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Harmonizing the BCG model with logic of curriculum and maxims of teaching for maximizing effective teaching-learning

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Abstract

The Bio-Circular Green Economy Model introduced by Thailand aims to create a sustainable, inclusive society, economy and environment, through application of science, technology and innovation, using Thailand's comparative advantage in biological and cultural diversity into competitive advantage. The importance of BCG model encompasses every country that aims to thrive through a culture of equity, inclusion and sustainability. India being one such country which does have a comparative advantage of cultural and environmental diversity, there lies need to promote equity, inclusion, innovation, economic and cultural responsiveness in its society. Educational scenario in India had showcased teachers as entities who tend to control the students and pour knowledge into them. The primary goal of every teaching learning process is maximum outcome of learning which includes behaviour modification, and therefore the maxims of teaching are the general principles which guides every teacher to manage their classroom effectively, with maximum participation of learners, invocation of sustainability and inclusiveness, as well as self-motivated learning taking place. An effective teacher is a facilitator, who uses the maxims to maximize the learning outcome keeping the outcome in congruence with the BCG Model. National Education Policy 2020 has laid down various pedagogical strategies that suits the logic of the curriculum structure. The logic is based on psychological aspects of growth and development. Hence, this study aims at seeking a relation between BCG Model and logic of Curriculum Instruction to intensify the learning outcome through application of Maxims of Teaching within the classroom by adopting thematic analysis.

Keywords: Effective Teaching; Learning; Maxims; Logic of Curriculum; BCG Model

1. Introduction

Edmund Amidon said, "Teaching is defined as an interactive process primarily involving classroom talk which takes place between teacher and pupil and occurs during certain definable activity" [1]. Teaching is also perceived as a process designed to produce change in the behaviour of students. It is the teacher who builds the nation serving as a torch bearer for the youth of present day. He or she is accountable for the progress the students make and the changes they bring in their behaviour. Recent years have shown immense research on the teaching and learning process which rendered teaching as an activity to be understood more from inside (Cochran, Smith and Lytle, 1990). The teacher's identity, the knowledge base, the pedagogical approaches, classroom management, the motifs, the need of the society, and the like are all crucial to produce effective teaching practices.

A teacher's identity is often shaped by their past experiences (Proweller and Mitchener, 2004), their values, beliefs, engagement and commitment towards the classroom teaching and learning. Grier and Johnston's (2009) argued that, "Teacher identity is based upon the core beliefs one has about teaching and being a teacher that are constantly changing and evolving based upon personal and professional experiences" [2]. Despite all, the teaching and learning goal of every teacher remains constant, i.e., maximum participation of the students in classroom learning, promising changes in the

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behaviour of students, inculcating inclusiveness and sustainable attitude towards environment, improvement in their academics and total development of their personality.

Similar to a teacher, students too have their identity but their identity is not extrapolated. Learner's identity is identified based on their unique behavioral pattern that reflects their psychological trait. The psychological traits of learners are not independent of their age, and can therefore be classified as per the age group or stages of development. National Education Policy 2023, stated four stages of curriculum structure [3] based on the stages of development and age group. The stages are Foundational stage, Preparatory stage, Middle stage and Secondary stage.

- **Foundational stage:** This stage spans over a period of five years from the age of 3 to 8. The first three years of education is called pre-primary or Anganwadi schooling, followed by first and second standard. This stage is devoted to build a strong foundation and the essential skills needed to survive. Children between the ages of 3 and 8 fall into this category. The learning standards of this stage focus on physical, socio-emotional, ethical, cognitive, aesthetic, cultural, language and literacy development.
- **Preparatory stage:** This stage defines students between age group 8-11 years. Fundamental concepts of speaking, reading, writing, physical education, art, science, mathematics are all to be learned by the learners at this stage. At this stage the learners should be made to understand the world around us, get acquainted to work and pre-vocational skills, learn at least two languages, and take the first step towards the awareness about the environment.
- **Middle stage:** This stage deals with students between age group 11 and 14. The learning standards of this stage sets at learning three languages, mathematics, art education and physical education. Science education, social science education and vocational education at this stage has their own separate learning standards and designs teaching assessment and evaluation accordingly. Students at this stage are expected to gain a more formal understanding of concepts of science, social science and vocational education, and the methods of inquiry followed in each.
- **Secondary Stage:** Secondary stage is the last stage of curriculum as is outlined by National Education Policy 2020. This stage is categorised into two phases for learners between age group 14 to 18.

