A Peer Reviewed Research Journal in Education

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EDUFOCUS
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Contents

Editorial

Edufocus, Peer reviewed journal in Education contains a collection of eight research articles. First article titled Policy On School Bag 2020: A Bird's Eye View, analyses The School Bag Policy 2020, introduced by the Department of School Education and Literacy under the Ministry of Education in the Government of India, aims to tackle the issue of heavy school bags and its adverse effects on children's health and well-being.

Second article titled A Comparative Study on Environmental Ethics among Student Teachers and the study reveals that most of the Student Teachers at Elementary and Graduate Level possess average level of Environmental Ethics. The results also revealed that there is a significant difference between Elementary level and Graduate level Student Teachers. Third article titled NEP 2020 towards 21st Century Teacher Education Program reveals that the proposed NEP 2020 is providing some necessary changes which are changing the scenario of Indian teacher education system and the possibility of implementing the teacher education programs suggested by the new education policy on various levels, results after implementation of the new policy are discussed towards new aspects to be incorporated regarding the duration, pedagogical, non-pedagogical aspects, etc in the new education policy. The fourth article Research Trends in Multicultural Education: A Qualitative Study examines how multiculturalism influences on teaching and learning.

Fifth article A Study on Emerging Challenges and Issues in Teacher Education Programs and New Perspectives in the 21st Century Educational Systems explores emerging challenges and issues in teacher education programs (TEP) and new perspectives in the 21st-century educational systems. Sixth article Effect of Embedded Strategies on Delayed Memory in Economics of Higher Secondary Students Based on Locale, was designed with a view to see the effect of certain Strategies, like cognitive, metacognitive, social, and resource management strategies which were embedded (implies to surround with and implant) in the teaching-learning process, and to see its effect on the delayed memory (retaining capacity) of higher secondary school students based on locale of Kerala. Seventh article Outcome based education –Need of the hour examines the implementation of outcome-based education (OBE) in higher education and its impact on student learning outcomes and employability. The findings indicate that OBE provides a paradigm shift from content-focused approaches towards learner-centered education.

The eighth article titled Biochar: A Product that improves Regenerative Agriculture reveals that Biochar production is a carbon-negative process, which actively reduces the amount of carbon dioxide in the atmosphere. Benefits of Biochar in improving agricultural production and mitigating climatic changes make it a promising tool for regenerative agriculture and hence these aspects should be included in the curriculum so that it will generate an interest among students to do cultivation.

Dr. Smitha Jose

Editor

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POLICY ON SCHOOL BAG 2020: A BIRD'S EYE VIEW

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ABSTRACT

The School Bag Policy 2020, introduced by the Department of School Education and Literacy under the Ministry of Education in the Government of India, aims to tackle the issue of heavy school bags and its adverse effects on children's health and well-being. The policy emphasizes the importance of collective efforts to reduce the weight of school bags and textbooks. It proposes various measures such as introducing schedule flexibility, limiting the number of subjects taught at the elementary level, and reducing the prescribed number of textbooks. Additionally, the policy highlights the significance of counseling sessions, regular bag checks, and awareness programs to promote lighter school bags. It suggests alternatives like using digital tabs instead of traditional textbooks and ensuring access to high-quality drinking water in schools. Implementing a standardized ratio of bag weight to body weight is also recommended. The policy emphasizes the crucial roles of teachers, schools, parents, and education authorities in implementing these recommendations. The paper provides a comprehensive overview of the policy's essence and its theoretical exploration.

Key words: School Bag, Home Work, Learning without Burden.

INTRODUCTION

When we educate a child, our goal is to foster their holistic development. Schools provide a formal structure for this education. When we envision schools and students, we often imagine a child carrying a heavy bag on their shoulders. This image reinforces the perception that the burden is too much for the child, and the reality does not contradict this perception

The issue of heavy school bags for children has been addressed in various educational frameworks and reports. The National Curriculum Framework for School Education (NCFSE) 2000 and the National Curriculum Framework (NCF) 2005, developed by the National Council of Educational Research and Training (NCERT), discussed this concern. In 1993, the Report of the National Advisory Committee, led by Dr. Yash Pal and appointed by the Ministry of Human Resource Development,

titled «Learning without Burden,» highlighted the physical discomfort caused by heavy school bags, along with the burden of an extensive curriculum.

