



A REVIEW OF IMPACT OF BIOLOGY IN DEVELOPING CREATIVITY IN THE B. ED CURRICULUM.

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ABSTRACT

Learning biology is considered troublesome, particularly in certain territories like cell division, hereditary qualities, and chemicals (Cimer, 2012). Then again, there is an association between understudy achievement in learning science with creativity (Son, 2009). As creativity can be defined as the development of new and valuable approaches to take care of a problem (Sternberg and Kaufmann, 2010), it can be used to assist understudies with learning biology. In the interim, as per Guilford (1950), creativity incorporates unique and merged reasoning. Research on creativity in learning biology assists with coordinating diverse research discoveries, figuring thoughts, and analogies (Dunbarr, 1997). Similarity is an interaction to clarify a troublesome theme, by alluding to other more recognizable subjects. While coordinating diverse research discoveries is significant, understudies normally can't discover any relations among various themes. Figuring thoughts is used to help understudies' abilities in building up a theory and a subsequent end. Albeit the benefit of creativity in science education is critical, the research on this field is as yet inadequate. The research in creativity to help learning biology may assist with improving learning result, just as plan understudies for their future vocation

Keywords : *Impact of Biology, Developing , Creativity , b. Ed curriculum*

INTRODUCTION

The current public requests to relate education to the needs of society and to the objectives of public advancement necessitate numerous inventive changes in Biology Education. They highlight the need of connecting Biology Education with genuine situations with models found in the student's current circumstance. Alongside the advancement of abilities and ideas, understudy instructors' ought to likewise secure social qualities and morals. They should have social mindfulness, an awareness of certain expectations to shield the climate, and regard for the heeds of other people. Genuine situations ought to be related with climate and the community assets. The climate ought to be taken in an exhaustive way which incorporates social, social, biological and actual viewpoints, which impact the existence of the person. Likewise, community assets are materials which are available in the community, for example, characteristic assets, exhibition halls and ventures. These methodologies will be useful in growing logically literate people.

The interest currently is for more ambitious results from Biology Education and by suggestion, a curriculum characterized by more prominent accessibility, more obvious significance to perceived problems and increased agreement with explicit social settings. Trained researchers and engineers are no less in need, but their contribution can be enhanced by an all the more experimentally literate populace.

Biology is a subject that is hard to learn. The trouble influences understudy accomplishment. In addition, the trouble makes understudies less motivated to gain proficiency with the subject. Subsequently, it is difficult for them to accomplish a decent aftereffect of their examinations.

The trouble is caused by misinterpretations, trouble in discovering connection between biology points and the idea of the theme all in all. For instance, understudies don't comprehend the design of the chromosome in a cell core and its role in hereditary activities (Cimer, 2012; Kubika-Sebitosi, 2007). It is difficult for the understudy to learn it since they don't have the ability to get familiar with the particular themes.

There are many research contemplates that are conducted to discover answers for the learning trouble. To learn biology viably, understudies need to make associations between various points (Law and Lee, 2004). Further, they must be able to address any question within their learning activities. This is the expertise to create and approve thoughts (Lawson, 2001, Mumford, 2010). A few understudies don't have the right stuff, which raises them have hell considering biology.

The understudy battle is caused by their inability to describe the ideas of biology and they need abilities to acquire biology. They must be trained to think, describe and assess ideas. Consequently, they need to think innovatively, since creativity is an expertise to form a problem, discover an answer, assess and scatter it to other people (Torrance, 1969). Understudies who have the ability will have a favorable position to comprehend the idea, because they can assess thoughts and produce answers for real problems.

Difficulties in learning biology

Biology covers a few points that are considered hard to learn. As per Cimer (2012), there are five themes that are the most troublesome, which are: matter cycles, endocrine framework and chemical, aerobic breath, cell division, and hereditary qualities. The outcome was gathered from an examination of 177 understudies of an auxiliary school in Turkey. A few reasons were likewise found for the learning trouble. Cimer (2012) explained that the idea of the point, educators' way of instructing, understudies' learning habit, understudies' negative emotions and attitudes towards the theme and absence of assets were the fundamental driver of understudies' anxiety to examine biology. Any improvement that is related to learning habit, encouraging style and attitude will assist understudies with learning biology. Additionally, it is possible that it can reduce the troubles caused by the idea of the themes and absence of assets.

