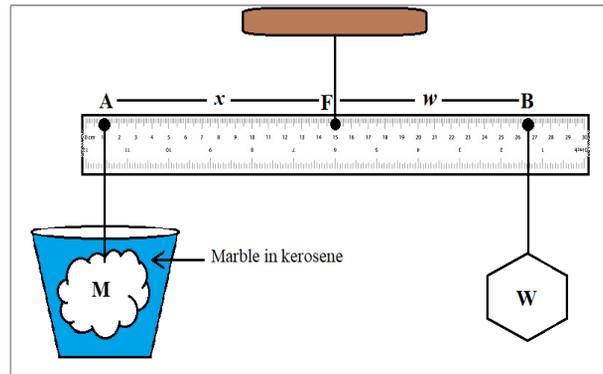
- One can take five pairs of (x, y) , and plot a graph to verify the lever principle.
- Keeping the marble fixed at A , it is immersed in water (as shown in Fig 3b). To restore equilibrium the weight W is placed at a distance z cm from F . Then the weight of the marble in water, $m = \left(\frac{z}{x}\right)W$ gm wt. Then the mass of water displaced by the marble is $(y - z)\left(\frac{W}{x}\right)$ gm. So specific gravity of marble $\frac{y}{y - z}$.

Fig. 3b: A Plastic Scale held Horizontal with One Weight in Air and the Other in Water



- Again, keeping the marble fixed at A , it is immersed in kerosene (as shown in Fig 3c). To restore equilibrium W is suspended from a point on the scale which is at a distance w cm from F . Then specific gravity of kerosene = $\frac{y - w}{y - z}$.

Fig. 3c: A plastic Scale held Horizontal with One Weight in Air and the Other in Kerosene



- Now a small toy bucket is partially filled with water and its weight is measured as in a); it is found to be P . Then its weight is again measured with the marble fully immersed in water without touching the bucket anywhere (See Figs. 3d & 3e); this time its weight is Q . Difference $(Q - P)$ is numerically equal to $(y - z)\left(\frac{W}{x}\right)$ gm wt. This is the measure of the reaction to the buoyant force.

Some Experiments Using a U-tube

A pitch board is pasted with a mm graph paper and a 60 cm long, 6mm diameter plastic tube, ordinarily used by masons for testing level of a floor, is fixed on it in the form of U with one arm somewhat elongated. Some water is poured in one of its arms. The levels of water in the two arms would be equal

Fig. 3d: A Plastic Scale held Horizontal with One Weight in Air and a Bucket Full of Water

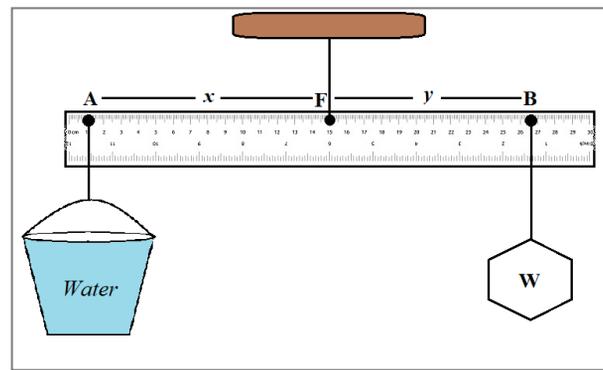
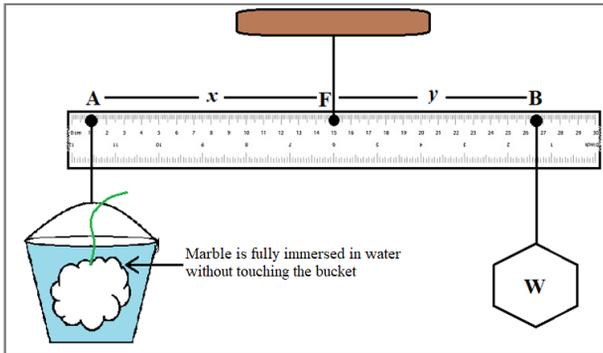


Fig. 3e: A Plastic Scale held Horizontal with One Weight in Air and a Weight Immersed in Water

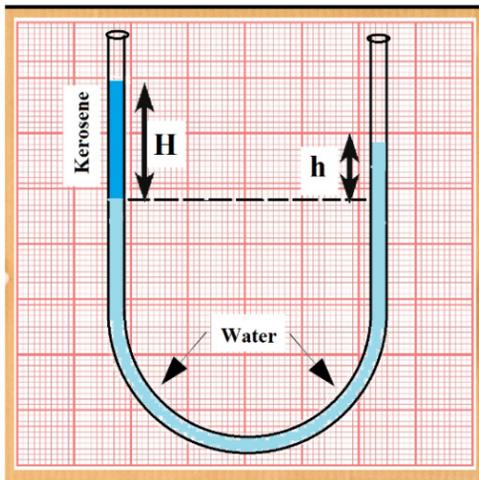


if they are exactly parallel and vertical. So, the U tube is arranged in that way so the water columns in it are vertical.

a) Determination of Specific Gravity of a Liquid, Immiscible in Water Using the U- tube

Refer to Fig. 4a. With water in both the arms, kerosene is added in one arm using a dropper. Now the liquid levels are different in the two arms. If the height of kerosene level from the horizontal contact plane of the two liquids is H cm and that of water level in the other arm is h cm, then specific gravity of kerosene is $(\frac{h}{H})$.

Fig. 4a: U Tube with Water in One Hand and Kerosene in Other Hand



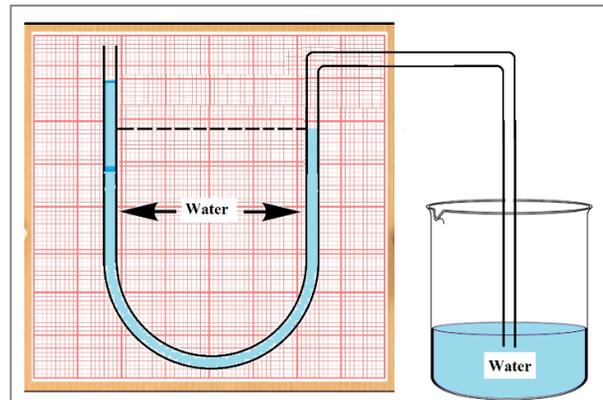
b) Use of U Tube as a Manometer

With water in the two arms, end of the extended arm is dipped in water taken in another container. Refer to Fig. 4b. It is found that difference in the levels of water in the two arms increases as the open end is dipped more and more. This demonstrates

that pressure at a point in a liquid increases with the depth. Here, the tube acts as a manometer.

Similarly, it can be shown that liquid pressure at a point is the same in all directions. If another liquid, kerosene, is taken in the container then one can demonstrate that the liquid pressure at a point depends on its density also.

Fig. 4b: U Tube with One Hand Connected to a Beaker with Water



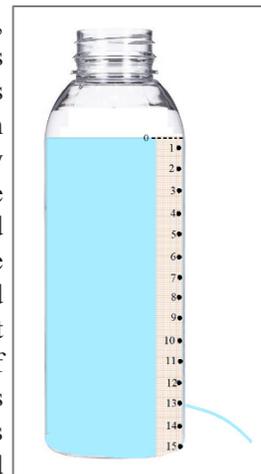
c) Determination of the Relative Density of the Saturated Solution of Common Salt in Water

If common salt is gradually added to clean water in a transparent glass, then after sometime salt remains undissolved - the water has got converted into a saturated solution of common salt. The drops of the solution are poured in an empty tube. Afterwards, kerosene is added. Following the method adopted in a) the density of saturated salt solution with respect to kerosene is determined.

Determination of Acceleration (Retardation)

Refer to Fig. 5. A transparent plastic bottle with uniform cross section, circular or rectangular, has a circular hole close to its bottom. A strip of mm graph paper is attached vertically on a vertical surface of the bottle, which is to be used as a scale. With the hole blocked, the bottle is filled with water. The uppermost water level is marked 0 - of the scale. The blockage is withdrawn at time t , which is taken to be zero ($t=0$) second

Fig. 5: A plastic bottle with a hole



and the position of the level is to be considered, $s=0$ cm. Whenever the level crosses a centimetre mark the time t in second and corresponding position s in cm. are noted. In this way a good number of (t, s) pairs are recorded. Taking t along horizontal x axis and s along vertical y axis the points (t, s) are plotted respectively along the X & Y axes to obtain a graph. But, if the ratios $(\frac{s}{t})$ and corresponding values of t are plotted respectively along Y and X axes, then a straight line, with a negative slope and a positive y -intercept is obtained.

If one observes the flow of water through the hole and downward slide of the water level in the bottle then it would be quite evident that the level starts its downward journey with an initial velocity, say u cm/s, which eventually decreases at a rate f cm/s per second. This means it decelerates with acceleration $-f$ cm/s/s. Hence, it's average velocity in the time span 0 to t , is

$$v = \frac{u+u-ft}{2} = u - \frac{ft}{2}.$$

If we assume that the level descends in this time span uniformly with this average velocity v , then the displacement s of the level in time t is

$$s = ut - \frac{1}{2}ft^2. \therefore \frac{s}{t} = u - \frac{1}{2}ft.$$

From this procedure we understand from experimental observations that y -intercept is the initial velocity of the level and twice the slope is its downward deceleration.

Principle of Rectilinear Propagation of Light and the Properties of Similar Triangles

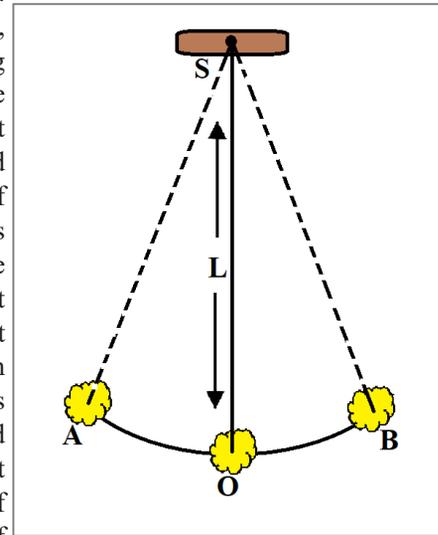
Refer to Fig. 6. Actual lengths of three sticks AB , DE and XY which are about 20,30 and 40 cm long are measured with a measuring tape. Let the actual lengths be respectively a , b and c cm. Now one participant holds the stick AB vertically with B on the ground. A shadow BC of AB is formed on

the ground, because the sun ray that strikes the point A eventually reaches the ground at C following a rectilinear path. The other participant measures the length of BC to be p cm. It is quite clear that a right-angled triangle ABC is formed with its plane vertical. Similarly, the triangles DEF and XYZ are formed. The respective lengths of the shadows EF and YZ are found to be q and r cm. Using very little Algebra, we get, $\frac{p}{a} = \frac{q}{b} = \frac{r}{c}$. This relationship is an outcome of the fact that the three right angled triangles are similar owing to the fact that vertical sticks AB , DE and XY are parallel and the sun rays AC , DF and XZ are also parallel. The above experimental relationship conforms to this fact that light travels in a rectilinear path. Of course, the measurements of the lengths p , q and r are done almost instantaneously. Otherwise, the rotation of sun would make the sun rays AC , DF and XZ non-parallel.

Some Experiments with a Simple Pendulum

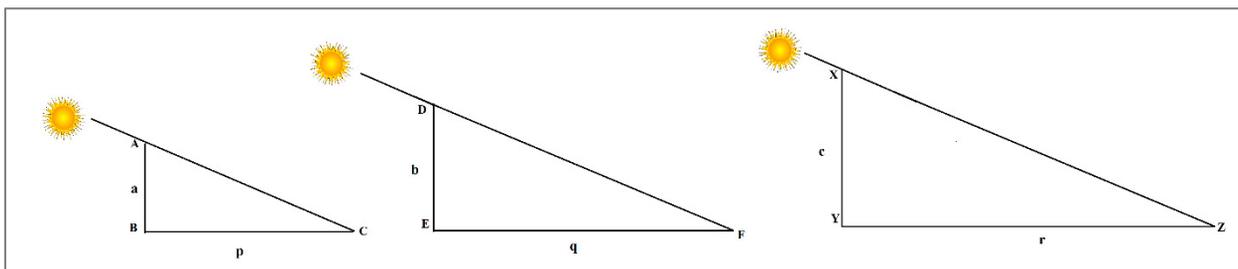
Refer to Fig 7. A practical simple pendulum can be prepared by suspending a small object (a piece of gravel, a small magnet, a potato, etc.

Fig. 7: Simple Pendulum Prepared at Home



using a long, thin but strong thread. The small object is the bob and the length of the thread is its effective length, L . Let S be the point from which the thread is suspended and O is the rest position of the centre of

Fig. 6: Sticks held Normal to the Ground Facing the Sun



gravity of the bob, then $SO = L$.

If the bob is dragged to a point A and then released, the bob would move to and fro from one extreme point A to another extreme point B along the path $AOBOA$. In fact, AOB is the arc of a circle of radius L with centre at S . If L is very large then AOB is practically a straight line. In that case $AO = OB = a$, is called the amplitude (linear amplitude) of the pendulum. The ratio $(\frac{a}{L})$ is the measure of its angular amplitude in radian.

From the properties of a circle, it can be shown that the point A or B is vertically above O by

$h = \frac{a^2}{2L}$. (It may be observed that quite a lot of properties of a circle and the Pythagoras' Theorem have been used to arrive at this relation.)

It means that the potential energy of the bob at A is mgh with respect to O (m is the mass of the bob in gm). In fact, this is the total energy of the bob. As the bob moves to O its $PE = 0$, as $h = 0$. So, the entire energy of the bob is kinetic. Hence if the velocity of the bob is v , then

$$\frac{1}{2}mv^2 = \frac{mga^2}{2L}. \text{ So, } v = \sqrt{\frac{g}{L}}a$$

Again, at B energy is completely potential $= \frac{mga^2}{2L}$. This means as the bob moves along the path $AOBOA$, energy of the bob alternates between its two forms - potential and kinetic.

The time the bob takes to complete its one oscillation i.e., in traversing the path $AOBOA$, is called the time period of oscillation of the pendulum and the number of oscillations it completes in one second, $(\frac{1}{T})$ is called its frequency; its unit is Hertz.

The time period T is independent of its amplitude a and the mass m of the bob, but it increases with the length L of the pendulum and decreases with the increase of g . Variation of T with L and g can be summarized in the mathematical statement: $T = 2\pi\sqrt{\frac{L}{g}}$

Independence of T with a

If a small object is tied with a thread of length about 98 cm, then the pendulum that is obtained has a time period of 2 seconds. Now, if the amplitude is 10 cm, then the bob traverses a path of length 40 cm in 2 second. But, if the amplitude is 20 cm, then the bob traverses 80 cm again in 2 second. Though

it is surprising, it is experimentally true because T is independent of a .

