

A Review of Playponics Pedagogy Review Report

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A review of the Playponics report is as follows.

1. AN EVALUATION OF THE CURRENT EDUCATION SCENARIO ESPECIALLY SINCE THE INTRODUCTION OF THE NEP2020

Education in India currently is on the threshold of a paradigm shift. Like all conservative, examination-oriented education systems that are highly competitive and stressful for learners, Indian education is shifting to a holistic integrated, multidisciplinary system that focusses on experiential learning and also takes due cognisance of the changes happening around the world due to ICT revolution, knowledge proliferation and climate change.

The National Education Policy 2020 launched in May last year has strongly recommended this shift due to the poor achievement levels of school learners across grades for the last many decades now. Several annual surveys of education have reported dismal learning outcomes in literacy and numeracy in primary levels indicating a severe learning crisis brewing in the schools. Due to their inability to understand concepts as a result of the widely prevalent 'rote' learning method a large number of children drop-out of the school after primary level. NEP2020 has recommended a plethora of reforms to retain children in the schools so that the coming generations of Indians are knowledgeable, skilled and productive. The NEP puts special emphasis on skill development, self-reliance and entrepreneurship to prepare the youth of India for the changing knowledge landscape of the world.

National Education Policy 2020 has created an air of optimism with its recommendations to make learning a fun and productive experience for the young school-going children in order to tackle the problem of children dropping-out of the school after primary level.

1. The most significant change is introduction of early childhood education in the national school curriculum. India has the largest child population of the world as ***'40% of India's population is below the age of 18 years which at 400 million.'*** However, despite primary education being a key thrust area of the government and having the largest network of schools in the world, half the child population is out of the school system. The introduction of early childhood education in 'balwadis' and government-run schools, is likely to boost enrolment of children in schools and also reduce drop-out rates. Formally termed as 'foundational level' this includes 3 years of pre-primary and 2 years of early primary classes I & II. A child-centred curriculum

with play-way methodology and discovery approach of learning have been prescribed.

2. In order to improve the literacy rates in schools, the National Education Policy also places major emphasis on schools ensuring '**foundational literacy and numeracy**' in the learners at foundational and primary level of schooling. The NEP2020 also recommends a number of pedagogical reforms to make learning in formative years a 'fun and happy experience' for the learners. A universal assessment of literacy and numeracy levels of all the schools is planned after classes III, V and VIII.
3. In a major departure from learning to succeed in the exams, the NEP is pushing for 'learning for conceptual understanding' through experiential approaches to learning. It has recommended enquiry-based learning, discovery approach, hands-on approach for learning by doing etc. The emphasis is now on learners using manipulatives, gamification of learning, and peer-collaboration on tasks/projects for enhancing active engagement of learner in the learning process.
4. Another significant shift happening in Indian education scene is breaking away from the rigid system of academic streams in the high school. Schools have been directed to offer a **multidisciplinary curriculum** to learners from class IX onwards. This is supposed to increase their learning choices based on their choice of academic trajectory in higher education and career preferences. The learners will be introduced to the inter-relatedness of different disciplines and opportunities of application on one subject into another subject area. This process shall begin in middle -school with integrated learning of sciences and social sciences.
5. Another area of emphasis in school education is '**competency-based learning**' that aims to develop in learners' '**discipline specific knowledge, skills and attitudes**' in the learners. Right from primary onwards the focus has shifted from only knowledge acquisition to learning hard and soft skills in all subjects. E.g mathematical thinking, mathematical vocabulary, four language skills LSRW in language learning, scientific temperament and enquiry-based learning, application and higher order thinking skills in sciences and humanities.
6. Reinforcing government of India's push for skill development **vocational education training (VET) and skill development** is introduced as an integral part of subjects offered at secondary level from IX to XII. In addition, in Class-VI **pre-vocational courses** have been offered in the form of mandatory 10 bag-less days when learners could take up an apprenticeship in a local cottage industry where they learn about the local art and handicrafts and get trained in producing them.

At the secondary level the curriculum has been made multidisciplinary to give learners the choice of combining academic and vocational streams, instead of imposing rigid boundaries of academic and vocational education. The multidisciplinary approach will open a number of career options for them. This will also help learners make informed choices about their careers. More than 8 lakhs students are presently studying skill subjects at secondary and senior secondary level in more than 8000 CBSE schools.