As indicated by Kubika-Sebitosi (2007), the understudy's trouble in learning biology at university level is derived from their misguided judgment about ideas of biology in their auxiliary school. The creator did an examination toward optional school understudies in two areas in South Africa about their comprehension of the hereditary ideas. It was discovered that understudies didn't have an away from about the role of quality in a cell of a life form. They didn't have a reasonable theoretical system about cell and quality. Based on the discovering, it can be concluded that understudies couldn't discover any relationship between's the construction of cell, including the chromosome and DNA as the piece of the phone structure that contain the quality itself, with the hereditary trait of any creature.

The possibility of misguided judgment by Kubika-Sebitosi (2007) is supported by Oztap, Ozay and Oztap (2003), in their review toward biology educators of auxiliary schools in Turkey. Instructors need to clarify the unique idea of some biological interaction. An overview toward instructors of optional schools in Turkey showed that they recognized troubles in showing subjects of biology. For instance, cell division measure comprises of two distinct cycles. Along these lines, encouraging the subject requires suitable strategy. As per the creator, the utilization of supporting materials, similar to display, diagram, video and laboratory activities can be used to defeat these challenges, in spite of the fact that it didn't really imply that it increased understudies' creativity.

Bio-social issues and Biology Education

There are numerous social and moral issues in biology like. Populace blast, Pollution and Environmental Degradation, Drugs, Energy and Environmental Education, Evolution versus Cretinism, Recombinant DNA and Bio-Engineering and so forth which need mindfulness with the goal that a legitimate balance between nature and man might be maintained. It is visualized that understudies ought to find out about the biosocial issues of today and tomorrow and ought to be able to take legitimate choices supportive in tackling them.

Definition of creativity

There are two sorts of creativity as per Craft (2001), high creativity and standard creativity. The high creativity is innovative activities of unprecedented talented people. It incorporates definition of creativity as per Fieldman, Csikzentmihalyi, and Gardner (1994) that described creativity as something remarkable and new, essentially changing in global scale.

Accordingly, this sort of creativity is considered less pertinent to application in the education sector, which is more related to taking care of every day life problem. As opposed to high creativity, the conventional creativity is more applicable to the problem that the understudies have. The common creativity is about the creativity of normal individuals, including understudies. It covers originality and worth (Craft, 2004). Creativity in delivering clever thought that can tackle the learning problem is considered as critical expertise that helps the understudies who learn biology.

Creativity is defined by advancement, quality and pertinence (Kaufmann and Sternberg, 2010). A creativity is related to another thing or another method of doing a job. At the end of the day, creativity is additionally a development. Beside it is something new, creativity must be a high caliber.

While creativity is special and having an excellent, creativity must be pertinent with a specific job or setting. Its importance is a prerequisite for tackling a problem (Kaufmann and Sternberg, 2010). Based on the definition, an innovative individual is capable of managing problem to make an answer.

Creativity is a result of both inward and outside preconditions. As per Oral (2009), there are five stages of creativity that are affected by the preconditions. The inside preconditions affecting creativity are insight, abilities, interest, education and knowledge. In the interim, physical, social, and monetary elements are the outside preconditions are impacting creativity. Both variables must be maximized in education, with the goal that understudies can learn better. For this situation, the push to cultivate understudies' creativity is an illustration of the outside preconditions.

OBJECTIVES OF THE STUDY

1. Study on Difficulties in learning biology
2. Study on Humanistic education, contribution to knowledge, and biology teaching & Ideas to foster creativity in learning biology

Humanistic education, contribution to knowledge, and biology teaching

Humanistic education is concerned within the understudy as a distinct individual who believes in his innovative potential and is provided the climate to develop autonomously. It additionally believes in relating school educational plans to the universe of human issues for building up a comprehension about the spot of an individual on the planet. It thinks about the value of human qualities, interest of individuals and self-satisfaction of the person. Humanistic education is concerned with self-acknowledgment and self realization. It is clear that Biology Education is going into the humanistic stage. It began as a clear subject talking about Zoology and Botany. The beginning of the Biological Science Curriculum Study Project started In the subsequent stage, that is, biology as request. Presently, in the third stage, Biology Education Is related to the advancement of the individual potential in all domains to make a cheerful community.