Independence of T with m

In the above experiment, bobs of different masses are taken without any effective change in L . It is found that T remains unchanged.

T varies with \sqrt{L} , if g remains unchanged

For small amplitudes, T is measured using a stopwatch. Length of the thread is taken: 25, 50, 75, 100, 125, 150 cm and time for 20 oscillations are found from which T is determined. T^2 is plotted along Y -axis, and L along X -axis. The linear nature of the graph suggests that

T varies with \sqrt{L} , if the experiment is performed at a particular place.

T varies with \sqrt{g} , if L remains unchanged

To accomplish a variation of g , one does not need to go to the top of a hill or to the bottom of a mine. One has to take a small magnet as the bob and allow it to oscillate over a big magnet. Here L is fixed to a value of say 200cm. Its time period is measured. Next, the distance d between the bob and the magnet below is changed. It would be found that if the two magnets are in attractive mode, then the presence of the lower magnet leads to a decrease in T because effectively g increases, but if they are in repulsive mode, then value of T increases as there is an effective decrease of g . This confirms the above relationship.

(Is it possible to arrive at the relation

$$T = 2\pi\sqrt{\frac{L}{g}} \text{ FROM } v = \sqrt{\frac{g}{L}}a \text{ ?}$$

Experiments with Convex and Concave Lenses

- Refer to Fig 8a. If a convex lens is placed in the proximity of a wall, real, inverted images of distant objects are formed. By definition, wall is the second focal plane of the convex lens and the distance between the wall and the lens is the second principal focal length or simply the focal length, f of the convex lens. Its power in diopter (D) is $P = \frac{100}{f}$, if f is measured in cm.

In case of a concave lens, the procedure a) fails. But if the concave lens is combined with the convex lens, keeping them in contact (Refer to Fig 8b), then sometimes, when convex lens has smaller

Fig. 8a: Image Formed by a Convex Lens Placed Near a Wall

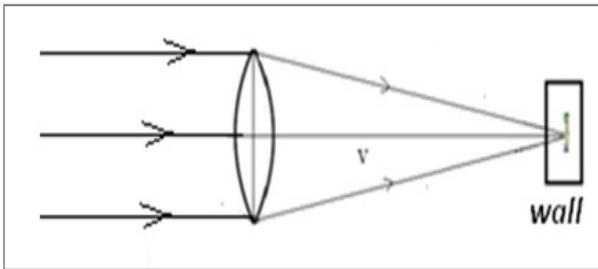
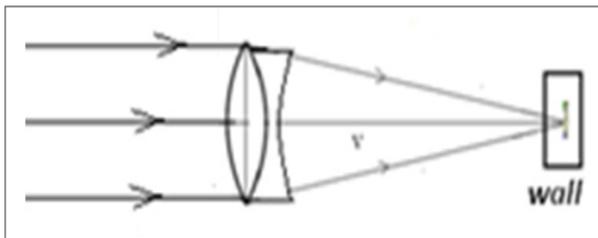


Fig. 8b: Image Formed by a Combination of a Convex Lens and a Concave Lens

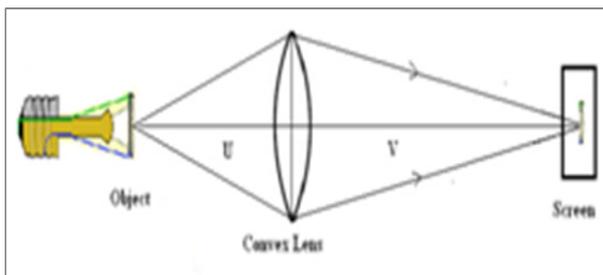


focal length (larger power) the procedure may be adopted in finding the focal length and power of the lens combination f' and power $P' (= \frac{100}{f'} D)$ respectively. Then the power of the concave lens is $(P' - P)$ and its focal length is $(\frac{100}{P' - P})$ cm.

- b) A 60W filament bulb is placed at a distance of D cm from a screen, $D = u + v$, with u as the object distance and v as the image distance, both measured from the thin convex lens, placed in between them. Only for certain values $D (\geq 4f)$, then for two positions of the lens two real images are formed on the screen, filament of the lamp being the object. Clearly, the situation leads to a quadratic equation in v .

For a convex lens producing real image the $u-v$ relation is $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$. Using, $u = (D - v)$ in this relation, we get the quadratic equation: $v^2 - Dv + fD = 0$. Refer to Fig 8c.

Fig. 8c: A Real Image of an Object Formed on the Screen by a Convex Lens

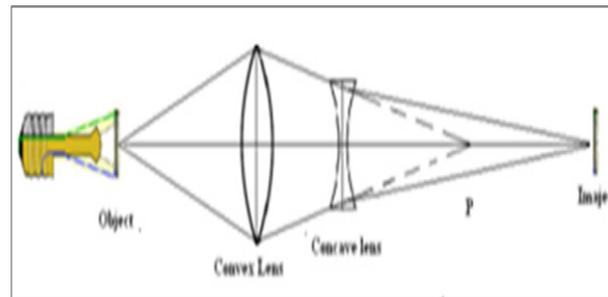


If the difference between the two values of image distances is x , then focal length of the convex lens (applying the theory of quadratic equation) is given by $f = \frac{D^2 - x^2}{4D}$.

Hence, just by measuring the separation x between the two positions of the lens it is possible to measure the focal length of a convex lens.

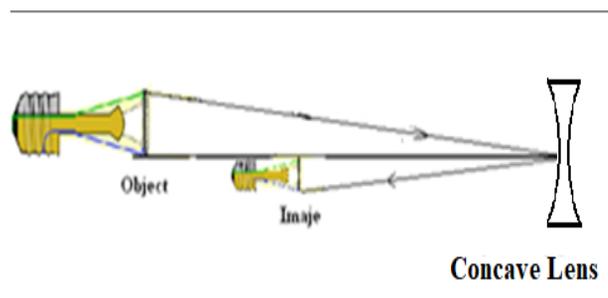
- c) The procedure b) can be employed to measure the focal length f' of the combination of the convex and the concave lens (Refer to Fig 8d). Following the procedure in a) the focal length of the concave lens can be determined when that of the lens combination is known.

Fig. 8d: A Real Image of an Object Formed on the Screen by a Combination of a Convex Lens and a Concave Lens



- d) If light from a filament is incident on the front surface of a concave lens (Refer to Fig 8e), then this surface acts as a concave mirror and a real image of the filament is formed near to it. By adjusting the position of the filament lamp, it is possible to superpose the image on the filament itself. Then the distance of the filament from the concave lens is its radius of curvature R . In that case the focal length of the double concave lens $= \frac{R}{2(n-1)}$, where n is the refractive of the material of the lens. As focal length is known this relation can be employed to find n .

Fig. 8e: Use of a Concave Lens as a Concave Mirror



Determination of the Water Equivalent of a Thermos Flask

Temperature ($t^{\circ}\text{C}$) of water at room temperature is determined. A glass of hot water (M gm) at $T^{\circ}\text{C}$ is poured in the flask. In this situation its temperature $T^{\circ}\text{C}$ is measured. Next, a glass of cold water (m gm) at room temperature is poured in the flask. Water in flask is stirred using a spoon and the temperature of the mixture $T'^{\circ}\text{C}$ is also measured. If W gm is the water equivalent of the flask, then

$$(W + M)(T - T') = m(T' - T)$$

From this relation W can be determined.

Workshop-Wise Activities

First Workshop

- On the first day, after the formalities of introduction and familiarization were over, the resource persons explained all the experiments.
- Thereafter the students were divided into groups, one group for each experiment. With each group two teachers were attached.
- During the second half of the first day, the students performed the experiments under guidance of the resource persons/teachers.

On the first day the experiments were demonstrated by the resource persons. As a matter of fact, every detail was explained to the participants while they performed the experiments.

On the second day, a complete two-hour session was devoted to highlight the mathematics linked with the experiments, conspicuous among them the following:

- a) Linkages with Co-ordinate Geometry
- b) Theory of Quadratic Equation
- c) Similar Triangles
- d) Summation of a G.P. Series
- e) Use of Approximations

Thereafter they again took up the task of performing the experiments. Their queries were attended to, over and above which they were asked to present their feedback in prescribed formats. Two separate formats were designed for the teachers and the students (Appendix II & III).

On the third day, the students tried to complete all the experiments in every respect, which included presentation of data in tabular form, performing calculations, using graphs and estimation of errors in a rudimentary way. The overall completion rate of doing the experiments in terms of numbers was about 70%. And then we conducted a detailed feedback session.

Second Workshop

- It was attended by the teachers and students of the host institution, i.e., Filix School of Education.
- They were trained towards being capable of explaining each experiment to the students of every other participating institution when they would be coming for the third workshop.
- The students did set up all the experiments themselves, and could make the observations without much help from the resource persons.
- They needed guidance while, doing the analysis, where the mainstay had been the use of graphs and the art of writing the inferences.

It was a two-day workshop, where the participants were only from the Filix School of Education (FSOE). They did the observations for all the experiments on the first day, and on the second day they completed the tabulation; analysis using graphs; calculations pertaining to the desired result as well as that of the related errors, and on each day every student was mentored by the resource persons with the objective of making him/her competent about handling the training of the students of the other participating schools in the third workshop

Third Workshop

- It was a three-day workshop
- The participants were students and teachers from all the nine schools, but the role performed by the students of the host institution was different.
- The experiments were distributed among the students of the host institution, each taking up at least one experiment, and explaining its working to every other student.
- The experiments got completed in every respect by the first half of the third day.
- The second half of the third day was utilized for detailed feedback about the three-phase workshop from the students and teachers. A

discussion on mathematical modelling in physics was integrated with the session.

Strategy Driven Outcomes

- Out of the nine schools, six were such that the students have not seen any laboratory. Some of them have seen unpacked instruments lying almost like abandoned items. At two schools some lab activities have been carried out, but the students hardly got any chance to perform the physics experiments hands-on. They have seen the experiments being done by the teachers, that also mostly in Chemistry, where they have enjoyed something of the sort of magic of colours.
- On the contrary, Filix School has excellent facilities. STEM Education is one of the strongest points of FSOE. From the early stages children are taught using various hands-on scientific model and classroom experiments. Even at primary level, math lab and simple models are used to instill mathematical concepts. Classroom demo experiments are an integral part of teaching physical science for middle to secondary school; hands-on robotics and artificial intelligence-based applications are practiced by the secondary students. So, they could pick up the nitty-gritty of the experiments faster than their counterparts. They have much more direct connect with learning by way of experience at their laboratories. So, they were assigned the task of dissemination of the knowledge about the experiments to the students of the other schools during the third workshop.
- We went progressively from a teacher-centric to a learner-centric approach. At the first workshop, experiments were set up mostly by the resource persons. The second workshop was meant only for FSOE. At the third workshop, it was the students who did the set-up. The observations were all taken by them. There were occasions when they committed mistakes, which they were asked to identify and also do the subsequent rectifications. Basically, the role of guidance was taken by the students of FSOE, of course under the mentorship of the resource persons.
- The experiments were not performed in any laboratory. The students were all made to sit in a hall. And every experiment was performed in that hall and two other adjacent rooms. Like, for the ratio between one inch and one cm, some lengths were just drawn on their exercise books, and the students were made to measure them using an inch and a centimetre scale. The pendulum was made to hang from a make-shift hook struck on the door panel and quite a heavy potato (weighing more than 100g) was used as the bob. For determination of focal length, a battery driven bulb was lighted and the light from the filament was made to fall on a lens or a combination of lenses as per the demand of the situation. The images were made to form on white sheets. The relevant distances were measured using a scale. For the experiment to verify rectilinear propagation of light, the students were taken outside in the sun, and they enjoyed looking at the shadows of the sticks of different lengths and analyzing them. Likewise, for every experiment some arrangement could be made to set it up inside the hall itself or in its vicinity, but not in a laboratory.
- The team of authors have acted as resource persons in several workshops (with teachers as well as with student-teacher combined) based on the pedagogy of ATLP, but all of them had been single phase workshops. In most of the cases, the participants gave extremely satisfactory feedback, but the irony had been that the teachers could hardly do the desired follow-up at their parent institutions due to multiple reasons, like the pressure of completion of syllabus, infrastructural limitations and so on. The impact, if any, had always been temporary. Here, by planning three back-to-back workshops we could ensure some continuity. Meeting the challenges was a journey and the impact had been more meaningful which will get reflected from the section on the analysis of feedback.
- A very crucial objective was to bring home the nature of intimate connection between physics and mathematics. The experiments were chosen very judiciously so that they help in establishing the above said feature.
- Let us first talk about graphs, with the help of which they could connect with Co-ordinate Geometry.
- For example, $\frac{y}{x} = m$, which is a straight line passing through the origin, was used for the experiment on determination of ratio between one inch and one cm; or for verifying that, $\frac{T^2}{l} = \text{a constant}$, in case of a simple pendulum. Several such other graphs may be drawn to verify several other features of a simple pendulum.

The straight-line graph, $y = mx + c$, was used for studying accelerated (as a matter of fact, retarded) motion as in Experiment No.6.

The straight-line graph, $x + y = a$ constant; and the hyperbola, $\frac{x+y}{xy} = a$ constant have also been used for the lens-formula related experiment.

For the first time, the students had drawn graphs, and have applied them for obtaining the desired results. They have come across graphical presentations in other subjects, which were mostly bar graphs, pie graphs, line graphs and some of them were conversant with the method of drawing them using a computer. But none of them have drawn any graph to represent any data taken by them. So, they were thrilled by seeing the graphical representation of a y vs x graph of some data observed by them.

- They have learnt to apply Sridharacharya's Formula (SF) for solving a quadratic equation. Many, unaware of SF, have used the factorization method. But they have never been able to feel the reality of a quadratic equation having two solutions, before they saw images of an object being formed on the screen by a convex lens, at two positions. Further, they could relate the simple mathematics behind the interchangeability of the positions of the object and the image through this experiment. They also got practical example of geometric mean by comparing the actual size of the object with the square root of the product of the sizes of the images at the two positions.
- As in the case of their tryst with quadratic equation at their respective classes of algebra, they have learnt the properties of similar triangles at their geometry classes. But they imbibed the same by performing the experiment on rectilinear propagation of light.
- They did the practical application of the sum of a G.P. Series through the experiment on determination of coefficient of restitution and acceleration due to gravity.
- They got ideas about approximations like $\sin\theta \approx \theta$, for small values of θ through the experiment on simple pendulum. We could allay the misgiving that the above approximation is valid for θ being less than or equal to four degrees. The students were exposed to basis of approximation in each case it was used, thereby making them aware that there is always a rationale behind taking such a step.