Ministry of Education, GOI

Following Prime Minister Modi's mantra, '*Niti se Ranniti*' meaning '*from policy to strategic implementation*', the Ministry of Education is in the process of consultations with all the states and UTs to work out a strategic plan for effective implementation of the policy in a phased manner. "We believe that teachers are the key to the implementation of NEP2020, and hence we have decided to call for suggestions from all school teachers and principals from across the country to take the implementation process of NEP forward"- tweeted the then Union Minister of Education Ramesh Nishank Pokhariyal.

The Ministry of Education, GOI, is encouraging wide scale public discussions by the stakeholders on how to effectively implement NEP2020 in their schools and colleges. Stakeholders from public and private institutions in school and higher education from all across India are engaged in discussions on key principles of NEP2020 for understanding of the concepts and steps towards effective implementation of the same. Anita Karwal, Secretary School Education declared "All the suggestions received shall be examined by a team of experts from NCERT.... teachers whose suggestions are found useful for incorporating in the National Curriculum shall be individually contacted.... States and UTs may hold video conference, send teachers to WhatsApp groups ...or use SCERTs and DIETs for ensuring wide dissemination of this process." Suggestion and recommendations thus received are compiled and sent to the apex bodies NCERT and CBSE.

The Ministry of Education has brought out a teacher's manual containing comprehensive guidelines for implementation of Foundational Literacy and Numeracy Mission, called **NIPUN BHARAT** (National Initiative on Proficiency in Reading with Understanding and Numeracy) with the objective to foundational learning skills that forms a basis for all future learning by the students. The manual has set 'actionable agendas' in the form of overall literacy and numeracy targets for all States and Union Territories to achieve the objectives of the Mission starting from the local Balvatikas at Pre-primary levels.

The Apex Bodies

Since lockdown was announced and schools were closed down physically, India's apex educational bodies at centre and states, the **National Council for Educational Research & Training (NCERT)** and **State Council for Educational Research & Training (SCERTs)** have been involved in managing the learning crisis created due to the COVID pandemic. This involved rationalising the syllabus to reduce the curriculum load, recording lessons for all classes in all subjects for being aired on TV and radio. Also, they have been addressing teachers to train them to teach in the distance-learning mode. NCERT is also directly involved in organising content for the PM e-VIDYA platform's 12 DTH TV channels started for the purpose of reaching learning to students' home in distance mode through radio, tv and YouTube.

Due to large scale loss of life and livelihoods almost every household in India was affected by the COVID pandemic. Deferring to the popular sentiment that demanded cancellation of Board exams due to the physical and psychological trauma faced by the students during COVID pandemic, the **Central Board of Secondary Education (CBSE)** cancelled the public

examinations at the end of Class X and XII asked the schools to make an assessment of learner performance based on internal assessment of their performance in exams conducted by the school in classes X, XI & XII. (1)

Indias apex educational body, the **NCERT** is also currently engaged in holding consultative meetings with education ministries of all states for preparing the **National Curriculum Framework for School Education (NCFSE)**. The NCFSE serves as a guideline for syllabus, textbooks, and teaching practices for the schools in India. After the finalisation of the NCFSE, the subject-wise syllabus will be prepared and text-book production will begin. The NCFSE is likely to be released by November 2021.

The **SCERTs** in all 29 states in India are currently engaged in preparing their own new curriculum and text-books based on the recommendations of NEP2020.

The Schools

The schools in the India came to a virtual standstill during COVID pandemic as the classes were suspended and the schools were shut down indefinitely. In India only 24 per cent of the households have internet access. In urban areas the condition is better with 42 per cent of households having access to the internet as compared to 15 per cent in rural areas. As a result, online education could only cater to the need of the rich and urban students.

A major challenge for **private schools** during pandemic has been non-payment of tuition fee by the parents of their student as their business and jobs are hit by the lockdown. This has resulted in slashing of teachers' salaries in the schools by almost half and a number of teachers being laid off due to lack of resources to pay their salaries.

The challenges faced by **government schools** have been of a basically low-income clientele that doesn't possess the technological resources such as internet connection or laptops and smart phones to access the online classes. Making the digital divide between urban rich and poor starkly visible in urban areas.