Recommendations were made to alleviate this issue, such as introducing flexibility in the school timetable. These recommendations included suggestions like no textbooks at the pre-primary stage, limiting the number of subjects to three for Classes I-II, four subjects for Classes III-V, and six subjects for Classes VI-X (as stated in the NCF, 2005). These measures were aimed at reducing the load of textbooks and curriculum content, which contributes to the heaviness of school bags, as well as the stress and discomfort experienced by students in carrying them.

In response to the issue of heavy school bags, several states, union territories (UTs), and other organizations have taken initiatives to alleviate the burden. For instance, Tamil Nadu

has implemented a semester system in schools, while some Kendriya Vidyalayas (KVs) have introduced locker systems for students to store textbooks within the school premises. Similarly, the states of Telangana and Maharashtra have issued guidelines regarding school bags.

Furthermore, a significant development in this regard was a judgment by the Honourable High Court of Jurisdiction at Madras on May 29, 2018 (M. Purushothaman Vs. Union of India, WP No. 25680 of 2018). The court directed the Union of India to formulate a policy on children›s school bags, based on the provisions outlined in the Children›s School Bag (Limitation on Weight) Bill of 2006. This judgment emphasized the need for a standardized policy to address the issue of heavy school bags and its impact on children.

Problems of heavy school bags
- Heavy school bags have been found to be a cause of backache and muscle strain in children, as noted in a study by R. Avantika et al. in 2013.

- The weight of school bags can contribute to the development of posture-related disorders, according to research conducted by Katarzyna Walicka-Cupry et al. in 2015.

- The burden of heavy school bags can impact the spinal posture, foot shape, and even the gait of a child.

- Carrying heavy school bags can have adverse physical effects on the growing children, particularly on their vertebral column and knees.

- Imbalances in the body caused by heavy school bags can affect the health of the nervous system.

- Heavy school bags can also disrupt body posture, leading to further complications.

Addressing the problem of weight of School Bag

The authority has considered the following guidelines, documents and researches and discussed relevant points related to the weight of school bags.

- Learning without Burden, Report of the Yash Pal Committee, (MHRD, 1993)

- National Curriculum Framework-2005

- The Children's School Bag (Limitation on Weight) Bill, 2006

- CBSE Circular No.07.2006 on Subject Reducing the Bag Load on Children

- Reduction of weight of school bag—need for strict compliance, guidelines issued by Kendriya Vidyalaya Sangathan on 29.12.2009

- Measures to be taken to reduce the burden of school bag (Daptar) of the Children, guidelines by the government of Maharashtra, School Education and Sports Department, 21 July 2015

- Guidelines issued by the Government of Telangana (18.7.2017)

- Decision in W.M.P. No. 9267 of 2018. [M. Purushothaman, Chennai vs. Secretary, Government of India, Department of School Education and Literacy Human Resources Development Ministry New Delhi and Others, W.M.P. No. 9267 of 2018 & W.P. No. 25680 of 2017, decided on, 29 May 2018.]

- National Education Policy, 2020

- In 2009, the American Occupational Therapy Association (AOTA) and the American Physical Therapy Association (APTA) recommended not carrying a backpack heavier than 15 per cent (or between 10% and 20%) of the student's

body weight. Further in 2012, this was changed to10 per cent of their body weight.

- The American Chiropractic Association (ACA) recommended that backpack weight should not exceed 5–10 per cent of the child's bodyweight. (link-https://www. hindawi. com/journals/bmri/2015/817913/)

Survey on School Bag

The Expert Group had developed a set of questionnaires for School Heads, Parents and Students. A Google form was created to collect data through an online mode from a total of 352 schools, including Kendriya Vidyalayas, CBSE schools, and schools recognized by the states of Telangana and Maharashtra. The data collection involved 2992 parents and 3624 students. The sampling technique used for data collection was purposive sampling, where school heads were responsible for gathering data not only from their staff but also from parents and students

Major Findings

Major findings of the report may be summarised as

- Weights of school bags

- Homework

- Subjects being taught at the Elementary Stage

- Multiple Textbooks at the Secondary and Higher Secondary Stages

  Weights of school bags

- 48.8 % of school heads weigh the school bag of their children.