- They were also sensitized about errors in experiment, and its analysis. While so doing the application of statistics was restricted only to the use of the formulations, mathematical derivations were avoided. A similar approach was taken for explaining the calculation of proportional error. Performing logarithmic differentiation, which is required for calculating proportional error, is beyond the scope of the school curriculum and so it was not attempted; they were exposed only to the rudiments. It did serve one purpose. They could realize that errors are part of experimentation and they need not feel upset if the results obtained by them are at variance with the accepted ones. Further, they learnt to distinguish between personal (random) and instrumental (systematic) errors and got a feel about their determination. Notwithstanding the fact that they were not exposed to the required mathematical preliminaries, they could in general appreciate the role of mathematics in Error Analysis.

Feedback Analysis

Systematic Feedback was obtained from the participating teachers and students by making use of two separate questionnaires (Appendix II and III). But the students, and even the teachers faced the problem of articulation of their thoughts. So, after the third workshop rather than having written feedback, we depended on verbal discussions. The salient features of the feedback are as under:

- i) The teachers were asked to respond to one question – “What you have UNLEARNED?” It appeared from the responses that most of them could not decipher the meaning of the question. Some of them had not even answered this question, which turned out to be a kind of disappointment for us. However, there was a commonality in some of the responses. They felt that some experiments can be introduced without prior knowledge of the theory, and the theoretical basis can be made to emerge from the outcome of the experimentation.
- ii) The response about any innovative approach was also insignificant. But as regards learning something new, some of them mentioned that, earlier they used to think that the working formula happens to be the only thing a student needed to know to initiate an experiment, but

- now they realize that having a strong foundation in the mathematical basis of the principle of the experiment is an extremely significant co-requisite. Some of them have also remarked about strategizing the teaching-learning transaction in a practical class in such a way that a student can relate mathematics with the physical principles.
- iii) The three experiments in order of preference of their choice were the simple pendulum, shadows using similar triangles and scale balance related experiments. The first two also figured in the list of students' choice, but the third one was a bit surprising – the experiment on the determination of ratio between 1 inch and 1 cm. They said that more than the experimentation, which for them had been quite simple, they could master drawing of graph by way of that experiment.
 - iv) The three major things which the students felt that they have learnt were the following: - (a) Tabulation of observed data, (b) Drawing of graphs and performing calculations by making use of them, and (c) Analysis of error in a rudimentary way.
 - v) They realized that for doing an experiment it is not always necessary to go to a laboratory, one can go beyond that and can make use of very inexpensive devices. Some of them even felt that all these experiments can be performed even at their homes, but till the time of holding the third workshop, none of them have tried that.
 - vi) After the second workshop, which was meant only for the students of the host institution, they felt confident about guiding the students of the other schools towards performing the experiments.
- i) So, we consciously planned three back-to-back workshops, so that there had been a continuity. It indeed helped. Since, the workshops were held in residential mode, we used to have informal sessions in the evening with the teachers, where inter alia most of them expressed their desire in having regular laboratory sessions in their schools, which had hitherto been elusive. Some of them, along with their students, admitted that they have not ever entered into the portals of a laboratory, while now they feel confident about setting a physics laboratory with minimal institutional support. They made fervent requests to us to visit their schools and conduct similar workshops. They were conscious about the infrastructural limitations of their places, but there was no dearth of sincerity in their humble requests.
 - ii) The host institution was itself remotely located. The other schools were even more remote and of rural background of a very high order. Over and above these there are multiple kinds of extraneous socio-political pressure which act as serious impediments to dissemination of education. Further, there is always an insurmountable pressure of completing (?) the syllabus. Here, the 'question mark' is used as a metaphor to express that the so-called completion of the syllabus in a superficial manner does not serve any useful purpose, but still it needs to be done, at least on paper, and that also at the cost of transaction of meaningful knowledge.
 - iii) In the light of above, the series of workshops was different. It made the students as well as the teachers feel about the importance of performing experiments. They have the realization that they do not always need a laboratory to be able to perform experiments. They can do them at their homes or any other suitable place as per their convenience; they would not be facing any constraints of time. In other words, the workshop could inculcate among the students and the teachers the spirit of *anywhere-anytime* facet of experiential learning, which happens to be a very strong recommendation of the National Education Policy, 2020.
 - iv) Our objective of promoting mathematics as the queen of physics, and not just as a tool for facilitating understanding of physics got fulfilled to a reasonable extent. It had its reflections in two approaches of the students observed during the

Concluding Remarks

The team of authors has been conducting such workshops over the last two decades. Everywhere, without any exception, they have been told that the workshop has been useful. The participants always look forward to attending such workshops in future. The same happened here also, but there was nothing to be elated about it. As almost in every case, wherever we attempted to know about the follow-up actions, particularly by the teachers at their parent institution, the response has been very bleak. We had to face the fact that nothing significant could happen after the said workshops.

workshop. First, they picked up mathematical relations cutting across their curricular domain of algebra, geometry and trigonometry and felt eager to know about their applications in physics. Second, they showed a positive tendency towards revisiting all the mathematical principles which found application in the experiments.

- v) In view of the interest shown by the students about understanding the mathematical principles behind the experiments, we had conducted a session to give them an essence of mathematical modelling in physics. We primarily had discussions on the planetary model of atom and the postulates of kinetic theory of gases. These discussions, though not directly linked with any of the experiments, were quite vibrant because of the interactions we had. As stated, one of the objectives of these workshops was to establish the role of mathematics in giving proper shape to physics. This additional exercise acted as a confidence boosting supplement in that direction for the students.
- vi) Last but not the least, we cannot and also should not ignore the need of exam-oriented study, as after all it is the marks which finally counts. We can at best try to convince the students that they should give due importance to understand the subject; marks will keep coming automatically and that rote-learning should not be allowed to prevail. In such a situation, we need to introspect about the examination system, and observe that the overall percentage of marks in practical out of the whole syllabi is miniscule, and among that physics practical occupies very little space. So, we cannot expect a student to spend too much of disproportionate time on practical. They need to be guided towards planning a judicious time-budgeting by striking a proper balance between their conceptual needs and examination-based preparation.

Acknowledgement

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APPENDIX I

OF THE UNIVERSITY, ETC:

List of participating schools

- 1. Filix School of Education, Para, Purulia
- 2. P. K Raj Bhagini Nivedita Vidyapith, Kadshipur, Purulia
- 3. Golagara Pathmandir, Pucha, Purulia
- 4. Ramkrishna Sishu Sikhsaniketan, Gopalnagar, Purulia
- 5. Sishu Bharati Vidya Mandir
- 6. Kamalpur Netaji High School, Kamalpur, Purulia
- 7. Munseffdanga High School, Purulia
- 8. Bari Sosibhurian H.S. School
- 9. Ban Kati Primary School (Teachers only)
- 10. T.D.B. College, Ranigunj (Teachers only)

- 7. EMAIL ID:
- 8. MOBILE NO:
- 9. HOW YOU GOT TO KNOW ABOUT THIS WORKSHOP? (FROM A FRIEND /COLLEAGUE/RELATION/ COMMUNICATION FROM NANRITAM/ OTHERS (PLEASE SPECIFY)):
- 10. HAVE YOU ATTENDED ANY SUCH WORKSHOP EARLIER? (Y/N) IF YES, NAME THE WORKSHOP(S) AND THE ORGANISERS.

APPENDIX II

FEEDBACK FORM (Teachers) on the workshop on Linkages between Physics and Mathematics through Experiments

(The Organizers Intend to Know about Your Experience of the Workshop. Please Feel Free to Provide Your FRANK OPINION. You may Choose any Language, Bengali or English)

- 1. NAME (IN BLOCK LETTERS):
- 2. SCHOOL:
- 3. SUBJECT(S) TAUGHT:
- 4. TOTAL TEACHING EXPERIENCE (IN YEARS):
- 5. LEVEL (CLASSES) AT WHICH YOU TEACH:
- 6. DO YOU HAVE ANY PROFESSIONAL TEACHERS' TRAINING DEGREE (Y/N) IF YES, NAME THE DEGREE(S) AND THE CERTIFYING AUTHORITY, LIKE THE NAME

- 11. WHICH ARE THE THINGS YOU UNLEARNED AT THE WORKSHOP?
- 12. DID YOU LEARN ANYTHING NEW? (Y / N) IF YES, WHICH WERE SIGNIFICANTLY NEW FOR YOU?
- 13. NAME THREE EXPERIMENTS, IN ORDER OF PREFERENCE WHICH YOU LIKED THE MOST.
- 14. PLEASE SPECIFY ABOUT ANY NEW METHOD WHICH YOU HAVE OBSERVED.
- 15. DID YOU OBSERVE ANY INNOVATIVE APPROACH WHILE PERFORMING ANY EXPERIMENT? (YOU MAY MENTION MORE THAN ONE)

APPENDIX III

FEEDBACK FORM (Students) on the Workshop on Linkages between Physics and Mathematics through Experiments

(The Organizers Intend to Know about Your Experience of the Workshop. Please Feel Free to Provide Your FRANK OPINION. You may Choose any Language, Bengali or English)

15. DID

1. NAME (IN BLOCK LETTERS):

.....

2. DATE OF BIRTH:

.....

3. SCHOOL:

.....

4. CLASS:.....

.....

5. MEDIUM:.....

.....

6. YOUR FAVOURITE SUBJECT:

.....

7. EMAIL ID:

.....

8. MOBILE NO:

(FOR NUMBERS 7 AND 8 YOU MAY GIVE THE SAME OF YOUR GUARDIAN)

9. HAVE YOU ATTENDED ANY SUCH WORKSHOP EARLIER? (Y/N)
IF YES, NAME THE WORKSHOP(S) AND THE ORGANISERS

.....

10. HAVE YOU GONE TO YOUR SCHOOL LABORATORY?

.....

11. NAME TWO EXPERIMENTS YOU LIKED THE MOST.

.....

12. AMONG THESE EXPERIMENTS, WHICH ARE THOSE YOU FEEL YOU WILL BE ABLE TO PERFORM AT YOUR HOME?

.....

.....

13. WERE YOU AWARE ABOUT ISSUES LIKE:

A) PRESENTATION OF DATA IN TABULAR FORM

B) DRAWING OF GRAPH

C) ANALYSIS OF ERROR

D) ANY OTHER THING, WHICH YOU HAVE LEARNT AFRESH.

14. CLEARLY MENTION THE NEW THING YOU LEARNED.

.....

.....

15. WOULD YOU LIKE TO ATTEND ANY SUCH WORKSHOP IN FUTURE?

.....

.....

16. ANY OTHER COMMENTS NOT COVERED BY ABOVE

.....

.....

SIGNATURE WITH DATE

The Crucial Role of Think Tanks in Cultural Diplomacy: Insights from the Raisina Dialogue

Santhosh Mathew* and Anisha Anirudhan**

Think tanks play a pivotal role in the policymaking and implementation of these policies. In India, though the Prime Minister and the government officials articulate policies, it's the intellectual prowess of these institutions that shapes India's cultural diplomacy landscape. Their influence in shaping foreign policy is increasingly recognized, with India's Ministry of External Affairs (MEA) leveraging their expertise to advance Indian interests on the global stage. A prime example of this collaborative effort is evident in the annual Raisina Dialogue, a prestigious forum jointly organized by the MEA and the Observer Research Foundation (ORF), which serves as a platform for global leaders to address pressing issues facing the international community. Around 2500 participants from 115 countries took part in the recent edition of Raisina Dialogue this year. Under the theme 'Chaturanga: Conflict, Contest, Cooperate, Create,' the dialogue provided a platform to discuss the evolving dynamics of the global landscape.

External Affairs Minister S Jaishankar's call for reforms in the United Nations and Security Council to better reflect the contemporary world order was a significant highlight of the dialogue. This emphasized India's push for a more inclusive global governance system that acknowledges the rise of new global powers.

The discussions at the Raisina Dialogue delved into the complex geopolitical dynamics involving Russia. India advocated for a balanced approach that provides Russia with multiple options beyond aligning closely with China. This stance, amidst differing views from Western countries, reflects India's strategic positioning as a 'middle power' capable of navigating between competing global interests. Additionally, discussions on cultural rebalancing and challenging skewed narratives demonstrated India's commitment to promoting

fairer representation in global diplomacy and challenging the status quo.

The significance of the Raisina Dialogue lies not only in its high-profile participants but also in its ability to generate discourse that transcends traditional diplomatic channels. Through multilateral conferences and facilitated dialogues, think tanks like ORF play a crucial role in bringing together stakeholders from like-minded states to devise solutions to common challenges. The Raisina Dialogue showcased India's prominence in shaping the future world order and its assertiveness on a global level.

The Raisina Dialogue, often compared to Singapore's Shangri-La Dialogue, attracts distinguished participants from various fields, including politics, defense, diplomacy, academia, and journalism. Over the years, it has witnessed the participation of eminent figures such as former Afghan President Hamid Karzai and Israeli Prime Minister Benjamin Netanyahu. This year's event, held in New Delhi, featured panels addressing critical topics, including discussions on the Indo-Pacific security framework, showcasing India's commitment to regional stability and cooperation. At the Raisina Dialogue, these think tanks present insights on how India's cultural diplomacy can foster mutual understanding and respect among nations. They offer recommendations on leveraging cultural heritage, soft power assets, and digital platforms to enhance India's global influence.

At its core, the Raisina Dialogue serves as a testament to the growing importance of think tanks in shaping international relations and cultural diplomacy. By providing an informal space for the exchange of ideas between states, these dialogues foster dialogue and cooperation on a wide range of issues, from security and defense to trade and climate change.

Moreover, think tanks have a long history of influencing foreign policy and diplomacy, dating back to the Cold War era. For example, initiatives like the Dartmouth Conference and the Neemrana Dialogue paved the way for unofficial dialogues between

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adversaries, leading to confidence-building measures and cooperation on critical issues. Similarly, the Raisina Dialogue has become a platform for India to assert its role in the Indo-Pacific region and engage with stakeholders on a new security framework.

Think tanks like the Observer Research Foundation, India Foundation, and Vivekananda International Foundation are at the forefront of formulating policies that project India's cultural heritage and values on the global stage. Through research, analysis, and strategic recommendations, they facilitate dialogue and cooperation between India and other nations. The prominence of Indian think tanks in cultural diplomacy has surged in recent years. Institutions like India Foundation and Vivekananda International Foundation have stepped up, providing innovative solutions and policy frameworks for cultural exchange programs, educational initiatives, and people-to-people connections.

Furthermore, think tanks collaborate with universities and academic institutions to deepen cultural ties through educational exchanges, research partnerships, and language programs. By engaging with diverse stakeholders, including civil

society, diaspora communities, and international organizations, they amplify India's cultural narrative and promote intercultural dialogue.