The Rural Schools

The schools in the rural area were completely closed down during COVID first and second wave in 2020 and first half of 2021 as the classes were suspended. Since the rural household do not possess laptops and smart phones their children could not attend the virtual classes. The social and economic inequalities, which meant absence of digital infrastructure for the rural schools and learners, is commonly referred to as – the digital divide. The digital divide made it impossible for rural children to access the online classes/ virtual platforms.

The Central government's Ministry of Education (MOE) launched the PM e-VIDYA platform, with 12 new DTH channels, to ensure continued school education for all children during the pandemic. In addition to these state governments are also started classes for school students on TV and radio based on their state curriculum and syllabi. These efforts have proved beneficial to a sizable chunk of the school-going population. However, the social inequities, gender-bias and gender stereotypes still prevalent in some sections of rural India have adversely affected governments outreach programs during the pandemic.

When not in the school the children are expected to share the household chores of their mothers. The rural boys are expected to assist their fathers in the cultivation and other farming activities. The rural population unaware of the effective use of technology for educational purposes views it with suspicion and concern. Therefore, watching state sponsored educational programs on TV becomes a remote possibility for the rural children of some sections.

Urban Schools

The competitive nature of the urban private schools made them quickly learn the ropes of organising online classes for their students. Within days teachers were trained, protocols for online classes were worked out and teachers began to connect with their learners regularly through online classes. The online classes have since covered scholastic as well as co-scholastic activities, and also include counselling sessions for learners and teachers to handle the lockdown induced psychological issues.

Making optimum use of technology, the schools are using virtual meetings for organising NEP2020 advocacy and orientation webinars for all stakeholders. Workshops are being organised to train teachers in the major reforms and innovations introduced by NEP2020. These workshops cover the topics such as -Learner-centred approach, Integrated Curriculum & pedagogy, Inquiry based learning approach, Discovery learning, Experiential pedagogy, Continuous & Comprehensive assessment, Vocational education & skills training and Multidisciplinary approach to learning, etc.

All urban Schools, private and government-run, have begun the process of implementation of NEP2020 by making changes in the academic structures, routines etc. New subjects in academic as well as vocational streams are being introduced at school level based on the new careers that have emerged in the last few years. These new subjects range from coding, machine learning, artificial intelligence to. Indian schools are all set to offer skill courses in three different levels for students:

1. For classes 6 to 8 (middle level)- Nine courses
2. For classes 9 and 10 (secondary level)- 18 courses
3. For classes 11 and 12 (senior secondary level)- 37 courses

Challenges of NEP2020 implementation before schools-

- 1) This has also necessitated making a shift in the school vision and philosophy from an examination-oriented system to a flexible, inclusive, holistic and multidisciplinary system of learning.
- 2) This has also necessitated appointment of new teaching staff and also exploring the possibility of sharing teachers within their hubs-of-learning to cut down on cost of employing full-time faculty for all subjects.
- 3) Schools are busy in the preparation of new time-tables, incorporating experiential pedagogy in the lesson plans and also designing new system of continuous and comprehensive assessment.

- 4) New holistic report-cards are being designed to enable a holistic assessment of learner's personality that includes- development of linguistic, cognitive, social, emotional physical and aesthetic abilities of the learners.
- 5) Efforts are also being made to identify a special gift, talent or aptitude that a child may naturally be endowed with.
- 6) For introducing Multilingualism, several channels are being explored from volunteer teachers to software and apps.

2. EVALUATION OF THE UK EXPERTS' SUMMARY REPORT

The Playponics Pedagogy Review Report by UK expert Lindsey Stanton, from Sheffield Hallam University, has made an assessment of the feasibility and advantage of integrating kinaesthetic learning through Playponics into the current education system module(s) to familiarize kids with practicalities of their syllabi and for better understanding, interaction and engagement through play.

Playponics is deemed to not only facilitate children's play but also harness play into supporting the growth of plants that can be used as a source of complementary food for the school or community, inter alia acting as a kinaesthetic educational resource to engage and enhance learning within schools and local communities.

To make a case for the potential and usefulness of Playponics in India, the report makes a succinct analysis of status of Indian child, recent developments in Indian education, and based on the perceived shortcomings, recommends its integration in the Indian curriculum. The understanding thus derived is used to support the usefulness of Playponics, as a ***sustainable, integrated, application-based, hands-on experiential learning strategy that is also fully aligned with the vision of NEP2020***. The report concludes with an analysis of possibilities of integrating Playponics in the school curriculum, given the challenges that may pose a hindrance to its successful integration in the curriculum.