- It has been observed that children are carrying school bags weighing 2 to 3 kilograms more than the recommended limit, which is 10 percent of their body weight, a universally accepted guideline. Additionally, the weight of the empty bags

themselves varied from 150 grams to 1 kilogram.

- 77.2% of School Heads say that besides textbooks, the students usually carry lunch pack, followed by water or drinks (63.5%), thick notebooks (38.5%), science or math kit (16%).

- 77.7% of parents said that handling of heavy school bag is a serious problem which they often discuss with their child and family.

- 90.8 % of parents often check their children's bag.

- 71% of students opine that daily files (from Classes VI onwards)will be useful instead of notebooks for reducing the weight of school bags.

Homework

- In Classes I-II, the homework hours vary from 0 to 2 hours on a daily basis.

- In Classes III onwards, homework hours vary from 2 to 5 hrs daily.

- 92 per cent schools have home- work policy, and either they do not give home work in Classes I and II or give homework of very less duration, say, 30 minutes.

Subjects being taught at the Elementary Stage

Despite the National Curriculum Framework-2005 recommending only two subjects, Language and Mathematics, for Classes I and II, many schools choose to offer additional subjects like Social Sciences, Science, Computer Science, etc., for these classes. Similarly, for Classes III-V, schools offer a range of subjects, although the NCF-2005 recommends only Language, Mathematics, and Environmental Studies. The inclusion of these additional subjects results in the need for more books in those subject areas, consequently increasing the weight of the child's school bag.

Multiple Textbooks at the Secondary and Higher Secondary Stages

• Schools prescribe more than one textbook for the same subject in secondary and higher secondary classes. This not only creates burden on parents, but also adds to the load of school bag.

RECOMMENDATIONS FOR THE REDUCTION OF WEIGHT OF SCHOOL BAG

Following are a few actions and best practices undertaken by some schools to address the problem of heavy school bag

• Advise and counselling sessions by the teachers and schools to bring lighter school bags. For the same, announcements are being made during the morning assembly.

• Checking of the school bags of the students regularly.

• Brought changes in the school time table to address the issue.

• Sharing of one textbook in a subject with the peer sitting nearby.

• Divide the textbook into two parts, one for each term.

• Scope to children to complete their work in school only, after school hours.

• School Bag Awareness Programme among the students to reduce the burden on their shoulders.

• Arrange periodic or surprise checking of school bags in the morning assembly.

• Provide good quality drinking water in the school premises.

• Use of weighing machine to check the weights of school bags in the school

• One note book for all the subjects

• No reference book is allowed to be carried to the school

• Interaction with parents on the issue of heavy school bag in Parent-Teacher Meetings

• Use tabs instead of textbooks.

• The class time table should indicate which book will be used on which day.

• Follow universally accepted ratio of weight for school bag as 10 per cent of the body weight of the student across Classes I to X.

• Light-weight school bag with proper compartments and contain two padded and adjustable straps that can be squarely fit on both the shoulders.

• Wheeled carriers should not be allowed as it may hurt children while climbing stairs.

• Provide good quality water in sufficient quantity accessible to all the students in the school.

• Weight of each textbook may be printed on the textbook by the publishers, along with the Grams per Square Meter (GSM).

• Weight of Textbooks Developed by the NCERT is as given in Table 1.

Table 1

Weight of Textbooks Developed by the NCERT (class wise)

S. No.	Class	No. of NCERT Textbooks	Total Weight (in gms.)	No. of Subjects (Version-English or Hindi)
1.	Pre- primary	No text book is recommended		
2.	Class I	3	1078	3
3.	Class II	3	1080	3
4.	Class III	4	1572	4
5.	Class IV	4	1804	4
6.	Class V	4	1916	4
7.	Class VI	10	3080	6
8.	Class VII	10	3508	6
9	Class VIII	11	3640	6
10.	Class IX	15	4400	6
11.	Class X	13	4182	6

- Lockers in classes may be installed for students with disabilities for storing and retrieving books and other items.

- The suggestive table for class-wise range for ratio for school bag as 10 per cent of the body weight is given below Table 2.