Phase 1 is for age group 14-16 or Grades 9 and 10. All students will engage in all curricular areas as they were in the middle stage. In addition to that, Environmental education as a potential area of interdisciplinary study will be examined. Power of reason and argument regarding public issues from an ethical and moral perspective will be inculcated in the learners at this stage.

Phase 2 constitutes student from age group 17-18 or Grades 11 and 12. Here choice based courses are to be offered to have a trans-disciplinary approach towards learning and not compartmentalization of subjects. Students will learn two subjects from language education, one must be native and one the other tongue. Here, literature too becomes a part of language education. The other four subjects are to be chosen from Group 2 (Art, Physical and Vocational education), Group 3 (Social science, Humanities and Interdisciplinary areas) and Group 4 (Science, Maths and Computational Thinking). By letting students choose according to their will it breaks through the concept of compartmentalization.

It is of utmost importance for the teachers to reconcile the pedagogy of the subject they teach to the different stages of learning according to the logic of curriculum (as discussed above).

1.1. Purpose of the study

- To find out whether there lies a relation between Bio-Circular Green Economy Model and logic of Curriculum Structure by National Policy of Education 2020.
- To examine the role of a teacher in promoting Bio-Circular Green Economy Model to maximize learning.

2. Research Methodology

The study follows qualitative research method with the technique of thematic analysis. Thematic analysis analyzes qualitative data that involves reading through a set of data and looking for patterns in the meaning of the data to find similarities or themes. It is an active process of reflexivity in which the researcher's subjective experience is central in making sense of the data.

At first, the pedagogical strategies suggested by National Education Policy 2020, India and the BCG Model [4] set forth by Thailand is scrutinized, to look for the pattern of the concept of sustainability and inclusiveness stated in both, so that teachers can use the pedagogical strategies suggested by NEP 2020, to enhance sense of sustainability and

inclusiveness among the learners. Secondly, the maxims of teaching is aligned with the BCG Model for development of a teaching-learning model that supports inclusiveness and sustainability.

3. Results and Discussion

A critical analysis of the Bio-Circular Green Economic Model states its agenda based on three major slants; the bio-economy, the circular-economy and the green economy. The bio-economy states that biological resources and bio-based materials are to be converted into value-added products using technology and innovation. The circular economy states that sustainability of resources can be achieved when the principals of reuse, repair and recycle is followed. The green economy leverages ecosystem processes to benefit human beings in equitable and inclusive manner. Here, the ecosystem provides inputs to the society and economy of any country.

The major insights that was drawn from the outline of BCG Economy is that technology and innovation adds value to products, the principles of reuse, repair and recycle is essential to ensure regeneration and redesigning, and green economy is suggestive of inclusion and equitable distribution of resources. Therefore, the study established a relation between the insights of BCG Economy Model and Educational strategies as suggested by National Education Policy, 2020, India.

- **Bio-Pedagogical Principle:** A bio-pedagogical principle can be defined as a principle that directs a strategy to use technology and innovation within the classroom so that learners not just learn the lesson, but begin to value it. Learners will learn not just for the examination but also for life, once they start valuing or understanding the worth of their learning.
- **Circular Pedagogical Principle:** A circular pedagogical principle can be defined as a guideline suggestive of implementation of a planned strategy, looking for the consequences and reflecting on the strategy to repair and reuse the modified form. Teachers will follow the action research cycle-*Plan, Act, Observe and Reflect*, but will go beyond just reflecting and try to incorporate new idea and repair it, and reuse it on the same group of learners until the goal is achieved.
- **Green Pedagogical Principle:** A green pedagogical principle can be defined as a principle that ratifies equitable distribution of resources to the learners and assuages the learning needs of all. The strategy developed by the teacher following this principle will be an amalgamation of many as it has to address the learning needs of all kinds of learners (Visual, Auditory, Reading & Writing, and Kinesthetic).