While the report is a detailed analysis of the Indian school system well supported by facts, figures and references, it overlooks contribution of a major stakeholder in education - **Private Un-aided Schools** that account for 25% all Indian schools and 40% of the total student enrolment in India. The Indian school system is one of the largest in the world with more than 1.4 million schools with 250+ million students enrolled. The Indian education system suffers from two major challenges- access and quality. While the GER at primary grades has peaked due to consistent efforts by subsequent governments in the form of ***Sarva Shiksha Abhiyan, the Mid-day Meal plan, Beti Bachao, Beti Padhao Abhiyan*** the dropout ratios in middle and secondary level continue to be high.

The reasons for these are primarily poor public investment in physical and human resource that gives rise to factors such as lack of suitable school infrastructure, high pupil-teacher ratio and lack of trained teachers impact the quality of education imparted to students in

government-run public and aided schools. Low learning levels across elementary and secondary leads to repeated failure and subsequent drop-out of students.

“The contribution of the private sector to increase the standards..... 25% of all schools in India are private schools accounting for 40% share in enrolment. The number of private schools has grown at the cost of public schools. Contribution to access and quality has resulted in enrolment shift from public to private schools in the recent years. K-12 private schools today operate across a vast range of curriculums and boards. Key indicators that make them preferred today are the process of ongoing and continuous evaluation, comprehensive curriculum and syllabi based on practical applications, assessments based on interactive, skills and fun based learning which has led to better learning levels and quality of school education. Based on current trends, it appears that the private sector may account for a 55-60% share in overall enrolment in K-12 schools by 2022.- FICCI

Private un-aided schools not only meet the aspirational needs of the Indian parents but also drive the educational excellence, by benchmarking the best practices. They are aware of the developments in education sector across the world and invest to bring the best practices to their institutions. They finance to create a state-of art infrastructure, incorporated technology in teaching learning practices and adopt modern innovative pedagogy to provide a high-quality alternative to government-run public schools.

While in NEP2020 formally inducts early years education in the Indian school system now, the private schools have always been running ECCE classes in the school. While not all of them may have adopted the play-way child-centric curriculum and could be continuing to teach a formal syllabus of 3Rs at pre-school level.

REVIEW OF UK EXPERT’S ANALYSIS OF PEDAGOGICAL POTENTIAL OF PLAYPONICS

With the NEP2020s thrust on sustainable education to tackle climate change, Playponics as a new concept in sustainable education has the potential of finding acceptance among the vast educational spectrum of India that includes Ministries of Education – Central and States, Apex Bodies NCERT, SCERTs, DIETs, Boards of Education- Government and Private, Non-governmental organisations, and all kinds of school across India- public, aided, private, urban and rural.

Potential acceptance of Playponics as a pedagogy in Indian schools can be assessed on the basis of two inter-related factors -

- A. Pedagogical Potential & Impact
- B. Socio-economic Potential & Impact

A. Pedagogical Potential & Impact of Playponics

- a. **Cost Effective & Low Maintenance:** Playponics has the potential to become a low-cost, low-maintenance pedagogical strategy and as well as a device that is low-cost, economical and low maintenance. The rural schools with limited resources can also be expected to create the hydroponics technology in the school grounds using local

material and local labour. In fact, the school can reach out to the parents who are primarily farmers or simple mason and mechanics to help them put together.

- b. **Real-life Context:** Playponics has the potential of giving learners structured opportunities throughout their school years of learning about growth plants for food by using limited available resources. Since a large number of households (55%) are agrarian in India, this experiential learning strategy will generate a lot of interest and support from the parents thereby increasing the quality of student's interest and engagement.
- c. **Multidisciplinary Learning:** With the potential of integrating Playponics pedagogy across all STEM subjects in academic curriculum and gardening, farming and Physical Education in the vocational stream, introduction of Playponics supports the multidisciplinary nature of learning recommended by NEP2020.
- d. **Learning by Doing:** The Playponics learning resource for hands-on, kinaesthetic learning involving a hands-on experience into exploring the science of growing plants without using soil by using mineral nutrient salts dissolved in water. For children of different levels, it has different learning outcomes.
 - **Pre-school students** -Integration in fun and outdoor play, development of gross motor skills, socialisation, sensory-motor experience, sharing, language development.
 - **Primary school students** – fun, play, development of gross motor skills, fine-motor skills, discovery learning for conceptual understanding of plant-life, observation and sensitisation about plants as living organisms, learning new vocabulary, team-work.
 - **Middle School Students** - Integration in STEM curriculum – would an enquiry-based learning approach – that involves learning by doing. The students could observe and understand the Playponics equipment and reproduce it using local equipment of bamboo troughs, rubber tyres, connecting a source of water to run through these structures. Demonstration, observation and hands-on by learners would result in learning.
 - **Secondary school students**- Integration in STEM curriculum – would ensure a hands-on learning strategy, incorporation of activities requiring learner to use lower as well as higher order thinking skills-application, observation, discussions, critical analysis, problem -solving assessment, creativity and innovation.
- e. **Transfer of Learning:** Hydroponics is the science of growing plants without using soil, by feeding them on mineral nutrient salts dissolved in water. Playponics as a teaching - learning resource has immense potential and benefits of not only improving learning processes in the school by making them experiential but equipping students with hands on skills that will lead to transfer of learning.