Table 2

Suggestive table for class-wise range for ratio for school bag as 10 per cent of the body weight

S. No	Class	Average Body Weight Range (in Kg)	Bag Weight Range (Recommended)
1	Pre Primary	10-16	No Bag
2	Class I	16-22	1.6-2.2
3	Class II	16-22	1.6-2.2
4	Class III	17-25	1-7-2.5
5	Class IV	17-25	1-7-2.5
6	Class V	17-25	1-7-2.5
7	Class VI	20-30	2-3
8	Class VII	20-30	2-3
9	Class VIII	25-40	2.5-4
10	Class IX	25-45	2.5-4.5
11	Class X	25-45	2.5-4.5

- School Diary or Almanac also adds to the weight of school bag. This needs to be avoided or made thinner as it remains mostly empty.

- The issues related to heavy school bag need to be included in the pre-service and in-service teacher education curriculum.

- Recommended Note books as given in Table 3.

Table 3

Recommended Note books

Number	Class	Purpose
Single	up to Class II	For classwork only
Two	Classes III-V	for classwork and homework (At a time only one notebook shall be allowed in a child's bag, the second one will be kept in school.)
One file with loose paper	(from Classes VI-VIII)	Classwork and homework.

- National Education Policy, 2020 recommends concerted efforts, through suitable changes in curriculum and pedagogy, will be made by NCERT, SCERTs, schools, and educators to significantly reduce the weight of school bags and textbooks.

- Based on recommendation of NCF-2005 on homework, the Group recommends the following as mentioned in Table 4.

Table 4

Recommendation on Home Work

Level	Class	Total Homework time
Primary	up to Class II	No homework
	Classes III-V	maximum of two hours a week
Middle School	(from Classes VI-VIII)	maximum of one hour a day (about five to six hours a week).
Secondary and Higher Secondary		maximum of two hours a day (about 10 to 12 hours a week)

CONCLUSION

Children's good health and stress free mind will contribute to nation building. It is important to look at other factors contributing to the load, such as, capacity to carry weight, mental or physical disorder, disability, disease, distance for which the bag is continuously to be carried, etc., which cannot easily be quantified. For this, implementation of School Bag Policy is mandatory in every school (Government, Government aided, unaided) for the betterment of our children.

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A COMPARATIVE STUDY ON ENVIRONMENTAL ETHICS AMONG STUDENT TEACHERS

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ABSTRACT

Every person has the right to a good life, yet there are now environmental factors that tend to impede the acquisition and enjoyment of such a life. The intensification of environmental contamination may result in unimaginable suffering. Environmental ethics is the responsibility to understand how our actions affect the environment and to realise that we all have a duty to protect natural resources and keep the world in good shape for future generations. Environmental Ethics is a crucial characteristic that must be fostered in future educators. The study is entitled as "A Comparative Study of Environmental Ethics among Student Teachers". The research was conducted using a descriptive survey methodology. This research attempted to characterize the Environmental Ethics of Student Teachers in the current context. As a result, 200 Elementry and Graduate level (100 from B.Ed and 100 from D.El.Ed)Student Teachers were selected as a sample for the current research. In the current investigation, a Cluster Sampling Technique was used. Haseen Taj (2011) developed and standardized the Environmental Ethics Scale employed in the current research. Using statistical approaches, data is gathered, analyzed, and interpreted. The present study reveals that most of the Student Teachers at Elementary and Graduate Level possess average level of Environmental Ethics. The results also revealed that there is a significant difference between Elementary level and Graduate level Student Teachers.

Key Words: Environmental Ethics, Student Teachers, Elementary Level, Graduate Level.

Introduction:

Since 1990, environmental degradation has become a worldwide problem. Global awareness has made the environmental catastrophe the top concern. Global warming, acid rain, and stratospheric ozone depletion are pollution issues, while deforestation, species extinction, and other bio-diversity issues threaten the global eco system for sustainable living. Humans experience unhappiness and suffering due to a lack of care for the common good and a lack of feeling of duty and ethics for maintaining a healthy eco-system. If we are to strive to a higher quality of life, one that guarantees freedom from lack, sickness, and fear itself, then we must all work together to stop the escalating toxicity of our planet. We need everyone to work together right away to stop this environmental disaster. However, this will only happen if we rebuilt citizenry values. We have to give them the right awareness and values (ethics). Those values that will make them care more about keeping the balance in the ecosystem, and teach them how to save the environment from getting worse and help make it a healthier and more progressive place to live. Changing the human-nature interaction is one of the most important challenges we confront and must address now. With the degradation of ecological systems that are essential to human survival and the intensification of the environmental crisis, it has become apparent that economic and legal approaches alone are insufficient in addressing issues of environmental pollution and ecological imbalances. As such, it is imperative that we tap into the boundless ethical reservoirs of humanity to supplement these methods. The