In the age of social media and information overload, think tanks serve as trusted sources of analysis and expertise, distilling complex cultural issues into actionable policy recommendations. Through their research and advocacy efforts, they contribute to shaping a vibrant and inclusive cultural diplomacy agenda for India. Not only do they play a crucial role in promoting cross-cultural understanding, but they also help in countering cultural stereotypes related to India in the West. By highlighting India's rich diversity and pluralistic ethos, they challenge misconceptions and foster a more nuanced appreciation of Indian culture and society.

In conclusion, think tanks are indispensable partners in India's cultural diplomacy endeavors. As the country seeks to strengthen its global presence and forge closer ties with the international community, these institutions will continue to serve as catalysts for dialogue, cooperation, and mutual respect, advancing India's cultural diplomacy goals on the global stage. □

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Safeguarding Academic Integrity: Unveiling Cloned Journals in UGC CARE Group I

Saju M D* , Vijesh P V** and Varsha Chopade***

In academia, where the dissemination of knowledge serves as the cornerstone of progress, maintaining the integrity of scholarly publications is paramount. Enter the University Grants Commission's (UGC) Consortium for Academic and Research Ethics (CARE), a stalwart guardian dedicated to upholding the sanctity of academic discourse within Indian academia. The UGC-CARE initiative, born out of a commitment to nurture quality research and promote publication ethics, has given the academic community a beacon of guidance: the UGC-CARE Reference List of Quality Journals. This catalogue, meticulously curated to showcase reputable avenues for scholarly dissemination, represents a testament to India's dedication to global academic standards. (Patwardhan,2019).

Yet, amidst the noble pursuit of academic excellence, a troubling trend threatens to compromise the integrity of scholarly discourse: the proliferation of cloned journals (Krawczyk,2021). These journals shrouded in the guise of legitimacy, entice unsuspecting scholars with promises of swift publication, inflated impact factors, and dubious indexing credentials. However, beneath their veneer of authenticity lies a realm of substandard research, casting a shadow over the reputation of Indian academia. In a significant revelation, UGC-CARE has unveiled a list of cloned journals infiltrating its esteemed Group I—a collection carefully curated to exemplify scholarly integrity. This list, which has 63 entries, is evidence of the stringent evaluation procedures used by UGC-CARE to sift through the flood of submissions and distinguish legitimate scholarly platforms from their fraudulent counterparts(<https://ugccare.unipune.ac.in>)

Each entry in this list is a stark reminder of the importance of academic vigilance. It underscores the need for scholars to exercise discernment in

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selecting the avenues through which their research finds expression, steering clear of the pitfalls posed by predatory publishing practices. As this revelation reverberates through the academic community, it calls for collective action. It implores scholars to remain vigilant, scrutinize the journals they engage with, and align themselves with reputable platforms endorsed by UGC-CARE. In doing so, we can fortify the foundations of academic integrity, ensuring that the pursuit of knowledge remains untainted by the shadows of deceit. In this paper, the authors try to demonstrate how unveiling cloned journals in the UGC-CARE Group will serve as a watershed moment for Indian academia. It prompts us to re-evaluate our approach to scholarly dissemination, prioritize quality over practicality, and champion the cause of academic integrity collectively. In this pursuit lies the promise of a future where scholarly discourse thrives, untainted by the spectre of predatory publishing practices.

In a pioneering move, we present the complete list of cloned journals identified within UGC-CARE Group I. This revelation comes at a critical juncture where the integrity of scholarly publishing faces unprecedented threats from predatory practices. While this list is readily accessible through a simple registration process, many scholars remain unaware of its existence or how to navigate it effectively. The proliferation of pay-and-publish schemes and predatory publishing agencies has reached alarming levels, perpetuating a cycle of exploitation within the academic community. Yet, amidst these challenges, there exists a prevailing silence among the majority of affected scholars—professors, researchers, and academics—who hesitate to speak out against the fraudulent activities of predatory publishers.

In this context, the publication of this comprehensive list in the university news journal holds immense significance. By shedding light on the prevalence of cloned journals within UGC-CARE Group I, we aim to empower scholars with the knowledge and tools necessary to navigate the complex terrain of scholarly publishing. This initiative serves as a beacon of guidance, offering clarity amidst the murky waters of predatory publishing practices. Through disseminating this list, we endeavor to equip

scholars with the means to distinguish reputable journals from their deceptive counterparts and make informed decisions about where to publish their research. Furthermore, by openly addressing the issue of cloned journals, we hope to catalyze a broader conversation within the academic community. It is time for scholars to unite in solidarity against predatory publishing, to advocate for transparency and integrity in scholarly dissemination, and to hold fraudulent publishers accountable for their actions. Therefore, the publication of the UGC-CARE cloned journals list represents a pivotal step towards empowering scholars to safeguard their research and uphold the principles of academic integrity. Together, let us embark on a journey toward a future where scholarly publishing is characterized by honesty, accountability, and excellence. The Objectives of the Study are:

- To raise awareness among scholars, researchers, and academics about the existence and proliferation of cloned journals within the UGC CARE Group I list.
- Identify the characteristics and common traits of cloned journals listed in the UGC CARE Group I, including discrepancies in language availability, publisher information, ISSN, and URL accessibility.
- To evaluate the potential impact of engaging with cloned journals on academic integrity, credibility, and the dissemination of scholarly research.
- To assess the effectiveness of current awareness initiatives and communication channels in informing scholars about the risks associated with predatory publishing practices, specifically focusing on cloned journals within the UGC CARE Group I list.
- To examine scholars' attitudes, perceptions, and experiences towards cloned journals, including their knowledge of how to identify and avoid deceptive publishing practices.
- To explore the role of academic institutions, regulatory bodies, and scholarly communities in combating the proliferation of cloned journals and promoting best practices in scholarly publishing.
- To develop recommendations and guidelines for scholars on navigating the complex landscape of academic publishing, emphasizing the importance of consulting authoritative sources like the UGC CARE list and exercising discernment in selecting journals for publication or reference.
- To advocate for increased transparency and accountability in scholarly publishing, urging

publishers to adhere to recognized editorial standards and peer-review processes to ensure the integrity and reliability of academic research.

- To foster a culture of collaboration and mutual support among scholars, encouraging sharing knowledge and experiences related to identifying and addressing deceptive publishing practices within the academic community.
- To contribute to the ongoing discourse on academic integrity and ethical conduct in research, highlighting the need for collective action to safeguard the credibility and trustworthiness of scholarly publications.

Analysis of Cloned Journals listed in UGC CARE Group I

The comparison between journals listed in the UGC-CARE List and their cloned counterparts not recognized by UGC sheds light on crucial distinctions impacting academic integrity and credibility. The UGC-CARE List is a hallmark of reputable scholarly publications endorsed by India's University Grants Commission (UGC). However, cloned journals pose significant challenges, necessitating awareness within the academic community. Among the 63 journals identified as cloned, discrepancies abound in crucial areas such as language, publisher, ISSN, and URL accessibility. For instance, journals like "Shodha-Prabha" and "Shodhak: A Journal of Historical Research" exhibit variations in language availability between their legitimate and cloned versions. While the originals uphold linguistic diversity, the clones often lack recognition or offer limited language options, potentially compromising scholarly inclusivity. Furthermore, the presence of cloned journals lacking identifiable publishers raises concerns about editorial oversight and adherence to standard publishing practices. Journals like "Industrial Engineering Journal" and "International Journal of Food and Nutritional Sciences" lack publisher information in their cloned versions, raising questions about the legitimacy of their editorial processes and peer-review procedures.

The analysis also highlights discrepancies in URL accessibility, with some cloned journals directing to dubious sources or predatory content. The absence of valid URLs in legitimate journals can hinder accessibility and undermine the dissemination of scholarly knowledge. Conversely, cloned journals often need proper URLs or redirect to suspicious sources, jeopardizing the credibility and reliability of

academic research. Additionally, the cloned journals' presence underscores the importance of vigilance and discernment among researchers and academic institutions. By consulting authoritative sources like the UGC-CARE List, scholars can ensure scholarly publications' authenticity and reliability, safeguarding against predatory practices and maintaining the integrity of academic discourse.

On the whole, comparing legitimate journals on the UGC-CARE List and their cloned counterparts reveals significant academic integrity disparities. Awareness within the academic community is crucial to discerning between reputable publications and cloned versions, thereby upholding rigorous editorial standards and preserving the credibility of scholarly research (<https://ugccare.unipune.ac.in/Apps1/User/Web/CloneJournalsNew>).

Suggestions and Recommendations to the Academic Community

Increased Awareness and Education

Organizing workshops, seminars, and informational sessions can be invaluable in raising awareness about the risks associated with predatory publishing. These sessions should cover topics such as identifying cloned journals, the consequences of publishing in predatory journals, and the importance of maintaining academic integrity. Additionally, incorporating this information into the academic curriculum ensures students receive a comprehensive education on scholarly publishing practices.

Utilize Authoritative Resources

Encourage scholars to regularly consult reputable resources such as the UGC CARE List, Think Check Submit, COPE, DOAJ, and OASPA. These platforms offer guidelines and checklists to help researchers evaluate journal credibility. Access to these resources through institutional libraries and websites ensures that scholars can access reliable information quickly.

Develop Institutional Guidelines

Academic institutions should establish clear guidelines for faculty and researchers on selecting credible journals for publication. These guidelines outline the criteria for assessing journal credibility, emphasize the importance of rigorous peer review, and provide steps for verifying publisher authenticity. By institutionalizing these guidelines, institutions can ensure consistency in publishing practices across departments and disciplines.

Strengthen Peer Review Processes

Publishers and academic societies play a critical role in maintaining the integrity of scholarly publishing through robust peer review processes. It is essential to prioritize transparency and rigor in peer review, including disclosing reviewer identities and providing clear criteria for manuscript evaluation. By strengthening peer review practices, publishers can instill confidence in the quality of published research and mitigate the influence of predatory publishing.

Collaborative Efforts

Facilitating collaboration between faculty members, librarians, and scholarly communities fosters collective action against predatory publishing practices. Establishing forums for knowledge sharing, such as discussion groups or online forums, allows stakeholders to exchange information, share experiences, and coordinate efforts to combat predatory journals effectively. Creating interdisciplinary research networks focused on publishing ethics can also enhance awareness and promote best practices.

Support for Early Career Researchers

Early career researchers often lack experience navigating the complexities of academic publishing, making them particularly vulnerable to predatory journals. Providing mentorship programs, workshops, and resources tailored to the needs of early-career researchers can empower them to make informed publishing decisions. Mentors can offer guidance on selecting reputable journals, navigating peer review processes, and avoiding predatory practices, thereby safeguarding the career trajectories of young scholars.

Regular Updates and Monitoring

To avoid emerging threats posed by predatory publishers, institutions should regularly update and monitor lists of predatory journals and publishers. Establishing mechanisms for reporting suspicious journals and publishers ensures that potential threats are swiftly identified and addressed. Institutions can collaborate with industry organizations, regulatory bodies, and scholarly publishers to share information and effectively coordinate efforts to combat predatory publishing.

Advocate for Transparency

Advocating for increased transparency and accountability in scholarly publishing is crucial for maintaining the integrity of the academic publishing

ecosystem. Institutions, funding agencies, and scholarly societies should advocate for publishers to adhere to ethical editorial practices, disclose publication fees upfront, and provide transparent policies on peer review, copyright, and retractions. By promoting transparency, stakeholders can instil trust in the scholarly publishing process and mitigate the influence of predatory publishers.

Promote Quality Over Quantity

Encouraging scholars to prioritize quality over quantity in their publishing endeavours is essential for upholding academic standards. Emphasize the importance of publishing in reputable journals with rigorous editorial standards, even if it means longer publication timelines or higher rejection rates. By promoting a culture of excellence in publishing, institutions can deter scholars from engaging with predatory journals and elevate the overall quality of scholarly research.

Encourage Critical Evaluation

Foster a culture of critical evaluation among scholars by encouraging them to assess journal credibility critically. Provide training and resources on evaluating factors such as journal indexing, peer review processes, editorial board composition, and publication ethics. Encouraging scholars to conduct due diligence before submitting manuscripts ensures that they make informed decisions about where to publish their research, thereby safeguarding the integrity of academic discourse (Richtig et.al,2018).

By implementing these recommendations, the academic community can work together to combat predatory publishing practices, protect the integrity of scholarly research, and uphold the credibility of academic publishing.

In conclusion, the revelation of cloned journals within the UGC-CARE Group I list marks a pivotal moment for Indian academia, underscoring the critical need for heightened vigilance and proactive measures to safeguard academic integrity. As scholars, researchers, and academic institutions navigate the complex landscape of scholarly publishing, these cloned journals serve as a stark reminder of the challenges posed by predatory practices and the imperative to prioritize quality over expediency. The comprehensive analysis of these cloned journals reveals glaring disparities between reputable publications endorsed by UGC-CARE and their fraudulent counterparts. Discrepancies in language availability, publisher information, ISSN,

and URL accessibility underscore the importance of discernment and reliance on authoritative sources like the UGC-CARE list to ensure the authenticity and reliability of scholarly publications.

The objectives outlined in this study emphasize the multi-faceted approach required to address the proliferation of cloned journals effectively. Increased awareness, utilization of authoritative resources, development of institutional guidelines, and collaborative efforts among stakeholders are essential to combating predatory publishing practices and promoting best practices in scholarly dissemination. Moreover, supporting early-career researchers, advocating for transparency, and encouraging critical evaluation of journal credibility is integral to fostering a culture of academic integrity and excellence. By prioritizing quality over quantity and empowering scholars with the knowledge and tools to navigate the publishing landscape responsibly, the academic community can mitigate the influence of predatory publishers and uphold the credibility and trustworthiness of scholarly research.

In essence, the publication of the UGC-CARE cloned journals list represents a call to action and an opportunity for collective reflection and collaboration. By working together to confront the challenges posed by predatory publishing practices, we can uphold the principles of academic integrity, promote scholarly excellence, and ensure that the pursuit of knowledge remains untainted by deceit. By doing so, we demonstrate our dedication to promoting research and upholding the standards of intellectual discussion in Indian academia and beyond.