B. Potential for Socio-economic Impact

1. India is world's largest agrarian economy: With 1.35 billion people, India is currently the second most populous nation in the world, and with 1.2 population growth rate it is poised to become most populous by roughly 2028. (5) poverty, hunger, Illiteracy remains huge challenges to economic development of the nation.

“Agriculture, with its allied sectors, is the largest source of livelihoods in India. 70 percent of its rural households still depend primarily on agriculture for their livelihood, with 82 percent of farmers being small and marginal.” (4)

Farming sector is especially hit hard by underemployment due traditional methods of agriculture and impact of climate change. A near total dependency on monsoons for irrigation leads to repeated crop failures. Therefore, unpredictable monsoon, poor soil quality, lack of access to latest scientific methods and technology to handle the vagaries of nature and crop cultivation has over the years resulted in extreme poverty in the segment of small and medium farmers resulting in a spate of farmer suicides in in the last decade. In order to improve the lives of the farmers and rural dwellers it is important to achieve the SDG-1, Poverty and SDG-2 Hunger.

“Agriculture development is one of the most powerful tools for ending extreme poverty and chronic undernutrition. It is well documented that growth generated by agriculture is more effective in reducing poverty than growth in any other sector for this reason, we are right now trying to find bigger, better and faster solutions to ending hunger and poverty.” -Gilbert Hounbo, President, IFAD speaking in the context of agriculture development in India (5)

2. Sustainable Development: Playponics has immense potential not only as a learning resource but provides a practical solution to end the problem of hunger by training youth in this skill of growing food with minimum resources. Poverty and hunger are a huge problem threatening survival of families in rural India. Frequent droughts and floods due to climate change has further aggravated these issues. Therefore, Playponics has the potential to play an important role in the larger socio-economic context because it can be planned and implemented locally with not much requirement of funds and expertise from external sources.

3.Skill Development: In addition to this the potential of Playponics teach and train students in production of vegetables and fruits through the plants grown by them is an added advantage. The low-cost strategy of cultivation through hydroponics makes Playponics an important skill for learners of the rural area where agrarian households are constantly battling hunger and poverty.

4. Youth Empowerment: Skill development of youth has the power to make them employable. When the learners are exposed to practical training in hydroponics throughout their school tenure, they are not only learning but acquiring degree of expertise in this technology. In fact, the larger tracts of desert in north western areas of India that include Rajasthan, Gujarat and part of Punjab and Haryana have a hot and arid climate. Learning to grow plants without soil create a supply of fresh vegetable would have immense potential of generating livelihood and boost entrepreneurship.

3. EVALUATION OF THE STRATEGY RECOMMENDED FOR INTEGRATION OF PLAYPONICS IN THE INDIAN CURRICULUM

The strategy recommended for integration of Playponics in the Indian Curriculum is would be very effective for the following reasons-