establishment of a suitable attitude towards nature and the development of an ethical relationship between humans and nature are prerequisites for the automatic and conscientious love and respect for nature. Only with such guidance we can effectively tackle environment related issues. Environmental ethics is a new branch of philosophy that examines the moral issues underlying environmental conservation. Academics, scientists, policymakers, and governments worldwide are concerned about environmental challenges. The UN World Conference on Environment in Stockholm (1972), the Earth Summit in Rio de Janeiro (1992), the Global Forum (1992), and the activities of international NGOs and other forums show that environmental preservation is the international community's biggest concern. Human activities and unexpected technology growth have worsened environmental challenges. Population expansion and industrialization have altered human lifestyles. Fossil fuel use increases atmospheric CO2 and global warming. Rapid urbanization requires massive energy use and trash production. These activities have accelerated environmental deterioration, biodiversity loss, and the loss of certain pristine ecosystems, jeopardizing human survival. Environmental deterioration is hampered by a lack of scientific understanding and will. In such a situation, society has to be taught about the environment and sustainable development to ensure a better future. Environmental education sensitizes individuals to rational resource use and environmental damage. Environmental ethics is understanding the environmental impacts of our consumption and recognizing our individual and collective responsibilities to preserve natural resources and maintain the world for future generations. Human-nature ties are one of the most important topics we must address today. With the deterioration of ecological systems on which humans depend and the worsening of the environmental crisis, humans have realized that economic and judicial methods alone cannot solve environmental pollution and ecological imbalances. We must also appeal to our limitless internal ethical resources. We can only solve environmental pollution and ecological imbalances by loving and respecting nature automatically and conscientiously. Environmental ethics is a new philosophy topic that addresses environmental issues. It supports worldwide environmental conservation with morality and ethics. Environmental ethics concerns humans' interaction with nature. Environmental ethics became a philosophical field in the 1970s. Two important books at that time raised awareness of the dangers of chemical pesticides to public health and wildlife. Rachal Carson's (Carson, 1962) "Silent Spring" was the first. The Population Bomb (Erlich, 1969) by Paul Ehrlich warned of the destructive impact of a growing population on the planet's resources. The deterioration of ecosystems, depletion of natural habitats reduction of plant and animal diversity, and the impact of climate change are among a range of environmental concerns that have gained widespread public awareness and governmental attention. Environmental ethics is an ecological conscience or moral that promotes human societies living in harmony with the natural world on which they depend for survival and well-being. It also means understanding the environmental impacts of our consumption and taking personal and collective action to conserve natural resources and preserve the planet for future generations. Environmental ethics is human ethics centred on social justice for everyone, regardless of race, sex, religion, philosophy, caste, area, or country. Human actions and attitudes toward the socio-cultural and natural environment cause most environmental issues. To save the environment, we must alter our mind-set (Natural Environment Research Council, UK, 1989). Humans' environmental ethics. It addresses human environmental behaviour. Two issues dominate environmental ethics. First, human action to improve the environment. It questions if this is ethical from a human perspective. The second is whether the environment has rights that must be protected. Instrumental and intrinsic environmental ethics exist. The instrumental value pertains to value of things as means useful to some other ends. The intrinsic value is the value of things as ends in themselves regardless of whether they are useful as means to other ends or not. Whether they serve other purposes or not, objects have inherent worth. All species should exist. All species are interdependent. Losing one species might affect other community members.