If the above three kind of pedagogical principles are employed to design strategies to teach learners within the classroom, effective results can be expected as well as delivered. Effective results require effective teaching. Some characteristics necessary for effective teaching [5,6] are,

- Ability to meet the interest of learners
- Having an outstanding knowledge about the subject taught
- Ability to use different strategies and teaching styles to motivate learners towards learning
- Ability to know the learners
- Ability to create a conducive environment that promotes collaborative learning, endorses positive social interactions and channelizes towards self- motivation.
- Ability to advocate a positive learning environment by being caring, warm, friendly, supportive, attending the affective attributes of the learners
- Ability to communicate easily, comprehensibly, allowing students to interact be it in mother tongue or the other tongue, attending the queries of the learners
- Ability to challenge the students, motivate them intrinsically to achieve a higher defined goal
- Ability to manage classroom proficiently through production of high rate of work involvement with a low rate of deviancy in academic settings (Laslett & Smith, 1984)
- Personal values and beliefs which includes having empathy, being respectful, analytic, creative, motivating, forgiving and responsible.

Every teacher wants to deliver effective teaching but often falls prey to the thought of adverse effects on the learners due to new teaching styles, approaches or methods that might disrupt the classroom learning and discipline. To maintain classroom discipline the teachers tend to micromanage. *Paulo Freire*, a Brazilian educator, talked about the banking concept of education (Pedagogy of the Oppressed, 1968), where the teacher tries to micromanage students by asserting excessive control on them, which often leads to boredom in class. A bored and exhausted learner can never learn, as learning involves self-motivation, interest and fun. Effective teaching makes sure that students are managed

with their will and not by force. Effective teaching can only take place when the primary stakeholders, i.e, the teachers and the learners both construct the teaching learning experience together. Here, emerges the need for maxims of teaching.

Maxims of teaching are general truths, principles, rules, tenets through which teaching can be made interesting, effective and easy to comprehend. They are considered as facts of universal significance but cannot be considered as universal law, as they are heuristic, or rule of thumb[7]. The maxims accelerate the momentum of teaching, makes teaching learning process effective in every situation, as they are time tested. Bronson Alcott is considered the pioneer of the maxims of teaching as in 1826-1827, he came up with fifty eight maxims which can be grouped and cased down to 'general maxims' [8]. Educationists like Herbert Spencer and Comenius perceived teaching as a task while actually engaging in classroom teaching and learning and came up with the notion of the general maxims[9].

Prominent maxims of teaching are,

- **From known to unknown:** This maxim states that before providing students with new knowledge, this new knowledge should be linked with the students' old or previous knowledge, so that they can relate and comprehend easily. For example, the knowledge triangle can be explained after making the students recall the individual concepts of data, information, knowledge and wisdom.
- **From simple to complex:** This maxim states that teaching should advance from easy to difficult. A teacher should start with simple thing, for example, definition of 'teaching' and proceed to difficult one like micro and macro teaching skills, in a logical, systematic and step wise manner.
- **From concrete to abstract:** An abstract object or concept has no temporal or spatial existence, but rather is an idea or existence. Concrete objects on the other hand are tangible. For example, intelligence is an abstract concept but the scales to measure intelligence are concrete.
- **From particular to general:** The abstract convictions like generalized facts, concepts, principles, and phenomenon should not be presented in the beginning of the teaching. The pupils should be presented with specific examples first and then with the general laws or principles, along with the derivation process. For example, just like in inductive teaching, the *theory of multiple intelligence* (Howard Gardner, 1983) can be taught after explaining the different kinds of intelligence to the students.
- **From induction to deduction:** Induction draws a conclusion from a set of examples whereas deduction lays down a principle and draws the examples. The teacher should proceed from induction to deduction. For example, in English while teaching noun, the teacher should give set of examples and then group them into different kinds of noun, finally extracting the concept of noun from those.
- **From whole to part:** Gestalt psychologists say that, we first perceive the object as a whole and then its parts. When we look at an unfinished figure, we already perceive it as a whole therefore realizing which parts are missing. Perceiving the whole makes things understandable, motivating to complete and effective. For example, at the beginning of a lesson, the teacher should always mention or let the students have a glimpse of the whole (eg. aircraft) and then step by step its various parts should be presented before the students to make them know in details not only the structure but also the function of each structure.
- **From analysis to synthesis:** This maxim talks about the breaking down of difficult concepts into small units for comprehension. Each unit is to be described and explained with clarity. After the completion, the understanding of each broken part will be merged and synthesized to make the learners understand the whole concept. For example, to define and explain fruits, examples of different fruits can be provided. The need, benefits, nutrient values of each fruit can be explained. At the end the benefits of consuming fruits can be asserted through synthesis.
- **From Psychological to Logical:** In Educational Psychology, the child or the learner is central to each theme. The entire teaching-learning process is planned, organized, executed and explained on the basis of interests, abilities, capabilities, level of comprehension, etc. of the learner. This maxim therefore emphasizes that the learners or the target audience should be well analyzed by the teachers so that they have of grasp of their psychology. Based on the psychology of the learners, the teacher should strategize the teaching style and methods, organizing it in a planned way, to bring forth the maximum outcome of learning. For example, a student with spatial intelligence should be taught with reference to visuals and the one with linguistic should be taught with well framed comprehensible sentences.
- **From Actual to Representative:** This maxim states that the real or actual things should be used to explain what it stands for. For example, by showing the students a smart classroom and the function of the gadgets it hold, the concept of multimedia laboratory can be explained. The actual projection of videos on screen will represent the multimedia.