- I. The release of new National Curriculum Framework of School Education based on NEP2020 has been delayed and is likely to be released in the year 2022. Therefore, the strategy recommended and explained through an exemplar collated framework evidencing the relationship between Playponics outcomes and potential synthesis with the national curriculum 2005 principles, in force currently, is valid now and will be valid under the new NCFSE2022. These principals of NCF2005 are universal, time tested and central to all child-centred systems of education. The report recommends that following strategies should be adopted to integrate Playponics into the Indian Curriculum-
 - i. **Connecting knowledge to life outside the school** –Subject content taught at the school level gives a number of opportunities to integrate or infuse the Playponics concept, knowledge and skills while teaching from classes N to XII.
 - ii. **Ensuring that learning shifts away from rote methods** – Playponics makes it possible for the teacher to use active learning strategies such as experiential learning, peer - collaboration, facilitation Theory, Reinforcement Theory and Situated Learning Theory with the children. Teacher and children are both actively engaged in knowledge creation through communication, collaboration, critical thinking and creativity.
 - iii. **Enriching the curriculum so that it goes beyond textbooks** – The report recommends that such learning strategies should be adopted that learning extends the topics beyond the confines of the text-book and gives learners the opportunities to use higher order thinking skills (HOTS) to critically analyse issues, discuss pros n cons of possible solutions, take decisions based on facts and reason, innovate to find new solutions for existing problems. By using pedagogical methods such as Project work, Group work, Poster creation and presentation, Reflections, Portfolios, Discussion, Hydroponic system design/draft skills/ drawing skills, Business plans SWAT analysis etc it is possible to do so.
 - iv. **Making examinations more flexible and integrating them with classroom life-** The Playponics report recommends diagnostic and formative assessments that are ‘for’ learning and not ‘of’ learning. The learner assessment data is used to inform teacher practice so that teacher should reinforce and supplement wherever required. When exams are a one-time event to test the learner’s knowledge it creates a lot of stress and anxiety in learners, however when they are a part of regular teaching-learning process, learners use them to improve their own performance. Summative and Ipsative assessments that create opportunities of creative thinking, reflection and innovation are also recommended by the Playponics report for assessing Playponics integration.

v. **Nurturing an overriding identity informed by caring concerns within the democratic polity of the country' (p. viii)." (British Council, 2019)**

Playponics provides an opportunity to ignite learners' curiosity, train their minds for critical thinking and problem solving and motivates them to grow individually and collaboratively as a community within a classroom, village or family. The application of hydroponics has wide-reaching potential to be life-altering. Through linking of learning with health and environmental issues, children can better understand the role and importance of nutrition and natural sciences. Linking resources to their availability, use and scarcity can make children understand the concept of sustainability. The recommended collaborative pedagogy will create awareness of community and family and motivate them to apply technical skills and knowledge for the betterment of community/school/ family. This would create understanding of the natural world, social responsibility in the children.

SCOPE OF INTEGRATING PLAYPONICS IN ALL SUBJECTS AT SCHOOL

The report very comprehensively identifies opportunities of integrating Playponics in all subject areas within the Indian school curriculum by linking aims of learning with opportunities of application provided by Playponics in each subject. This matrix makes it easier to understand how integration of Playponics would help teacher not only meet her objectives of teaching the subject but also ensure the learning outcomes through an appropriate pedagogy. E.g.

- **Science-** Identify plant parts, name and label, Plan and undertake scientific experiment of plant life cycle, Design small research project around growing different plants, understand nutrients needed to feed and grow plant for food usage etc.
- **Mathematics-** Working out ratios of titration of nutrients for plants, working out amount of play usage, e.g how many swings moves how much water, etc
- **Computer Education-** Design using 2D skills an indoor aesthetically pleasing hydroponics unit for low mobility users, design a 2D/3D outdoor hydroponics unit that could enhance the Playponics unit
- **Health & Physical Education-** Examine physical benefits of children on swings/see-saw, barrel run etc. Examine the benefits of Playponics use on mental health of users, Investigate and present findings on psycho- social impacts of Playponics system within the school community
- **Work Education-** The NEP2020 provides for pre vocational education from classes VI to VIII. Vocational education and training help in involving children in a variety of production or service-oriented activities, to develop skills, positive attitudes and work-ethics.