Need and significance

The emergence of humans can be attributed

to the process of evolution of life forms and the influence of their surroundings. The environmental quality is crucial for the survival of humanity. However, most environmental issues and challenges can be attributed to human behaviour and their exploitative approach towards nature. Environmental literacy necessitates an individual's comprehension and cognizance of the environment, which in turn fosters positive alterations in attitudes and behaviours towards environmental issues, ultimately leading to their resolution. (Murphy, 2002; Ramsey et al., 1992). Sufficient comprehension of the environment leads to suitable actions. Environmental Education has been proposed and implemented as a mandatory subject across all educational levels, in which programmes that prepare educators are also included. (Supreme Court 1991 & 2009; NCTE, 2004). The sustainability of human well-being depends on our ability to keep the environment in good shape. Environmental ethics is the study of the moral concepts underpinning environmental values, as well as the difficulties associated with developing and implementing policies to protect and preserve ecological systems and biodiversity. In the framework of a pre-service teacher education programme, it is crucial that environmental ethics be incorporated as a key guiding concept in the training and development of future educators. Educators play a key role in shaping and influencing their communities. (Gillaspy, 2012) It is everyone's obligation to ensure that the world's natural resources are protected for future generations if we want to create a liveable and healthy environment. (Taj, 2001).

Literature Review

The environmental problems we face now are so pervasive and permeate every aspect of our society that they have become ingrained in our cultural norms. There has been a lot of worry and investigation into the effects that humans have on the planet's natural resources and ecosystems. In particular, pollution has been singled out as a major cause of environmental decline (Daştan, 1999); Individuals play a crucial role in promoting and maintaining a sustainable and high-quality environment (Sneddon, 2000). Those who are conscious of their impact on the planet might work to safeguard and enhance it. (Baykan, 2004). Integrating environmental ed-ucation into the curriculum successfully calls for thorough knowledge of the topic, mastery of applicable skills, and unwavering commitment to the cause. It is probable that an exemplary educator will foster the development of environmentally literate pupils. (Shobeiri et al. (2006). High school students in Pondicherry were surveyed to determine their level of environmental consciousness and environmental ethics, and the results were reported by Little Flower (2006). According to the results, pupils at higher secondary schools have strong environmental ethics. Students' environmental ethics were shown to vary significantly across demographic categories, including gender, geography, and administration. While certain people and groups have been aware of environmental degradation for quite some time, it is only in recent decades that the subject has received widespread attention. Literacy education and the cultivation of individuals' perspectives on environmental issues can make substantial contributions to the evaluation of environmental concerns and the formulation of appropriate responses. (Buckingham & Turner, 2008; Chauhan, 2008). The field of environmental education requires a re-evaluation of its focus, shifting away from a narrow emphasis on raising awareness and towards the cultivation of practical skills that enable individuals to analyse the ethical dimensions of environmental issues. This approach should also involve an examination of the values and goals that underpin our relationship with the environment, with the aim of reducing the extent to which they reinforce materialistic and self-centered values and goals. (Crompton and Kasser, 2009). Muthumanickam and Sarala (2009) found that students in their final year of secondary education showed strong environmental ethics, with no obvious differences between genders or regions. In Allahabad, a study was conducted by Aziz (2015) to examine the environmental awareness and environmental ethics of primary and secondary school teachers. The findings indicate a statistically significant association between the ethical considerations pertaining to the environment and the level of environmental consciousness exhibited by educators. Research comparing environmental ethics between adolescent boys and girls revealed that the latter exhibited a higher level of

environmental ethics. The study revealed that there were variations in environmental sensitivity between urban and rural adolescents, with urban adolescents exhibiting a higher degree of sensitivity towards their surroundings in comparison to their rural counterparts. (Ozgul & Ozera, 2016; Kaur & Kaur, 2016; Bhat, 2018). According to Maria's (2017) findings, there is evidence of environmental ethics being present among students in higher secondary education. The data collection process involved the utilisation of the Environmental Ethics Finding no statistically significant difference in environmental ethics across the sexes, the study concluded that the students had moderate levels of environmental ethics. Scale, which was developed by HaseenTaj (2001).

A significant difference was found in the Yalmanci and Gözüm (2019) study's findings between high school pupils who subscribed to eco-feminist ethics and those who adhered to eco-centric ethics after being exposed to pre-school education. There are major ramifications of the finding that pre-school education provides a statistically significant benefit to high school pupils.

Hypothesis of the Study
- There is a significant difference in the extent of Environmental Ethics among Student Teachers at Elementary Level and Graduate Level.