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Institutional Autonomy in Indian Higher Education: A Tapestry Woven with Progress, Challenges and Collaboration

Sakshi Sharma*

In the bustling tapestry of India's diverse landscape, one thread stretches with growing urgency: the need to revitalize its higher education system. Amidst an ever-expanding economy and the demands of a knowledge-driven world, the existing structure, riddled with bureaucratic hurdles and limited flexibility, struggles to keep pace. Enter the concept of institutional autonomy, a beacon promising empowerment and transformation. Yet, its implementation necessitates navigating a complex terrain marked by historical legacies, evolving policies, and diverse perspectives. This article delves into the contemporary status of autonomy in Indian higher education, dissecting the patchwork landscape where some institutions flourish with self-governance while others remain tethered to centralized control. We then navigate a labyrinth of concerned policies and their recommendations, analyzing the roadmap laid out by the National Education Policy 2020, UGC regulations, and insightful reports like the Rameshwar Nath Committee recommendations. However, the journey doesn't end here. We critically examine revisions and evolving perspectives, recognizing the need for a nuanced approach that balances autonomy with accountability, addresses resource disparities, empowers faculty, and nurtures a culture of innovation. With a futuristic vision firmly etched in mind, we paint a picture of a landscape where empowered institutions, thriving on performance-based funding and international collaborations, spearhead research and innovation. Yet, challenges lurk around the corner – political interference, capacity building needs, faculty development demands, and the ever-present quest for equity and inclusion. Unraveling these threads, we propose a collaborative action plan, advocating for strengthened governance, robust accreditation systems, and continuous evaluation. Ultimately, this journey towards meaningful institutional autonomy is not merely about granting freedom; it's about igniting a transformative spark, one that sets in motion a chain reaction of excellence, propelling India's higher education system towards a brighter,

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more vibrant future. So, embark with us on this intellectual odyssey, unraveling the complexities, exploring the possibilities, and paving the way for a tomorrow where empowered institutions stand tall, shaping the knowledge landscape of not just India, but the world.

What is Institutional Autonomy?

Institutional autonomy refers to the degree of freedom and self-governance enjoyed by an educational institution in areas like academics, administration, and finances. "A degree of self-governance, necessary for effective decision making by institutes of higher education regarding their academic work standards, management and related activities," (UNESCO, Vlasova, 2019). There are different types of autonomy each with varying levels of freedom and control. '*Full Autonomy Institutions*' have complete control over all aspects, with minimal government interference. Examples include some private universities in the US. '*Graded Autonomy Institutions*' have varying degrees of freedom depending on their performance and accreditation level. They may only have autonomy in certain areas, like academics, while others remain under government control. This is a common model in India. '*Limited Autonomy Institutions*' have minimal freedom, with most decisions subject to government approval. This applies to many public universities in India.

The scope of autonomy depends on the specific context and policies adopted by each country or region. However, some common areas of focus include 'Academic Freedom' such as the right to pursue research, teach, and express ideas without undue restrictions; 'Financial Independence', which provides the ability to raise funds, manage resources, and set tuition fees, etc.; and 'Administrative Autonomy' which gives the power to make decisions about internal governance, staffing, and operations.

Why Institutional Autonomy is Required?

Advocates of institutional autonomy believe it fosters innovation and excellence, Accountability and Responsiveness, Diversity, and Competition

as institutional autonomy allows HEIs to adapt to changing needs and experiment with new approaches, and make Institutions directly responsible for their success and accountable to stakeholders, and with this, different institutions can develop unique identities and attract diverse students and faculty.

However, concerns also exist; such as, Autonomy may exacerbate existing inequalities, making quality education less accessible to disadvantaged groups; Without proper safeguards, autonomy can lead to misuse of resources and lack of accountability and also, and capable mechanisms are needed to ensure institutions maintain high academic standards. Therefore, achieving meaningful institutional autonomy requires a balanced approach that ensures freedom, accountability, and a commitment to serving the wider public good.

The Status of Institutional Autonomy in the Indian Higher Education System?

The Indian higher education system, one of the largest in the world, stands at a pivotal juncture. The demand for skilled graduates and quality research output necessitates reform, and institutional autonomy emerges as a critical lever for change. Therefore, it is important to know the current state of autonomy in Indian higher education and its future landscape.

Contemporary Status

Currently, the Indian higher education system exhibits a diverse autonomy landscape. We can broadly categorize institutions into the following groups:

- *Highly Autonomous Institutions:* A select few institutions like IITs, IIMs, and Central Universities enjoy significant autonomy in academics, administration, and finances.
- *Graded Autonomy:* Some universities and colleges have achieved various levels of autonomy through schemes like Autonomous Colleges, UGC's Autonomy Framework, and NAAC accreditation with graded scales.
- *Limited Autonomy:* The majority of public universities and colleges remain under considerable government control, with limited flexibility in curriculum, fee structure, and faculty recruitment.

This varied picture highlights the uneven distribution of autonomy, with a strong centralization tendency historically. While some institutions

flourish with the freedom to innovate, the majority navigate bureaucratic hurdles and limited decision-making power. Several policies in India advocate for greater institutional autonomy in higher education, each with its own set of recommendations, which can be discussed as follows:

1. **National Education Policy--2020 (NEP--2020)** recommends some important reforms concerned with the autonomy of HEIs in India:
 - *Graded Autonomy Framework:* Establishes a tiered system of autonomy based on performance and accreditation ratings (e.g., NAAC). Institutions achieving higher grades will get progressively more freedom in academics, finances, and governance.
 - *Self-governing Boards:* Recommends independent boards with academic and administrative autonomy, including representatives from diverse stakeholders.
 - *Flexible Curriculum Design:* Encourages institutions to design curricula that are relevant, flexible, and cater to individual student needs.
 - **Financial Reforms:** Promotes greater financial flexibility for autonomous institutions, allowing them to explore alternative funding sources and manage their resources effectively.
2. **UGC (Declaration of Autonomy) Regulations, 2018:** UGC's regulation 2018 regarding institutional autonomy has defined some important regulations:
 - *Categorization of Autonomy:* Defines various categories of autonomy (e.g., Autonomous Colleges, State Private Universities) with specific criteria for each.
 - *Focus on Academic and Financial Autonomy:* Primarily emphasizes giving institutions freedom in curriculum design, examination systems, and fee determination.
 - *Performance-Based Renewal:* Autonomy granted is initially for five years and renewed based on continuous evaluation of performance against set parameters.

Rameshwar Nath Committee Report (2011): The key recommendations of Rameshwar Nath Committee Report 2011 can be discussed as follows:

- *Financial and Administrative Autonomy:* Advocated for greater autonomy in areas like

financial management, recruitment of faculty and staff, and governance structures.

- **Performance-Based Funding:** Proposed allocation of government funds based on performance measured through transparent parameters.
- **Strengthening Internal Governance:** Emphasized the need for robust internal governance structures to ensure accountability and effective utilization of autonomy.

Apart from the above, the Higher Education Financing Agency (HEFA) aims to provide loans and funding to eligible institutions for infrastructure development and research activities; the UGC Innovation Council focuses on fostering innovation and entrepreneurship in higher education institutions; and National Institutional Ranking Framework (NIRF) ranks institutions based on various parameters, promoting healthy competition and incentivizing performance improvement. All these initiatives support institutional autonomy in order to develop a high-quality and productive higher education system in India. The recommendations emphasize differentiation, offering greater autonomy to institutions that demonstrate excellence and capacity. The focus is on accountability and performance, with mechanisms in place to ensure the responsible use of autonomy. There is a growing emphasis on collaboration and partnership between institutions, government agencies, and industry players. It's important to note that these policies are at different stages of implementation, and some face challenges like resource constraints and capacity-building needs. Nonetheless, they represent a significant shift towards empowering institutions and increasing their autonomy. Understanding the nuances of these recommendations and their evolving implementation is crucial to comprehending the future of institutional autonomy in Indian higher education.

Revisions and Evolving Perspectives- Addressing Concerns and Fostering Change

While these policies hold promise, certain aspects require revision and nuanced understanding:

- Absolute autonomy, without robust checks and balances, can lead to accountability issues. Effective mechanisms for monitoring performance and ensuring equity are crucial.
- The uneven distribution of resources between institutions poses a challenge. Leveling the playing

field and ensuring equitable access to funds is essential for the fair implementation of autonomy.

- True autonomy extends beyond institutional leadership. Empowering faculty in curriculum development, research pursuits, and governance is key to fostering a vibrant academic environment.
- Fostering a culture that embraces experimentation, encourages risk-taking, and rewards innovation is crucial for institutions to capitalize on autonomy effectively.

These considerations highlight the need for a multi-pronged approach that goes beyond mere policy pronouncements. Building capacity, strengthening internal governance structures, and nurturing a culture of innovation are equally important aspects of a successful autonomy journey.

Futuristic Vision: A Landscape of Empowered Institutions

Envisioning the future of institutional autonomy in India, we can expect:

- **A Multi-tiered Autonomy Framework:** Different institutions, based on their performance and capacity, will enjoy varying degrees of autonomy, fostering diversity and competition.
- **Performance-based Funding:** Funding will be allocated based on institutions' performance, incentivizing excellence and innovation.
- **Enhanced Focus on Research and Innovation:** Autonomous institutions will be better equipped to attract talent, foster cutting-edge research, and contribute to knowledge creation.
- **Greater Internationalization:** Increased autonomy will empower institutions to forge global partnerships, attract international students and faculty, and enhance their global standing.
- **Accountability Mechanisms:** Robust systems for monitoring performance, ensuring equity, and addressing potential misuse of autonomy will be in place.

This vision necessitates collaborative efforts from various stakeholders. The government needs to create an enabling environment through policy reforms, providing targeted support, and facilitating resource mobilization; Institutions are supposed to build internal capacity, strengthen governance

structures, and foster a culture of innovation and accountability; funding agencies need to adopt flexible funding models, supporting research initiatives, and promoting collaborative projects. Civil society's job is to advocate for equitable access to autonomy, monitor its implementation, and hold institutions accountable to their stakeholders. As they say, "Together we can".

Achieving Meaningful Transformation: Challenges and the Road Ahead

By addressing concerns, fostering an innovative and accountable culture, and working collaboratively, India can unlock the true potential of institutional autonomy in its higher education system. However, several challenges remain on the road to achieving this future vision:

- *Political Interference*: Resisting undue political interference in institutions' decision-making processes is crucial to safeguard academic freedom and ensure autonomy is not misused.
- *Capacity Building*: Equipping institutions with the necessary infrastructure, financial resources, and human capital to effectively utilize autonomy is critical.
- *Faculty Development*: Fostering a culture of research excellence, innovation, and pedagogical leadership among faculty members is essential for institutions to thrive in an autonomous environment.
- *Equity and Inclusion*: Ensuring equitable access to quality education and research opportunities for all students, regardless of their background or socioeconomic status, is paramount.
- *Standardization and Accreditation*: Developing robust and reliable accreditation mechanisms that measure institutional performance holistically, beyond traditional metrics, is necessary.

Overcoming these challenges requires a multi-pronged approach. Implementing transparent and accountable governance structures within institutions, with representation from diverse

stakeholders, will be crucial. Fostering collaboration between institutions, government agencies, funding bodies, and industry partners will create a synergy for knowledge sharing, resource mobilization, and joint initiatives. Regularly reviewing the implementation of autonomy policies, incorporating feedback from stakeholders, and making necessary adjustments will be essential for its success.

Conclusion

Institutional autonomy represents a significant opportunity to transform India's higher education system, fostering innovation, excellence, and global competitiveness. While challenges remain, the potential rewards are undeniable. By adopting a holistic approach, addressing concerns, and fostering a collaborative environment, India can pave the way for a future where empowered institutions drive progress, create knowledge, and contribute meaningfully to the nation's social and economic development.

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Balance of Tension Creates the Melody of Life

Prasoon Joshi, Poet, Writer and Chairperson, Central Board of Film Certification delivered the Convocation Address at the Convocation Ceremony of FLAME University, Pune on September 04, 2021. He said, "It is important to examine yourself for what you want and examine what is there for you in the world. Don't settle easily. Explore. When your vibrations match what you're doing, the moment you find synchronization, work will never look like work to you." Excerpts

When I was requested to be here, I felt fortunate to be part of such an important day of your life. Today is a day you will always remember; after all, it's a milestone. So congratulations.

I wish one were present physically there, and we could chat and talk and look into each other's eyes. But these are difficult and unprecedented times. I am glad that we are at least getting to meet each other virtually, And I'm getting an opportunity to share my thoughts with you.

I can only share my thoughts because I believe that we all, as individuals, have our own learning process.

You have been extremely fortunate that you have been able to learn from such fine teachers. Tomorrow is Teacher's Day. So, I take this opportunity and thank all the teachers I have learned from in my life; the ones who have shaped me, not only in school or college but beyond that.

In this country, we have the grand tradition of "Guru-shishya Parampara" and understand the value of teachers in our life.

A true teacher wants you to be ultimately free and embark on your own journey. A true teacher wants you to be freed of even himself, so that you can go out there in the world and make a difference in your unique way.

Even today, I feel like a student. Learning never stops. So though graduation from college is a milestone in your life, never think that learning stops. Life is teaching you lessons every day. And you have to be open and receptive to keep learning.

Because if you feel that you have learned it all, you'll stagnate. As you live, you learn, and you learn every day.

Seek Well

And that brings me to 'Seeking'. I believe life is like a search engine. A search engine picks up the intent of what you are looking for, what you searched.

There is a sea of knowledge out there, and it's up to you- how you approach it, from which portal you get in. So it's essential to know yourself, to know your intent, what you're looking for. Keep seeking.

Bahut achha hai, bahut zaroori hai ki hum dhoonde, talaash kare and seek well.

You would have heard the song in Taare Zameen Par. I'd written, "Tujh main agar pyaas hai toh, Baarish ka ghar bhi pass hai, Tu, dhoop hai jham se bikhar, Tu hai nadi o bekhabar."

I was trying to say if you have that longing, the hunger in you to seek, you will find. It's essential to seek and never stop learning.

In your journey, develop an eye to see the minute. Start seeing small things which inspire around you, for we subconsciously sow many seeds.

Hum kehte hai ki sapne hamare adhikar main nahi hai, lekin aisa nahi hai. Jo sapne bhi aap dekhte hai woh kisi zameen main ugte hai. Woh zameen apke thoughts hai. The land where the dreams sprout is your making. Make it fertile. Then the goal is within reach.

Many people think that what they become later in life happens randomly. It's seldom random. Somewhere deep down, they have wanted it; they have probably desired some part of it. And so be very careful with what you dream because gradually, your energies are going to be channelized in that direction. And your subconscious is going to guide you to that place.

It's vital that we work on what we desire, dream, and seek. As I mentioned earlier, use the search engine of your mind well.

Choose Carefully

You may wonder, 'what about role models, whom should we follow?'

I think it's essential to choose your role models. Your role model doesn't have to be a celebrity.

For me, it was my grandmother. She was married off as a teenager and was not literate when she lost her

husband. She was only 18 years old, unlettered, and a widow.

She didn't give in to fate... She started studying and learning, worked her way up, and finally retired as a school principal. Her life is what inspired me. What I saw in her was the burning desire to be self-reliant. Woh kisi par bojh nahi banna chahti thi. Woh simple ek gaav ki mahila thi. Unki soch bhi bahut simple thi. But there was a specific anchor. And that anchor of self-reliance became a guiding principle a force in her life.