In addition to the above subjects mentioned in the Playponics report, Playponics can also be integrated in the following subjects in the Indian school curriculum-

- **Language learning-** Indian school children learn 3 languages -Mother tongue, national language and English. They are also offered a choice of a classical language Sanskrit and foreign Languages such as French, German, Spanish and Chinese etc Language is medium of expressing the thoughts and ideas as prose or poetry. The children could given age appropriate activities in the language classroom to strengthen their LSRW skill with Playponics as the theme. It can while playing outdoors and on the swings, see-saw etc use Playponics as theme for describing, discussing, debating, doing some creative writing, slogan writing etc.
- **Commerce Subjects-** Business Studies, Accountancy and Entrepreneurship. Playponics can be integrated in these subjects by developing business modules to develop the idea of start-up, develop entrepreneurship skills by growing and selling plants grown using the Playponics system, Learners can examine cost and profit margins, they can provide service to local communities with distribution of leafy green vegetables etc.
- **Vocational Subjects** - such as Agribusiness and Agriculture Technology also provide innumerable opportunities of giving opportunities for experiential learning of Playponics right for growing produce to selling it in the market to generate income and get a return on their investment.
- **Life Skills Training-** Learning of life skills in schools can be aided by motivating learners to plan Playponics project, set targets, volunteer to care for the plants etc.

CHALLENGE OF LOCALISATION

The review report says, 'Localisation is most impactful when considering education and its transferability to another location or country. Localisation means taking resources developed in one place and adapting them to another place.' In the case of Playponics adapting hydroponics as a learning resource from UK to India may take some time and effort because of the vast difference in geographical, social and cultural and educational systems of the two nations.

- Hydroponics is a relatively uncommon concept in India, especially in the states that face acute water scarcity due to extremely high temperature leading to drought conditions regularly. In such situations where water, a critical resource for survival is in a severe short supply, Playponics that uses hydroponics, a water-based system of growing plants may not be practical or feasible. However, on the hand if projected and demonstrated as a system economising the use of water to grow fresh vegetables and fruits in every school this may be become extremely popular and find acceptance from all quarters.
- There is often an inherent suspicion for all things and ideas foreign, and morality is attached to everything local and home-grown. This can also be barrier to acceptance and adaptation of Playponics in India.

- However, orientation, sensitisation and training of educators to create, manage and use Playponics as a valuable learning resource will facilitate implementation to a great extent.
- Advocacy sessions with other stakeholder such as parents, will create an friendly and welcoming eco-system.

AN EVALUATION OF PRACTICALITIES OF INTEGRATING PLAYPONICS MODULES OR KINAESTHETIC LEARNING

Integrating Playponics in school education and using it as vehicle for transmission of various academic concepts, social ideas and values of humanity and kinship is an effective pedagogical strategy. At times like now when human race and planet Earth are facing an existential crisis, it is a wonderful opportunity to sensitise learners in the concept of sustainable development by integrating the theme into all subjects being learnt at school.

In spite of obvious advantages, there could however be some challenges in implementing such a system of learning.

- 1. Challenge of Change-** The teachers, who are in their comfort zone in teaching a traditional manner in the classroom, may be sceptical about the new teaching strategies recommended in the review report. They will not be comfortable in giving up their 'privileged position as a "Guru" or the 'sage of the stage' to become a facilitator of learning as required by the discovery-based and experiential pedagogies. Only consistent teacher training, not as a one-time event but on a regular professional development, would help in bringing about a change in the mind-set and working habits.
- 2. Issues of Infrastructure, Resources and Know-how-** There could also be serious issues related to lack/absence of suitable infrastructure, resources, technical know-how and sustained support that may result in non-implementation of the Playponics project in the school, or its discontinuation after the initial excitement abates.
- 3. Overcrowded Time-table of the Learners-** The Indian schools already have a inflated curriculum resulting in an over-crowded time-table, having too many activities – sports, cultural events, co-curricular activities, social projects being organised. Addition of Playponics for integration in all subjects, may be resisted by the teachers as they may feel that this will further encroach into learners' study-time. This kind of resistance may also come from the parents too. An orientation of all stakeholders and school-neighbourhood community would ensure support but also enhance chances of successful implementation of the Playponics project.
- 4. Does Playponics have the potential to level the playing field for all schools?** Schools in all parts of the world have their own vision, mission, objectives, priorities and pace of functioning. Some schools that have continued access to resources are able to deliver quality education in school. On the other-hand some schools under-deliver as they face resource crunch or paucity of ideas and motivation.

There is a strong possibility that Playponics may help create a level-playing field for all schools irrespective of the difference in their status and resources through implementation of Playponics project. Playponics recommends use of an experiential pedagogy over the traditional. The traditional pedagogy kills learner motivation, due their passive role as it favours teacher-lecture & rote-memorisation methodology. The aspirational pedagogy of Playponics based on active learner engagement, peer collaboration, hands-on activities, critical thinking, initiative, freedom of creative expression. The results would create wonders in the form of enhanced learner understanding, skill development and performance. For under-achieving schools and learners this kind of growth would be life-changing and may put them on a successful academic trajectory.