Objectives of the Study

The current study was carried out with the subsequent aims:

- To find out the extent of Environmental Ethics among Student Teachers at Elementary Level.

- To find out the extent of Environmental Ethics among Student Teachers at Graduate Level.

- To compare the extent of Environmental Ethics among Student Teachers at Elementary Level and Graduate Level.

Methodology

Descriptive surveys are used to obtain information by asking respondents to elaborate on their experiences or thoughts. This research methodology was used in the study. The study's overarching goal is to determine whether or not there is a statistically significant difference between student teachers' mean scores on the Environmental Ethics assessment at Elementary level and Graduate level. The sample of the study consisted of 200 Student Teachers(100 from Elementary Level and 100 from Graduate Level) of the Thrissur and Kottayam district of Kerala. Cluster Sampling Technique was adopted to select the sample from the population. The statistical techniques used for analysis of data include Descriptive Statistics and t- test.

Tool Used:

The data collection process utilised the En-

Table No. 1 Level of Environment Ethics among Student Teachers at Elementary level (D.El. Ed.)

Environmental Ethics	Number	Mean	S D	Level in %		
				High	Average	Low
Elementary Student Teachers	100	112.57	10.67	21	66	13

vironmental Ethics Scale developed by Haseen Taj in 2011. The measurement instrument comprised of a total of 45 items, each rated on a 3-point Likert scale. The assessment exhibits a content validity and reliability coefficient of 0.71, ascertained through employment of the split-half technique. The scoring system uti-

lised a range of 1 to 3 for negative items and 3 to 1 for positive items. The range of the total score is between 100 and 135. A higher score is indicative of a greater degree of Environmental Ethics, whereas a lower score suggests a lower level of Environmental Ethics.

Analysis and Interpretation

The data collected were tabulated and sta-

tistically analysed. The entire group was classified into high, average and low-level groups based on their score for Environmental Ethics. The subjects with a score above or equal to the value of mean + σ were taken as high and those with a score below or equal to the value of mean – σ were taken as low. The score obtained in between these were considered as average. Significance of difference between two means (t-test) is used to compare the Environmental Ethics among Student Teachers at Elementary level and Graduate level. The details of the re-

Table No. 2 Level of Environment Ethics among Student Teachers at Graduate level (B.Ed)

Environmental Ethics	Number	Mean	S D	Level in %		
				High	Average	Low
Elementary Student Teachers	100	112.57	10.67	21	66	13

sults are given in the following tables.

The Table 1. shows that mean value of Environmental Ethics among Student Teachers at Elementary level is 112.57 and standard deviation is 10.67. The table also reveals that 21% of the total sample shows high Environmental Ethics, whereas 66% shows average and 13% shows low Environmental Ethics. That means the number of Student Teachers who possessed average level of Environmental Ethics higher than high and low groups.

Table No. 3 Comparison of Environmental Ethics among Student Teachers at Elementary (D.El.Ed) and Graduate level (B.Ed.)

Environmental Ethics	Number	Mean	S D	Critical Ratio	Significance
Elementary Student Teachers (D.El.Ed.)	100	112.57	10.67	6.037	P<0.01
Graduate Student Teachers (B.Ed)	100	121.50	10.24		

The result revealed that the number of Student Teachers at Elementary level show average Environmental Ethics. It focuses on the need for including effective strategic plans for developing Environmental Ethics among Student Teachers at Elementary level in the curriculum.