The second thing I saw in her was that she always wanted to be useful to someone else. "How can I do something to help?", so all these things shaped her character. And she became a role model. So for role models, if you have an eye, if you're seeking your role models, they are perhaps around you. It's not essential to have famous people as your role models.

You must select your role models carefully because they tip-toe into your subconscious and impact and make you act.

Respect Confusion

Another significant thing I want to share with you is about confusion. When you step out into the world, after your degrees and your education, you may still be confused. "Where do I want to go? What do I want to do? Some of you might want to start your own business, some want to become artists, and some want to join prominent organizations. And those dilemmas, those, you know, jise "dwand" kehte hai, you will encounter.

Now, this confusion is very discomfoting. But you have to learn to respect this state of confusion. I call it a liminal space. And I often talk about being 'Confused by choice'. It's the space that is most fertile. This confused state is when you explore options, experiment, and try to understand what you are.

Never underestimate the time of confusion and never be frustrated by that. That happens to everyone. Without that, you will become robotic, almost predestined.

It is important to examine yourself for what you want and examine what is there for you in the world. Don't settle easily. Explore. When your vibrations match what you're doing, the moment you find synchronization, work will never look like work to you.

People often say have fun whilst you work. We very casually say this, but it does matter. If your work and vibrations are in sync, it doesn't feel like work. Instead, it regenerates.

Apki jo minutest vibrations hai uske saath sync mein aa jaata hai. Aap subah uthte hai to aap ko mann karta hai ke mai karu, yeh kaam karu. Tab karm main aap 'Karta' nahi reh jaate, you become one with work. The distance is no more there. Because there is no other, it's your manifestation of yourself.

So, it's fine to be confused, explore, and then find what you are in sync with, in tune with.

Value Tension

So this state of confusion might be discomfoting, but you have to learn to be comfortable with discomfot. You might feel tensed. But this tension is essential.

Think about a musical instrument, think of a Sitar.

To produce music, you have to create tension in the strings- the right amount of tension.

If there is no tension, if the strings are loose they will be incapable of producing music. But if there is too much tension, they break.

So that balance of tension is important. It's that right amount, that 'musical tension, which creates melody, the melody of life. So it is essential to be able to value that tension.

When I was writing the song of Ma - Tujhe sab hai pata hai na ma, the obvious choice was to, see it as a separation moment and create a separation song in the film. But I kept on thinking. I was very tense that it would sound cliched because it was all about 'bichadna -milna'.

And this tension sparked something in me. I, sort of, stepped into my past. And I recalled when my mother had gone on a training program. I was a little child, left alone in the house without having the comforting presence of my mother. And I suddenly felt my fears come alive. And I wrote these lines: "Mai andhere se darta hoon maa". And then I started writing about my fears. And the song unfolded; a song that resonated with so many people.

So you mustn't underestimate the state of confusion and tension and see something positive in that.

Be a Worthy Medium

Another point I want to share with you is - humility. I think some of you might be exceptionally good, but sometimes success is taken too seriously.

I neither take my talent nor my success seriously as my doing.

You see, electricity and the wire are two different things. I feel like a wire.

I'm simply a medium through which electricity passes. I never confuse myself with electricity because electricity is coming from somewhere else. I chanced upon that electricity which comes and passes through me - it chooses me. But I must be a worthy medium.

The ones who have been students of science know what good conductors are. So when you are a good conductor of energy, you are least resistant to the flow.

So don't take your success for granted. It's collective.

Your teachers, friends, family, circumstances have contributed to it. We are the sum total of all their contributions. So, be humble and have space.

In today's world, we are becoming too obsessed with individualistic success. Earlier, there was time for others. Now I see some delicate values being lost.

I was reading somewhere that earlier if someone didn't do well or didn't make it, we used to call that person unfortunate. Today we call the person a 'Loser' as though it's entirely the person's fault and circumstance had no role to play.

There is a difference in society in the way success and failure are individualized.

It's important to have compassion and space for others because the meaning of success should not be so narrowly defined that it converts you into the machine. Human values have to stay intact, and we have to try hard not to lose them.

Be Authentic

When we first go out in the world as qualified professionals, we all want to do something unique. Soon, a feeling of "It's just nine to five job", or "why should I do this", or "This has been done before", "I am being repetitive" creeps in.

Please understand! You are unique. You are unparalleled. There is no one like you. The way you are, the way you think, will always be different. So even in a job that sounds mundane and repetitive to you, you can make a difference to it because you are unique. And you have your way of perceiving.

When I was writing for the film Rang De Basanti, at that time, many films were being done on Bhagat Singh, and other revolutionaries,

Bhagat Singh's life was, you know, portrayed in many movies.

We also did the film on the young revolutionaries. But it was a very different take. We could have been discouraged, as it was the same subject. But we went on to make the film because the energies which came in together were different.

That's the reason I wrote 'Roobaroo'

Abhi abhi hua yakeen,

Ke aag hai mujh mein kahin.

Hui subah, mai jal gaya,

Suraj ko main nigal gaya, Roobaroo Roshni.

Whenever you whole-heartedly do and complete something, you will feel "yes, it carries my stamp". Because it will, if you've genuinely done it, it will be authentic.

You have to be authentic at what you do. If you are conscious of it, you will never get bored. And you will always see your work in your unique way.

Kyonki sabse sunder geet abhi tak likha nahi gaya hai aur sabse sunder udaan abhi tak lee nahi gayi hai, that's waiting to happen. You can do it in your way.

Anuboot Satya

When we talk about authenticity, where does it come from? It comes from your first-hand experiences. The more you experience life, the finer you will become. It's a constant process of chiseling yourself. And that's what I call "anubhoot satya", first-hand truth, the experienced truth. The bone-deep truth, the reality your subconsciousness gathers, the fact your every cell knows. And that's what makes you authentic. The way you experience a certain reality, nobody else does. You have your vantage point. You have your way of looking at things. And that's what makes you authentic.

Jo mai phele zameen tyaar karne ki baat kar raha tha usme woh authenticity aa jaati hai. Usme jo sapne aate hai woh aapke unique sapne hote hain.

So Seek well, embrace confusion, welcome tension, be a worthy medium, and experience life in your authentic way.

In Bhag Milkha Bhaag, I had written,

'Daant se kaat le bijli taar,

Chaba le taambe ki chhankaar

Phoonk de khud ko jwala jwala,

Bin khud jale na hoye ujala.'

So with these words, I would once again congratulate all of you and thank all at FLAME for inviting me to be a part of such a momentous occasion in your life.

My best wishes.

CAMPUS NEWS

International Conference on Navigating Inclusive Education

A two-day International Conference on ‘Navigating Inclusive Education: Bridging the Divide and Empowering Every Learner’ was organised by the Department of Education, Fakir Mohan University, Balasore, Odisha from January 19-20, 2024. It was focused on the welfare of every learner by fostering inclusivity and attaining key concepts for empowering them. A total of 292 participants including renowned Professors and Faculties, Research Scholars, postgraduate students and participants from various states along with delegates across the globe participated in the event. The Welcome Address was delivered by Dr. Amulya Kumar Acharya, Organising Secretary followed by unravelling the Souvenir and Newsletter of the Department. The Inaugural Address was deliberated by Dr. Rekha Bhankaul, Professor, Curtin University, Australia, followed by the address by Prof. Sabyasachi Pattnaik, Chairman, PG Council and Guest of Honour, the Keynote Address was delivered by Prof. Hrushikesh Senapati, Department of Education, RIE (NCERT), Bhubaneswar along with the special address by Dr. Dillip and Prof. Arbind Kumar Jha, Professor, School of Education, IGNOU, New Delhi expressing the views on truly achieving inclusive society. The Chief Guest, Prof. Santosh Kumar Tripathy, Vice Chancellor, Fakir Mohan University addressed the gathering by expressing his concern affirming the outcomes of the programmes initiated by the university ‘Each One, Teach One’ and ‘Back to School’. The gratitude was expressed by Dr. Pratima Pradhan to all for the session.

The Plenary Session started with the deliberation of Prof. Dilip Giri, presenting the paper entitled ‘Innovation and Inclusive Education’ and the session ended with the talk of Prof. Arbind Kumar Jha who started with ‘Inclusion is Right to Learn’. Followed by a technical session having the subtheme ‘Inclusion and School Education’ which was Chaired by Prof. Purna Chandra Behera, Principal, CTE, Balasore along with the presentations of Teacher Educators, Academician, Research Scholar and some other explorers.

The next session on ‘Inclusion and Higher Education’ was chaired by Prof. Sarat Rout, Associate Professor and Head, Department of Education,

Ravenshaw University, Cuttack and the outcomes were indicated when a good number of interdisciplinary research was exhibited. The cultural programme was also organised. It was enriched with a few words by Prof. Surjendu Kumar Dey. In the end, the session was concluded with the poem recited by Prof. Arvind Kumar Jha.

The Plenary Session was started with insights of Prof. Gopal Krishna Thakur, Dean, School of Education, MGAHV (Central University), Wardha, Maharashtra followed by the address by Dr. Rekha Bhankaul, Professor, Curtin University, Australia. The next session was on ‘Inclusion and Teacher Education’ which was chaired by Prof. Gopal Krishna Thakur. The subtheme of the other session was ‘Innovation and Inclusive Education’. It was chaired by Dr. Abani Bhushan, renowned academician for Parallel Session 1 and Dr. Narayan Prasad Behera, Assistant Prof., Department of Education, Bhadrak Autonomous College, Bhadrak was graced for Parallel Session 2 and the diversity noted as the educational explorers, research scholars, and teacher educators were involved fostering inclusion in a better way to achieve a truly inclusive society.

The Valedictory Session was graced with the noteworthy thoughts of various dignitaries. The summary of the report was presented by the Convenor of the event followed by the deliberation of Prof. Sunil Kumar Padhi. Thereafter, Dr. Abani Bhushan Jena, a renowned academician addressed the gathering. The session ended with an Expression of Gratitude by Dr. Amulya Kumar Acharya, Organizing Secretary of the event.

ICSSR-Capacity Building Programme on Academic and Research Excellence

A twelve-day Capacity Building Programme on ‘Academic and Research Excellence in Higher Education’ is being organised for Social Science Faculty Members by the Department of Education, Nagaland University, Nagaland from May 07-18, 2024. The event is sponsored by the Indian Council of Social Science Research (ICSSR, Ministry of Education, Govt. of India) New Delhi. This Event aims to enhance participants’ comprehension of diverse topics encompassing Indian Knowledge Systems, implications of the National Education Policy- 2020,

professional ethics, quality assurance, and holistic education. This includes delving into research methodologies, data analysis techniques, academic writing, and crafting effective research proposals. Additionally, the aim is to explore the integration of modern technologies, foster interdisciplinary collaboration, and translate theoretical concepts into practical applications within the context of higher educational institutions. The Themes of the Event are:

- Exploration of Indian Knowledge Systems with a Focus on Northeast India.
- Implications of the National Education Policy 2020 on Higher Education.
- Professional/Ethical Standards and Values in the Higher Education Institutions.
- Enhancing the Wellbeing of Higher Education Stakeholders.
- Ensuring Quality Assurance in Higher Education.
- Advancing Research in Social Sciences: Problems, Methodologies, Tools, and Data Collection Techniques etc.
- Integration of ICT, SWAYAM, MOOCs, and OERs in Higher Education.
- Leveraging Libraries and E-libraries for Teaching, Learning, and Research.
- Academic Writing: Components, Challenges, and Issues.
- Practical Application of Qualitative and Quantitative Data Analysis Methods Using Relevant Statistical Software.
- Crafting Effective Research Proposals for Grants and Funding.
- Navigating the Publication Process in Research: SCOPUS/Web of Science/UGC CARE Listed Journals, Avoiding Plagiarism, and Addressing Challenges.
- Government Initiatives for Academic Excellence in Higher Education.
- Research and Skill Development in Higher Education.
- Academic leadership, Curriculum Design, Governance, Student Diversity & inclusion in Higher Education.

- Intellectual Property Rights in the Context of Social Sciences.
- Holistic Education & Multidisciplinary Research in Higher Education.
- Paper Clinic: Interactive Discussion on Research Papers and Field Visit Experiences.
- Technology-Cyber Security, etc. in Higher Education.

For further details, contact Course Director, Dr Limala, Associate Professor, Nagaland University, Kohima Campus, Meriema-797004, Nagaland, Mobile No: 09436070578, E-mail: nueducssrcbp2024@gmail.com. For updates, log on to: www.nagalanduniversity.ac.in/events/

National Conference on Research and National Education Policy- 2020

A two-day National Conference on ‘Research and National Education Policy- 2020: Current Trends and Future Prospects’ is being organized by the Karnavati University, Uvarsad, Gandhinagar, Gujarat from April 12-13, 2024 through Hybrid Mode. The event aims to unravel the intricacies of the NEP-2020 and its impact on research methodologies, trends, and future trajectories. Academicians and Educators, Policymakers and Administrators, Industry Professionals and Researchers and Scholars may participate in the Event. Embracing the hybrid mode, the event seamlessly blends the physical and virtual realms, ensuring widespread participation and fostering a collaborative environment. The themes of the Event are:

Research in Curriculum and Pedagogy

- Integrating Research in Curriculum Design.
- Evidence-based Teaching and Learning.
- Moving towards ‘Transdisciplinary’ Research.
- Reciprocal Linkages between Teaching and Instructional Practices.
- Community Engagement and Research.

Capacity Development of Faculty through Research

- Research and Teaching Skills.
- AI Tools/Softwares and Academic Research.
- Global Developments in Research.
- Faculty-student Collaborations.
- Ethical Considerations and Educational Research.

Emerging/Contemporary Trends in Research in any of the Following

- Humanities and Social Sciences.
- Law.
- Management.
- Design.
- Science and Technology.
- Dentistry.

Research in Policy Making

- Evidence-based and Data-driven Policies in Different Sectors.
- Fostering Collaborations between Policymakers and Researchers.
- Policy Implementation and Evaluation.

Research and Academic-industry Interface

- Collaborative Research Models/Projects.
- Research as an Instrument of Knowledge Transfer.
- Industry-relevant Curriculum: Medium to Bridge the Skill-gap.
- Intellectual Property Rights.
- Research and Entrepreneurship.