5. Teacher Training, Evaluation and Monitoring- The success of any newly introduced program in schools depends upon creating receptivity among the stakeholders and equipping them with competencies to implement it. In the case of Playponics there are a number of steps that the organisers will need to take to implement this program successfully in the Indian school system. These are listed below-

- Sensitisation of the teachers on the need and benefits of bringing in new learner centred pedagogies and assessments.
- Sensitisation to the benefits of Playponics as a learning program with a unique socio-economic dimension
- Role of Playponics in transforming school education into 'Sustainability Education' aiming to develop in learners' habits of hand, body and mind geared to think and act sustainably in the personal, social, and professional space.
- Hands-on experiential training of teachers in setting-up the Playponics equipment, get it functioning, supervise it and trouble-shoot minor issues.
- Integrating Playponics as an educational resource in all classes Nursery to XII.
- Integrating Playponics the lesson-planning in all subjects as given in the Review Report.
- Supervision of Teachers in the implementation of Playponics in the school.
- Feedback sessions with teachers to evaluate the degrees of success met by them individually or collectively in using the Playponics as a learning resource.
- Monitoring and supporting teachers' efforts for a period of time.
- Encouraging Teachers to take up action-research on effectiveness of Playponics as a learning resource.

CONCLUSION

NEP2020- an opportunity for induction of Playponics in the Indian education system. NEP2020 strongly recommends a shift from teaching to learning.

'Indeed, with the quickly changing employment and global ecosystem, it is becoming increasingly important that children not only learn, but learn how to learn. Education must thus, move towards

less content, and more towards learning about how to think critically and solve problems, how to be creative and multi-disciplinary, and how to innovate, adapt, and absorb new material in novel and changing fields. While learning by rote can be beneficial in certain contexts, pedagogy must evolve to make education more experiential, holistic and integrated, discovery oriented, learner-centred, discussion-based, flexible, and, of course, enjoyable. The curriculum must include basic arts, crafts, humanities, games, sports, languages, literature, culture, and values, in addition to science and mathematics, in order to develop all sides of learners' brains and make education more well-rounded, useful, and fulfilling to the learner.'- National Education Policy, 2020

The change that is waiting to happen in Indian classrooms can be ushered in universally, effectively and strategically using Playponics. Playponics as a learning resource is valid across both, the rural and urban, school-scape of India, hence its universal appeal. It is evidence-based hence suited to the enquiry-based, discovery and experiential pedagogies. It is holistic as it involves the development of cognitive, psycho-motor and affective capacities of the learners. Its multidisciplinary natures make it suitable for integration across all the subject areas and facilitates critical thinking as learners analyse issues to connect the dots and construct their understandings.

Since it suggests a solution to critical issues and worldwide problems such as hunger, poverty, conservation of resources, protection of environment, education of children, it has an undeniable relevance in the 21st century. Hence its integration in the learning content is not forced or alien, in fact it sets the stage for discussions on the relevant issues to happen in the classrooms and may provide youth the motivation to think of more sustainable solutions to the world problems.

In 21st century knowledge has a very short shelf-life, what children need to learn is '**how to learn**' as this will help them regularly create new knowledge and solve problems of the world in which they will live. Playponics as a learning resource has the potential to bring into teacher-use the experiential pedagogies that will train learners in these critical and creative thinking skills that NEP2020 wishes to introduce in the Indian education system. The Inter-disciplinary and multi-disciplinary nature of these pedagogies make them best suited to the 21st century world of work and life.

References

1. CBSE circulars for Board exams classes XII X
2. National Education Policy, 2020
3. CBSE starts 3 new subjects, skill courses, 09/04/2020 Desk-itgd@intoday.com
4. Private sector's contribution to K-12 education in India Current impact, challenges and way forward March 2014- [ey-ficci-report-education.pdf](#)
5. https://en.wikipedia.org/wiki/Cambridge_University_Press The Cambridge Economic History of India(1987)
6. The Importance of Agrarian Development in India, Agriculture-the lifeblood of humanity- Gilbert Houngbao, 18.02.2020
7. Child labour Policy, Child labour Causes, Child labour Education in India www.smilefoundationindia.org/ourchildren.html