Implications for Biology Teachers

There are three-teaching implications for :

- Curriculum development
- Teaching strategies to be used by biology teachers ; and

- Learning styles to be practiced by the learners

Biology instructors will need more diversified instructional methods. For the most part, training facilities and instructional practices later on should reach out beyond the study hall. It will connect with the all out school and the community. Biology educators will utilize varied assets available in the community. One explicit technology which biology instructors may use to move beyond normal homeroom helps will be the PCs. It is anticipated that soon microcomputer technology will be incorporated into the existence of each citizen. The educational system will give basic PC abilities and instructors will utilize microcomputers to oversee classes, encourage problem settling abilities, present inspiration and store information. It is envisaged that the idea of the expert requests on Biology instructor will change. There will be an unmistakable need for varied learning styles and distinctive instructing procedures.

Hence, a biology educator ought to gain another point of view as an expert individual :

1. A Biology instructor ought to comprehend life sciences in their contemporary viewpoint.
2. She ought to have a comprehension of 'self '- biological and mental parts of becoming an individual, and of the climate wherein she lives.

Self - regulated learning as an instructional method

Self-regulated learning as a pedagogical objective ought not be confused with the current-potential for utilizing it as a technique. Learning and instructing ought to be educated on some event as a subject. This tuition ought not be given in the abstract, for example detached from its solid subject-matter, but as a nonstop thought of learning experience, methodologies and results which ought to be aligned with the understudy's turn of events and possible at all ages. Students should take a cognizant and appropriately - directed offer in the responsibility for building up their own learning ability. A strategy for this sort has, for instance, produced amazing outcomes in projects for improving the meta-cognitive capacities of retarded understudies (CAMPIONE1982). The more the developing understudies consider themselves to be the specialists of their learning and learning execution, the more positive the overall impact upon the improvement of learning inspiration (DE CHARMS 1973). Numerous instructional strategies have been developed and tested over the previous many years and especially as of late to change over their standards into commonsense techniques

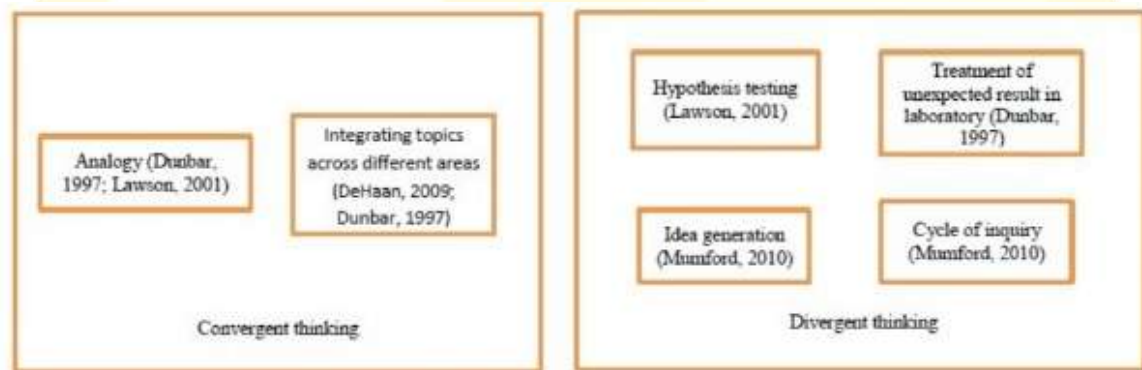
Teaching biology in higher secondary schools :

To bring about a primary change and furthermore qualitative improvement of education, the Government of India recommended the presentation of the 10+2+3 example. Under this example of education, opted to change over selected existing