For further details, contact Dr. Kishor Bhanushali, Director of Research, Karnavati School of Research, Karnavati University, Adalaj-Uvarsad Road, Uvarsad, Gandhinagar- 382422, Gujarat, Mobile No:09898422620, E-mail: research@karnavatiuniversity.edu.in. For updates, log on to www.karnavatiuniversity.edu.in/events/

AIU News

South Zone Student Research Convention:

ANVESHAN

A two-day South Zone Student Research Convention: *ANVESHAN* was organised by the Association of Indian Universities (AIU), New Delhi in collaboration with SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu from February 19-20, 2024. The event served as a platform for students to showcase their research endeavors, promoting academic collaboration and knowledge exchange. A total of 45 student teams, comprising 91 students with their mentors, participated in the South Zonal *Anveshan* after being selected in the university-level competition from across Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, and Puducherry. The project competition spanned six categories: Agriculture, Basic Sciences, Engineering and Technology, Health Sciences, Social Sciences, and Interdisciplinary. There were 18 expert members, three for each category, invited to evaluate the projects competing in the event.

The event commenced with the Inaugural Ceremony where the gathering was welcomed by Dr. T V Gopal, Dean (CET) of the Institute and Host Institute Convener of the event. The Convener, Dr. Amarendra Pani, Joint Director and Director (I/c), Research Division, AIU provided insights into the background of *Anveshan* and the role of AIU

in promoting research initiatives. The Organizing Secretary of the event, Mr. S Chezhiyan, Assistant Professor, Civil Engineering addressed the glimpses of *Anveshan 2023*.

Prof. C Muthamizchelvan, Vice Chancellor of SRMIST emphasized the importance of fostering a research mindset among undergraduate students. He stressed the significance of interdisciplinary research in addressing real-world challenges, encouraging students to look beyond domain-specific studies in his inaugural address. The Coordinator, Dr. Usha Rai Negi, Assistant Director, Research Division, AIU, Dr. B Neppolian, Host Institute Convener of the event, and Dean of Research, Dr. K Vijayakumar, Coordinator of the event and Dean of School of EEE of SRMIST graced the occasion.

During the morning session, each team presented their prototype, model, and poster in front of the expert members and other visitors to the event. In the afternoon sessions, all the teams were called for podium presentations in front of three expert members from their respective categories. This round occurred in six different venues as parallel sessions. The projects were evaluated based on Scientific Thought, Novelty, Thoroughness, Skill, Relevance, Cost-Effectiveness, and Teamwork. Additionally, the potential for commercialization was considered for some weightage where required.

Three winners, First, Second, and Third Positions were selected in each category and felicitated in the valedictory ceremony of the event. The winners of the South Zone were invited to compete in the International Convention of *Anveshan 2023*.

In the Valedictory Function, Dr. B Neppolian, Host Institute Convenor of the event and Dean of Research welcomed the gathering. Dr. K Vijayakumar, Coordinator and Dean of School of

EEE of SRMIST presented the Report of *Anveshan* and extended thanks to all the participants, faculty organizers, student organizers, and AIU officials for their support in making this event a success. Dr. T Mythili, Additional Registrar of SRMIST, delivered the valedictory address and felicitated the winners along with all other dignitaries on the stage. Convenor, Dr. Amarendra Pani proposed the Vote of Thanks and officially invited the winners to the International Convention.

Winners of South Zone *Anveshan*

Agriculture

Winning Position	Title of the Project	Name of Participants	University/Institution
I	Green Solution: Smart Film Combatting Soil Degradation	Monika S	Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, Tamil Nadu
		M S Priyadharshini	
II	Biosurfactant for Sustainable Agriculture: Rhamnolipids to Manage Crop Diseases	R Lokesh	Annamalai University, Annamalainagar, Chidambaram Tk, Cuddalore (TN)
		V Ajaydesouza	
		V Sathiya Aravindan	
		T Jaya Ranjani	
III	Smart precision agricultural system	Shivadarshini S	SRM Institute of Science & Technology (Deemed to be University), SRM Nagar, Kattankulathur, Kancheepuram (TN)
		Venkataraman P	
		Abdul Rahim M	
Basic Sciences			
I	Development of a Detection Protocol for Circulating Tumor Cells and Drug Profile Analysis Using a Multidrug-resistant Cancer Model	Shubham Singh	Annamalai University, Annamalainagar, Chidambaram Tk, Cuddalore (TN)
II	Appraising the Crop Health Response to Water Stress from Enhanced Crop and Soil Water Estimates Using SAR Data and Machine Learning Approaches	Neena M Gopi	SRM Institute of Science & Technology (Deemed to be University), SRM Nagar, Kattankulathur, Kancheepuram (TN)
III	Biochar - A Novel Approach for Soil Remediation	Dhadchayani M	Justice Basheer Ahmed Sayeed College for Women, University of Madras
		Badar Fathima S	
		Vasanthalakshmi J	
Engineering and Technology			
I	Ecoflow	Harikrishnan M	Manakula Vinyager Institute of Technology, Pondicherry University
II	Smart Parking System	Anand Kumar	SRM Institute of Science & Technology (Deemed to be University), SRM Nagar, Kattankulathur, Kancheepuram (TN)
		Shubh Patel	
		Jay Kumar Patel	
		Chirag Gupta	

III	Vehicle Detection and Classification using Deep Learning to Estimate Traffic Volume	Srivatsan S	Anna University, Sardar Patel Road, Chennai (TN)
		Gopika S R	
Health Sciences			
I	Brainwave Entrainment- Sound to which your Mind sways!	Areef Farah Shehani	SRM Institute of Science & Technology (Deemed to be University), SRM Nagar, Kattankulathur, Kancheepuram (TN)
		Sidra Ahmad Siraj	
		Kuheli Panja	
		Lalitha Priya	
II	The Comparison of Bispectral Index Value Under Spinal Anaesthesia in Elderly Patients With Bupivacaine vs Bupivacaine and Fentanyl -A Randomized, Double-Blinded Clinical Study	Dr Jeniffer Karan	Vinayaka Mission's Research Foundation, Sankari Main Road (NH 47), Ariyanoor, Salem (TN)
		Dr Santhiya C	
		Dr Keerthana Kodur	
		Kandhashree J	
III	Simplified Miniplate Modification- Enhancing Mandibular Angle Fracture Treatment Outcomes	Khyathi Reddy	Dr. YSR University of Health Sciences (Formerly Dr. NTR University of Health Sciences), (AP)
Interdisciplinary			
I	An Edible Biopolymer Composite Film for Enhanced Resistance to Post-Harvest Onion Wastage	Kavisree U	Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, Tamil Nadu
		Pon Nivetha A	
II	Low-Cost Optics and Smartphone Imaging Platform Using Electroluminescence Illumination for Biomedical Applications	Manikanth Karnati	Manipal Academy of Higher Education, Madhava Nagar, Manipal, (Karnataka)
III	Invigorating Eco-Empathy by Adopting the Synergy of Biofloc Technology through Multipurpose Portable Jala Siriâ Tanks and Developing Green Careers in Indian Terrain	Sinthanaiselvi S	Annamalai University, Annamalainagar, Chidambaram, Cuddalore (TN)
		S Kumaravel	
Social Sciences			
I	Wholesome Delights for Health-Conscious Indulgence	R Krithika	Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, Tamil Nadu
		M Haritha	
II	The Prominent Role Mental Health Literacy and Resilience in Preventing Suicides among Adolescents	Madhurya Dudyala	Annamalai University, Annamalainagar, Chidambaram, Cuddalore (TN)
		Asna Anzary	
		G Koushik	
III	Danger Alert Device Using IoT	Shiyam Prakash	SRM Institute of Science & Technology (Deemed to be University), SRM Nagar, Kattankulathur, Kancheepuram (TN)
		Parthiban	
		Ajai Jones	

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THESES OF THE MONTH

SOCIAL SCIENCES

A List of doctoral theses accepted by Indian Universities
(Notifications received in AIU during the month of Jan-Feb, 2024)

Commerce

1. Chavda, Viral Kiritbhai. **A study on CSR reporting practices in cement industry of India.** (Dr. Shailesh Ransariya), Department of Commerce, Saurashtra University, Rajkot.
2. Dhaku, Chavan Rajkumar. **Volatility spillover effects in cryptocurrencies.** (Dr. Senthil Kumar A), Department of Commerce, Christ University, Bangalore.
3. Jolapara, Binita Rameshbhai. **Corporate disclosure practices by selected NIFTY 50 companies of India.** (Dr. Urvashiba N Jhala), Department of Commerce, Saurashtra University, Rajkot.
4. Kanabar, Dhruvika Bharatkumar. **An empirical analysis on corporate intellectual efficiency and its impact on financial performance of service sector in India: Application of E-VAIC model.** (Dr. Urvashiba N Jhala), Department of Commerce, Saurashtra University, Rajkot.
5. Katini, K. **Role of financial literacy and digital financial inclusion on sustainable development among the Mao-Naga Tribe of Northeast India.** (Dr. Amalanathan S), Department of Commerce, Christ University, Bangalore.
6. Nair, Baiju J. **Impact of adoption of account aggregator framework in India.** (Dr. Tomy K Kallarakal), Department of Commerce, Christ University, Bangalore.
7. Panchakshari, Someshwar Rajkumar. **A comparative study of human resource management in public sector banks and co-operative banks: With special reference to Latur District.** (Dr. G P Kapase and Dr. P R Rodiya), Faculty of Commerce and Management, Swami Ramanand Teerth Marathwada University, Nanded.
8. Pandya, Shrikant Govindlal. **Financial literacy among the different stakeholders of higher education in Latur District: A study of commerce and management colleges.** (Dr. Brijmohan Dayma), Faculty of Commerce and Management, Swami Ramanand Teerth Marathwada University, Nanded.
9. Preethi, J P Sarah. **Challenges and resilience of transgender entrepreneur.** (Dr. Karthigai Prakasham C), Department of Commerce, Christ University, Bangalore.
10. Rathi, Gauri Durgadas. **Industrial disputes and procedure for their settlement in large scale private sector industries.** (Dr. Prakash N. Nihalani), Faculty of Commerce and Management, Swami Ramanand Teerth Marathwada University, Nanded.
11. Sawant, Sandeep Suresh. **An analytical study of tax planning investment avenues in selected private and government salaried taxpayers in Mumbai City.** (Dr. A P Jadhav), Faculty of Commerce and Management, Swami Ramanand Teerth Marathwada University, Nanded.

Economics

1. Goswami, Harsh Hasmukhigiri. **Economic study of fishermen of Devbhumi Dwarka District.** (Dr. Paresh Banugoriya), Department of Economics, Saurashtra University, Rajkot.
2. Khalifa, Aminbhai Farukbhai. **An economic study of the educational institutions of Board District.** (Dr. S G Purohit), Department of Economics, Saurashtra University, Rajkot.

Education

1. Bhankhodiya, Sanjaykumar Lakshamanray. **A review of the textbooks published for the subject of science and technology for standard 5th to 7th from the establishment period of Gujarat State Board of school textbook and suggestions with reference to the model textbook on the same basis.** (Dr. Sandip Ghetiya), Department of Education, Saurashtra University, Rajkot.
2. Buddhdev, Priyanka Kiritbhai. **Construction and standardisation of an aptitude test for pre-primary school teachers.** (Dr. Dipti B Kundal), Department of Education, Saurashtra University, Rajkot.
3. Deshpande, Amol Laxmikant. **Bal Bhawan Vigyan Kendrachey shaley vidhyarthachya vaigyanik drishtikoan viksnateel yogdan: Ek abhyas.** (Dr. Inamdar V G), Faculty of Interdisciplinary Studies,

Swami Ramanand Teerth Marathwada University, Nanded.

4. Hazra, Srikanta. **A study on value related problems of adolescents of higher secondary level in West Bengal.** (Dr. Ganesh T Pandit), Department of Education, Central Sanskrit University, New Delhi.
5. Jadeja, Mahendrasinh Mahipatsinh. **A critical study of educational philosophy of Pramukh Swami Maharaj.** (Dr. Sandip Ghetiya), Department of Education, Saurashtra University, Rajkot.
6. Tripathi, Chandra Prakash Mani. **Samanye evam viklang vidhyalayoan mein karyerat shikshoan ke shaikshik abhiprerna, kritey santosh evam takniki gyan ka adhyayan.** (Dr. Nand Lal Mishra and Dr. Ashok Kumar Singh), Department of Education, Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Chitrakoot, District Satna.

Law

1. Dubey, Sadhna Deshraj. **A study on regulation of e-commerce in India: Issues and challenges.** (Dr. Chetna Bujad), Department of Law, Gujarat University, Ahmedabad.
2. Goswami, Alpeshgiri Umeshgiri. **A socio legal study of Juvenile in Gujarat State: With reference to human rights and laws.** (Dr. Vimal Parmar), Department of Law, Saurashtra University, Rajkot.
3. Jayanthi, H L Bai. **A critical study on ADR mechanism in India with reference to court annexed mediation in family disputes.** (Dr. Aradhana Satish Nair), Department of Law, Christ University, Bangalore.
4. Kurian, Neetha. **Corporate insolvency resolution process under insolvency and bankruptcy code: A critical study.** (Dr. Fincy Pallissery), Department of Law, Christ University, Bangalore.
5. Sangani, Samir Ratilal. **A study on Hindu law with special reference to the development of law in matter of succession.** (Dr. Vimal Parmar), Department of Law, Saurashtra University, Rajkot.
6. Sarda, Shilpa Parikshit. **Empowerment of women with reference to Article 21 of Constitution of India.** (Dr. K V Reddy and Dr. M B Ali), Faculty of Humanities, Swami Ramanand Teerth Marathwada University, Nanded.
7. Sebastian, Anto. **Equality versus discretion in imposing death penalty in the criminal justice system: A comparative analysis between India,**

UK and USA. (Dr. Mallaiah M R), Department of Law, Christ University, Bangalore.

8. Sharma, P Abhishek. **Admissibility of DNA profiling evidence in criminal trials in India: A comparative study with specific reference to legal systems of United States of America and England.** (Dr. Sapna S), Department of Law, Christ University, Bangalore.
9. Shibu, P. **Access to justice through law schools legal aid activities in India: An empirical study with special reference to Kerala.** (Dr. Mallaiah M R), Department of Law, Christ University, Bangalore.

Library & Information Science

1. Chaudhari, Shantibhai Parbhabhai. **Webometric analysis of university libraries websites in Gujarat: A study.** (Dr. Atul Bhatt), Department of Library and Information Science, Gujarat University, Ahmedabad.
2. Gaikwad, Varsha Gangadharrao. **Research productivity of librarians working in affiliated colleges of Swami Ramanand Teerth Marathwada University, Nanded.** (Dr. G K Hambarde), Faculty of Interdisciplinary Studies, Swami Ramanand Teerth Marathwada University, Nanded.
3. Mehar, Manoj Kumar. **Impact of copyright in the libraries of Indian Institute of Technology in Northern India.** (Dr. Surya Prakash Shukla), Department of Library and Information Science, Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Chitrakoot, District Satna.
4. Singh, Ved Pal. **Perspectives of cloud computing in library and Information Management: A study of libraries and Information Centers in Delhi.** (Dr. R P Bajpai), Department of Library and Information Science, Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Chitrakoot, District Satna.