- **From Empirical to Rational:** This maxim states that the empirical knowledge of a student should be turned rational to make it certain. In other words, it evokes in the learners the ability to learn and verify after getting data and to turn it into knowledge through logic and reasoning. For example, the micro-teaching skill 'motivation' as demonstrated by the teacher can be perceived and the effects can be verified by the pupil teachers. Then, they can reason the effect it had on the target audience and turn it into knowledge.
- **From definite to indefinite:** This maxim asserts that what is said and universally accepted can be used to understand what is indefinite. For example, a teacher should first pen down the grammatical rules, for example of clause and subordinate clause. After the definition of clause, students can be asked to come up with sentences, denoting the main clause and subordinate clause.

Critical analysis of the maxims of teaching showcases the foundation that leads toward the BCG Economy Model in terms of Education. The analysis states that the maxims,

- Make the teaching learning process smooth, easy to comprehend, organized and feasible to execute
- Lead towards novelty, innovation and thought provoking teaching and learning environment to make learning joyful
- Help in creating interest among students
- Help to develop logical thinking and analytical ability among students as they are guided to analyse, synthesize, comprehend abstraction and so on.
- Promote learning by doing leading students toward problem solving skill.
- Help students in acquiring the skills of induction and deduction in learning

BCG Economy Model in terms of Education lays emphasis on sustainability and equity in education. A feasible, easy to comprehend, innovative teaching method address all kinds of learners irrespective of the difference in their level of understanding. If the focus of teaching lies on building interest in learners it won't discriminate among learners. Moreover, when learners are made to learn through learning by doing the learning sustains for a longer period. Therefore, to apply the maxims of teaching with focus on BCG Economy Model in terms of Education, a teachers role would be,

- **An Experimenter:** Teacher should create a learning environment that encourages novelty and innovation. Through continuous trial and error method, a teacher would finally chalk out a method/ methods that appeases all and helps learners to reach the ultimate goal of education; imbibing the concept to be learned.
- **A Researcher:** A teacher can never teach until and unless he or she is learning himself/herself. With the continuous upgradation in the sphere of knowledge, a teacher should know how to build interest in learners, as the learners of today are unquestionably rational, critical and quick-witted. Only a teacher who is a researcher and frequently re- searches the content to be taught to learners with a passionate and reflective mind, can furnish an environment that is creative.
- **A facilitator:** Teachers are no longer the 'sage on the stage' and therefore, they refrain from being monotonous and deliver hour long lecture to the learners. Teachers of today focus on fabricating a conducive learning environment for the learners, where all kinds of learners are welcomed to participate in learning activities. This act of engaging or facilitating is a challenging task as continuous modification in learning activities and posing a problem for the learners to solve, is difficult in the long run.
- **A Guide and Counsellor:** Teaching learners the process of analysis and synthesis is not a piece of cake. Developing analytical thinking, scientific rigor, critical thinking, acceptance and rationality are the major areas, where the thrust of the role of a teacher as a guide and counsellor lies. For example, a teacher by developing rationality among learners can make them accept differences among themselves and bring in inclusiveness, which is an essential aspect of the BCG Economy Model in terms of Education.

4. Conclusion

The thematic study concludes that there is a positive coherence between the Bio-Circular Green Economy Model and logic of Curriculum Structure by National Policy of Education 2020, where the relation has been justified through the three principles coined; Bio-Pedagogical Principle, Circular Pedagogical Principle and Green Pedagogical Principle. Even the role of a teacher was examined in promoting Bio-Circular Green Economy Model to maximize learning which manifested a teacher as an experimenter, researcher, facilitator, guide and a counsellor.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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