Secondary schools into Higher Secondary Schools. Biology as a subject is offered in the majority of the schools. The Government released the syllabus for the two-year Higher Secondary (Academic) course in 1978. Indeed, even in 1996 the syllabus has been reviewed and revised for the Higher Secondary classes as of late, in the record under reference, it was claimed that in outlining the syllabus, the syllabi of the NCERT, PUC, first year of the degree course, control schools and the objectives of the Higher auxiliary course have been considered by the separate committees responsible for the subjects. The reading material were likewise published by the India Text-Book Society based on the prescribed syllabus

Ideas to foster creativity in learning biology

Based on research on creativity in learning biology, it was discovered that there is a need to incorporate distinctive finding of research across various subjects (Dunbar, 1997; de Haan, 2009; Lawson, 2001). De Haan (2009) put accentuation on coordinating material across subject zones. It was supported by both Dunbar (1997) and Lawson (2001) that suggested relationship as an approach to interface various plans to upgrade creativity among understudies of biology. The various abilities of creativity are presented in Graph 1.



Graph 1. Skills of creativity based on convergent and divergent thinking

Another recommendation for upgrading creativity was proposed by Mumford (2010) and Dunbar (1997), with respect to unexpected finding of a research activity

Analogy

Similarity relates two things, which are the base and the objective. An idea that the researcher are attempting to elaborate is called the objective. Then again, another idea or model that is used to clarify the objective is the base. During the similarity cycle, the researchers utilize the base as an illustration to clarify the objective.

The utilization of relationship in the atomic biology analyses can prompt revelation of new discoveries. For instance, it can be used to discover the capacity of a recently discovered quality. The researchers may locate another quality with a specific DNA atomic construction. At that point, the researchers will search different qualities with practically

indistinguishable construction of DNA particle from databases. When they find comparative qualities with practically indistinguishable design, they can make further trial about the genuine capacity of the quality, based on the similarity of the new quality construction, with the relationship.

The ability to relate past knowledge and the more current one like in the relationship is additionally supported by McCabe (2011). The creator investigated of utilizing visual learning support for learning microbiology among college understudies in Australia. The outcome showed that the expertise to discover association between two unique thoughts were beneficial for understudies. They can have better comprehension of the subjects being learned.

Treatment of unintended findings

Treatment of unintended discoveries is urgent when a research produces diverse outcome based on what is expected by the researchers. As indicated by the McCabe (2011), most researchers will in general look for just the discoveries that help the thought. Then, they will in general put less consideration toward unexpected discoveries

Creativity in laboratory practice

Aside from the test in homeroom and web based setting, the research on utilizing creativity in laboratory practice is conducted by Haigh (2007). Analytical practice is significant, despite functional activities is basic in biology classes all over. As suggested by Cimer (2012) that useful activities assist understudies with understanding ideas of biology, the activities need to incorporate insightful activities, similar to open ended problems.

Analytical pragmatic experience may cultivate understudies' creativity. Haigh (2007) made an examination toward secondary school understudies in New Zealand. The understudies need to settle on choices as to insightful plan, validity or reliability of information, during the trial. By contribution in the logical examination, understudies comprehend the role of inventive activity in the development of knowledge. In this manner, understudies were planning their own investigation, to answer a given biology problem. In other word, problem addressing is the principle thought of the analysis (Haigh, 2007). An illustration of the problem settling is the point at which they locate an unexpected outcome within their analysis. As per Dunbar (1997), the unexpected outcome will offer an understudy a chance to create remarkable approach to settle it, just as similarity. It can assist understudy with explaining their confusion about certain themes in biology, and trouble to discover connection between biology points (Cimer, 2012)

REVIEW OF LITERATURE

Measured methodology would mean utilizing the developed modules for organizing both individualized and gathering guidelines In an assortment of situations, for example, study halls, laboratories, homes, fields, historical center and so on Measured methodology (Murray, 1971 ; Creager et al., 1971 ; Thornton, 1971) would mean utilizing the developed

modules for organizing both individualized and gathering directions in an assortment of situations, for example, homerooms, laboratories, homes, fields, historical center and so forth, Creager (1971) had considered the modules as bricks' of an educational encounter wherein 28 they are simply the basic building blocks, the instructional units designed to help the understudy in achieving the specified objectives.