Management

1. Gupta, Rajni. **After-sale service failure and their influence on customer behaviour with reference to home appliances.** (Dr. Sreedhara R), Department of Management, Christ University, Bangalore.
2. Jacob, Jobin. **Antecedents and consequences of green marketing orientation in automobile industry: A customer based corporate reputation mediation model.** (Dr. Arun Antony Chully), Department of Management, Christ University, Bangalore.
3. Rawat, Kavita. **Exploring determinants of user**

generated content: A consumer behaviour perspective. (Dr. Sunita Kumar), Department of Management, Christ University, Bangalore.

4. Sharma, Aunkita Alok. **Study of measurement and impact of personality factors on impulsive buying of luxury goods in Ahmedabad.** (Dr. Nilam Panchal), Department of Management, Gujarat University, Ahmedabad.
5. Sharma, Bhumiswor. **Relationship between industry-associated value premium and firm risk characteristics on stock returns: Evidence from Indian stock market.** (Dr. Srikanth P), Department of Management, Christ University, Bangalore.
6. Singh, Shweta. **A study on role of Regional Rural Banks (RRB's) in financial inclusion with special reference to Satna (M P).** (Dr. Vijay Singh Parihar), Department of Rural Development & Business Management, Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Chitrakoot, District Satna.

Physical Education & Sports

1. Baghel, Devendra Singh. **Study of achievement motivation skill attainment of achievers and non-achievers university cricketers of M P.** (Dr. Santosh Kumar Arsiya and Dr. Amar Kumar), Department of Physical Education, Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Chitrakoot, District Satna.
2. Gujar, Tushar Anil. **Malalkhamb ya Khelateel Rashtriye, Rajye va Jilha Patliwaril khelandumadheel kreeda spardhatamak chintecha abhyas.** (Dr. Kailas Palne), Faculty of Interdisciplinary Studies, Swami Ramanand Teerth Marathwada University, Nanded.
3. Chavan, Anand Balasaheb. **Construction of test for selection of Solapur University, Solapur men handball players.** (Dr. Dhondge S R), Faculty of Interdisciplinary Studies, Swami Ramanand Teerth Marathwada University, Nanded.
4. Parmar, Ashok Kumar Jayantilal. **Effect of Chittshudhi on the mental health and well being in yogic texts.** (Dr. Jitendra Kumar Sharma and Prof. Jyoti Swaroop Dubey), Department of Yoga, Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Chitrakoot, District Satna.
5. Pathak, Anshuman Kumar. **Madhyayugin Bharatvarsh mein dwandatatamak evam manoranjanatamak kriyaye: Samikshatamak**

adhyayan. (Prof. Kapil Deo Mishra and Dr. Swapna Saxena), Department of Physical Education, Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Chitrakoot, District Satna.

6. Phale, Vikaram Suresh. **Maharashtra Rajye Kumargat netball kheladunchya khelateel sthananusar niwdak sharimapan va sharirik sudridta ghatkancha vishleshnatamak abhyas.** (Dr. Manoj Reddy), Faculty of Interdisciplinary Studies, Swami Ramanand Teerth Marathwada University, Nanded.
7. Singh, Dhananjay. **Comparative study of selected physiological and psychological variables of players belonging to different games.** (Dr. Jitendra Kumar Sharma and Dr. Amar Kumar), Department of Physical Education, Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Chitrakoot, District Satna.
8. Yadav, Paras. **Comparison of physiological variables and health outcomes among swimmers and football players in the State of Maharashtra.** (Dr. Sinku Kumar Singh), Faculty of Interdisciplinary Studies, Swami Ramanand Teerth Marathwada University, Nanded.

Political Science

1. Desai, Pramod Arvind. **Ratnagiri Jilhyancha vikasateel Dr Shridhar Natu yanche yogan ek abhyas.** (Dr. Sarjerao Shinde), Faculty of Humanities, Swami Ramanand Teerth Marathwada University, Nanded.
2. Ghuge, Raghunandan Baburao. **Indo-US relations: A critical study (Since 1999-2013).** (Dr. Vishal Raosaheb Patange), Faculty of Humanities, Swami Ramanand Teerth Marathwada University, Nanded.
3. Giri, Niranjangir Govindgir. **Maharashtrachya Jadan Ghadnitt Vasantrao Naikanchey yogan.** (Dr. Kalpana Kadam), Faculty of Humanities, Swami Ramanand Teerth Marathwada University, Nanded.
4. Sharma, Roshni. **Refugee women: Negotiating womanness, identity and refugeehood.** (Dr. Priyanca Mathur), Department of Political Science, Jain University, Bangalore.

Psychology

1. Annie, A. **Experience of resilience in women with breast cancer: Implication for resilience-based intervention.** (Dr. Sreenath K), Department of Psychology, Christ University, Bangalore.

2. Dey, Anjali Miriam. **School counseling in India: School counselor roles, policy, and implementation.** (Dr. Elizabeth Thomas), Department of Psychology, Christ University, Bangalore.
3. Haritsa, Sneha Vinay. **Development of family intervention for the management of psychogenic seizures: A qualitative study.** (Dr. Jayasankara Reddy K), Department of Psychology, Christ University, Bangalore.
4. Hunjan, Unnati G. **Animal-assisted therapy: Effect on neuropsychological functioning, depression and emotion regulation.** (Dr. Jayasankara Reddy K), Department of Psychology, Christ University, Bangalore.
5. Kurian, Riba Maria. **The mediating role of perceived stress in the relationship between gratitude and well-being among information technology professionals.** (Dr. Shinto Thomas), Department of Psychology, Christ University, Bangalore.
6. Kusumgar, Vishwa Mehul. **Psychological aspects of infertility in working and non working women.** (Dr. Jigar Parikh), Department of Psychology, Gujarat University, Ahmedabad.
7. Malu, Bhasker. **Discrimination and coping of old settlers in Sikkim.** (Dr. Santhosh K R), Department of Psychology, Christ University, Bangalore.
8. Nagavadiya, Prashantkumar Virendrabhai. **A study of self-confidence, quality of life and happiness in employees.** (Dr. Ranjitsinh Parmar), Department of Psychology, Saurashtra University, Rajkot.

Social Work

1. Joseph, Salomy. **Effectiveness of the services delivered by special schools for children with intellectual disability.** (Dr. Princy Thomas),

Department of Social Work, Christ University, Bangalore.

2. Marykutty, E P. **Outcome evaluation of child sponsorship programme of a non-governmental organization.** (Dr. Hemalatha K), Department of Social Work, Christ University, Bangalore.
3. Tiwari, Ashutosh. **Deendayal shodh sansthan dwara swalamban hetu kiye gaye paryasoan ka adhyayan: Chitrakoot Prakalp ke vishesh sandarbh mein.** (Dr. Ajay R Chourey), Department of Social Work, Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Chitrakoot, District Satna.

Sociology

1. Babu, Gloria M. **Thinking beyond empowerment: Understanding autonomy in the context of Kudumbashree.** (Dr. Rajeev K), Department of Sociology, Christ University, Bangalore.
2. Bhandari, Yashmin. **Floriculture and floriculturists in Sikkim: A sociological study.** (Prof. Ujjwal Bhui), Department of Sociology, University of North Bengal, Darjeeling.
3. Bokade, Bhagavant Chandrakant. **Latur Jilhyateel Jayeshth nagrikanchya manavadhikaranchey samajshastriye adhyayan.** (Dr. B R Bhosle), Faculty of Humanities, Swami Ramanand Teerth Marathwada University, Nanded.
4. Sharma, Jyoti. **Kanya bhrun hatya ke prati mahilaoan ka drishtikon: Ek adhyayan (Banda Jile ke vishesh sandarbh mein).** (Dr. Rajesh Tripathi), Department of Sociology, Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Chitrakoot, District Satna.

□

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**Vivekanand Education Society's
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Hashu Advani Memorial Complex, Behind Collector Colony, Chembur (E), Mumbai - 400 074
(Sindhi Linguistic Minority)

APPLICATIONS ARE INVITED FOR THE FOLLOWING POSTS FROM THE ACADEMIC YEAR 2023-2024

UN-AIDED

S. No.	Cadre	Subjects	Total No. of Posts	Category
1.	Associate Professor	Pharmaceutics	02	02 - OPEN
2.	Associate Professor	Pharmaceutical Chemistry	01	01 - OPEN
3.	Associate Professor	Pharmacognosy	01	01 - OPEN

- The above posts are open to all, however candidates from any category can apply for the post. Reservation for women will be as per University Circular No. BCC/16/74/1998 dated 10th March, 1998. 4% reservation shall be for the persons with disability will be as per University Circular No. Special Cell/ICC/2019-20/05 dated 5th July, 2019.
- Candidates having knowledge of Marathi will be preferred.
- The Educational Qualification, Experience and pay-scale for the post of Associate Professor are as prescribed by the University of Mumbai, AICTE from time to time.
- Please refer University Circular No. मशिमक/विशिमक/तंत्रशिक्षण/11/2020-2021 दिनांक 11 जानेवारी, 2021 for qualifications and experience at the time of interview.
- Applicants who are already employed must send their application through proper channel. Applicants are required to account for breaks, if any in their academic career.
- Application with full details should reach the PRINCIPAL, Vivekanand Education Society's, COLLEGE OF PHARMACY, Hashu Advani Memorial Complex, Behind Collector Colony, Chembur (E), Mumbai - 400 074 within 15 days from the date of publication of this advertisement. This is University Approved Advertisement.

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ADVERTISEMENT NO. 04 / 2024

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Registrar



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विज्ञापन संख्या. 04 / 2024

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कुलसचिव

Atharva Education Trust's
ATHARVA COLLEGE OF ENGINEERING
S. No. 263, Plot No. 8-12, Malad Marve Road,
Charkop Naka, Malad (W), Mumbai – 400095

Applications are Invited for the Following Posts from the Academic Year 2023-24:

UNAIDED

Sr. No.	Cadre	Subject	Total No. of Posts	Posts Reserved for					
				Open	SC	ST	DT (A)	OBC	SBC
1.	Professor	Computer Engineering	02	01	01	--	--	--	--
		Electronics & Telecomm. Engineering	02	01	01	--	--	--	--
		Information Technology Engineering	02	01	01	--	--	--	--
		Electronics Engineering	01	01	--	--	--	--	--
		Electrical Engineering	01	01	--	--	--	--	--
		Engineering Mathematics	01	01	--	--	--	--	--
		Engineering Physics	01	01	--	--	--	--	--
		Communication skill	01	01	--	--	--	--	--
		Engineering Mechanics / Engineering Drawing	01	01	--	--	--	--	--
2.	Associate Professor	Computer Engineering	04	02	01 – SC/ST		01	--	--
		Electronics & Telecomm. Engineering	04	02	01 – SC/ST		01	--	--
		Information Technology Engineering	04	02	01 – SC/ST		01	--	--
		Electronics Engineering	02	01	01	--	--	--	--
		Electrical Engineering	02	01	01	--	--	--	--
		Engineering Chemistry	01	01	--	--	--	--	--
		Engineering Mathematics	02	01	01	--	--	--	--
		Engineering Physics	01	01	--	--	--	--	--
		Communication skill	01	01	--	--	--	--	--
		Engineering Mechanics / Engineering Drawing	01	01	--	--	--	--	--
3.	Assistant Professor	Computer Engineering	07	--	02	01	01	02	01
		Electronics & Telecomm. Engineering	07	01	02	01	01	01	01
		Information Technology Engineering	12	05	02	01	01	02	01
		Electronics Engineering	06	02	01 – SC/ST		01	01	01
		Electrical Engineering	04	--	01 – SC/ST		01	01	01
		Engineering Chemistry	01	--	01	--	--	--	--
		Engineering Mathematics	06	02	01 – SC/ST		01	01	01
		Engineering Physics	01	01	--	--	--	--	--
		Communication skill	01	--	01	--	--	--	--
		Engineering Mechanics / Engineering Drawing	02	01	01	--	--	--	--

(contd. on pg. 43)

Professor (Horizontal Reservation)

Details	SC	ST	DT (A)	NT (B)	NT (C)	NT (D)	SBC	OBC	EWS	OPEN	Total Post
Vacant Post	03	--	--	--	--	--	--	--	--	09	12
General	02	--	--	--	--	--	--	--	--	06	08
Women (30%)	01	--	--	--	--	--	--	--	--	03	04
Persons with Disability (4%)	--										
Sportsmen (5%)	01										
Orphan (1%)	--										

Associate Professor (Horizontal Reservation)

Details	SC	ST	DT (A)	NT (B)	NT (C)	NT (D)	SBC	OBC	EWS	OPEN	Total Post
Vacant Post	06	--	03	--	--	--	--	--	--	13	22
General	04	--	02	--	--	--	--	--	--	07	13
Women (30%)	02	--	01	--	--	--	--	--	--	04	07
Persons with Disability (4%)	--	--	--	--	--	--	--	--	--	01	01
Sportsmen (5%)	--	--	--	--	--	--	--	--	--	01	01
Orphan (1%)	--										

Assistant Professor (Horizontal Reservation)

Details	SC	ST	DT (A)	NT (B)	NT (C)	NT (D)	SBC	OBC	EWS	OPEN	Total Post
Vacant Post	12	03	06	--	--	--	--	08	06	12	47
General	07	02	04	--	--	--	--	06	04	08	31
Women (30%)	04	01	02	--	--	--	--	02	02	03	14
Persons with Disability (4%)	Total Post – 02 (A Group – B./LV.01 – Post) & (B Group – FD/HH. – 01 Post)										
Sportsmen (5%)	01	--	--	--	--	--	--	--	--	01	02
Orphan (1%)	--										

The posts for the reserved category candidates will be filled in by the same category candidates (Domicile of State of Maharashtra) belonging to that particular category only.

Reservation for women will be as per University Circular No.BCC/16/74/1998 dated 10th March, 1998. 4% reservation shall be for the persons with disability as per University Circular No. Special Cell/ICC/2019-20/05 dated 05th July, 2019.

Candidates having knowledge of Marathi will be preferred.

The Educational Qualification, Experience & pay-scale for the post of Professor, Associate Professor & Assistant Professor are as prescribed by the University of Mumbai, AICTE & DTE from time to time.

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Applicants who are already employed must send their application through proper channel. Applicants are required to account for breaks, if any in their academic career.

Application with full details should reach the SECRETARY, Atharva Education Trust's, ATHARVA COLLEGE OF ENGINEERING, S. No. - 263, Plot No. 8 - 12, Malad Marve Road, Charkop Naka, Malad (West), Mumbai-400095 within 15 days from the date of publication of this advertisement.

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