Ehrle (1971) had warned that where there was no vision, in any event, instructing modules would not assistance. As per him, modules could be Immensely incredible In the possession of an 'Illuminated' educator. He had, in this way, reiterated the need to create modules using the new discoveries which would guarantee powerful instructing learning

The Systems Approach has been used (Silvern, 1965; 1968; Carter, 1973; Kaufmen 1973 ; Ulmer, 1973 ; Natarajan, 1976 ; Briggs, 1977) to plan and build up an effective instructional framework. As in a characteristic bio-framework, the man-made framework additionally had the accompanying parts to work in a successful and proficient way; 1. Sources of info 2. Through puts 3. Yields 4. Controls 5. Feed-back 6. The board 7. Limitations and Restraints. Using these parts various kinds of models of frameworks way to deal with education have been formulated (Kaufman, 1973, Natarajan, 1976).

A Module has been discovered to be a feasible proposition to operationally consider it as an instructional framework (Burns, 1973 ; DIamkond, 1973 ; Klingstedt, 1973 ; Cyrus 1976 ; Briggs, 1977) for study hall directions.

Buch et al. (1978) defined a module as an independent, and independent instructional unit. They have additionally suggested that a module ought to have detailed guidelines determining obviously the instructional objectives of the unit, the rundown of learning activities to accomplish those objectives and furthermore the assessment procedure. The accentuation in the modules ought to be on the students support to the greatest and the instructor's interchange to the base. From the above definitions and view focuses, it could be summarized that an Instructional module could be conceived as a selfcontained and independent unit developed for an objective populace of students for understanding the stated explicit instructional objectives. For example, in 1992 the IModular Information Networit produced a bunch of standards for a particular way to deal with the curriculum (MIN, 1992) which convey considerable importance for advanced education.

Mumford (2012)' thought focused on the pattern of thought age and the subsequent feedback from the accompanying strides of the cycle. It might help understudies who experience issues in understanding complex ideas of biology. Notwithstanding, the thought isn't plainly uphold the understudies to comprehend the connection of one idea with another. In a specific idea of biology, understudies found that this is their problem to learn biology. One model is the trouble to learn hereditary qualities that Law and Lee (2004) discovered that the understudies can't locate the significant connection.

Dunbar (2001) thought focused on relating one point into different themes. It might assist understudies with discovering connection of one wonder, into a bigger image of the idea.

Understudies may discover the connection of an idea and the entire thought. The problems of relating two distinct points were disclosed by both Kubika-Sibetosi (2007) and Oztap, Ozay and Oztap (2003). Accordingly Dunbar's thought answered the problem of relating two distinct points.

Both Mumford (2012) and Dunbar (2001) have a connection to some point. A model is the point at which an individual is figuring out how to see new information. Mumford (2012) suggested that creativity for tackling problem requires an individual to have a past knowledge about a subject.

The individual needs to redesign both the current knowledge and the new information, to comprehend the new information. The revamping will result another and interesting thought. The individual may likewise interface the new information with other subject that appears to be unrelated, but will assist with understanding the interaction, as indicated by Dunbar (2001). As per Dunbar, the expertise of similarity and relating among various subjects are important for innovative cycle. Both cycles will assist with building up a more inventive interaction to take care of the problem.

CONCLUSION

Creativity is significant for understudies to learn in biology. As creativity is forming novel and valuable thoughts, it can be applied in the education sector, to assist understudy with taking care of their own problem. Hence, understudies need practice in the abilities. Learning activities need to incorporate analytical activities, to permit understudies do request while learning biology. It will cultivate understudies' creativity, as they are to settle their troubles in learning biology. Those activities incorporate creating thought, associating various thoughts, figuring recommendation for a specific problem, actualizing arrangement into reasonable activities, treating unexpected outcome and assessing result. The creativity activities are applied in different learning activities, including study hall, internet learning and laboratory practice

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