The Table 2 shows that mean value of Environmental Ethics among Student Teachers at Graduate level is 121.50 and standard deviation is 10.24. The table also reveals that 13% of the total sample shows high Environmental Ethics, whereas 74% shows average and 13% shows low Environmental Ethics. That means the number of Student Teachers who possessed average level of Environmental Ethics higher than high and low groups.
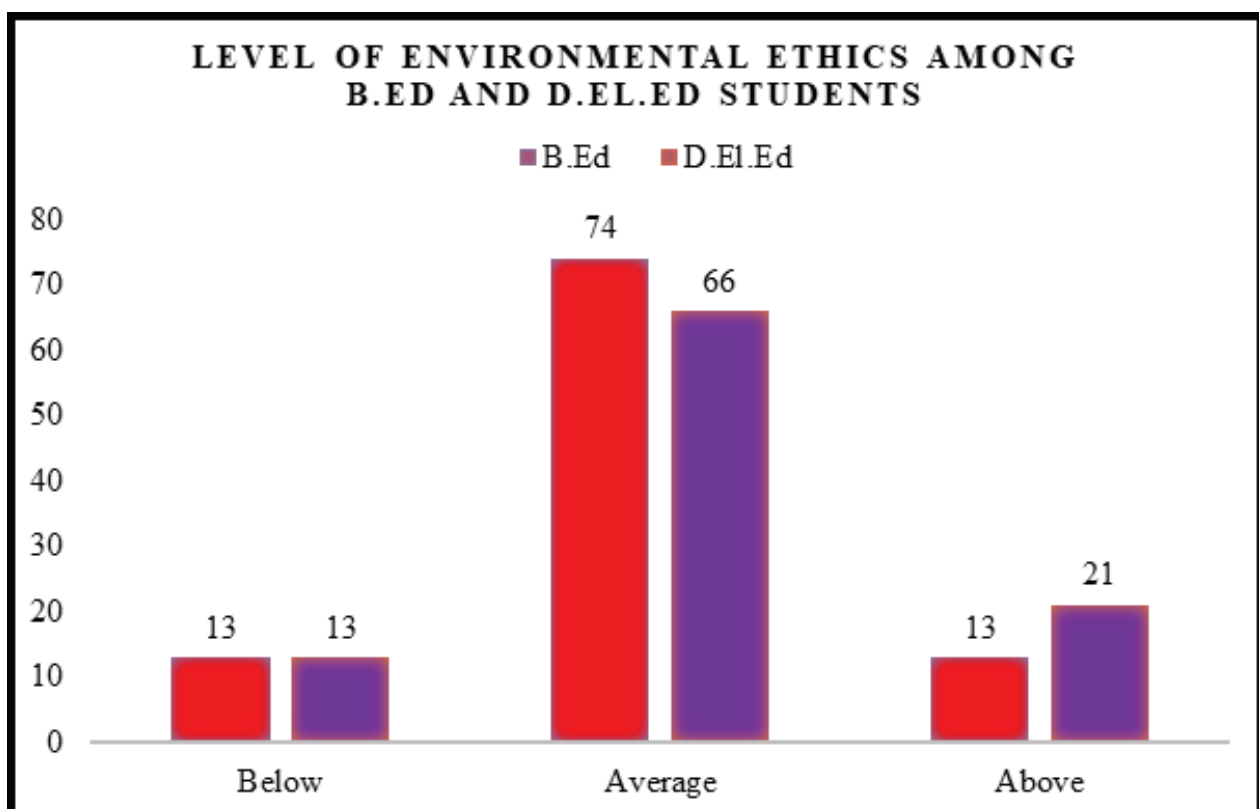
The result revealed that the majority of Student Teachers at Graduate level show average Environmental Ethics. In order to develop Environmental Ethics among Student Teacher at Graduate level, the teaching strategies should be developed to teach Environmental Science. The student should be actively involved in learning while the teacher teaches environmental science subjects. Environmental science education should go beyond the classroom and include principles that students may apply to their daily lives.

Figure 1: Graphical representation of the extent of Environmental Ethics among Student Teachers at Elementary (D.El.Ed.) and Graduate (B.Ed) level.

Table 3 illustrate that mean and standard deviation of Environmental Ethics among Student Teachers at Elementary are 112.57 and 10.67 and for Graduate level ae 121.50 and 10.24 respectively. The critical ratio obtained is 6.037. This value is greater than set value at 0.01 level of significance. That means there is a significant difference in Environmental Ethics among Student Teachers at Elementary level and Graduate level.

Hence the hypothesis that "There is a significant difference in the extent of Environmental Ethics among Student Teachers at Elementary Level and   Graduate Level" is accepted.

Findings and Discussion
The present study reveals that most of the Student Teachers at Elementary and Graduate Level posses' average level of Environmental Ethics. The results also revealed that there is a significant difference between Elementary level and Graduate level Student Teachers. It focus on need of comprehensive programmes in enhancing Environmental Ethics among both level Student Teachers, especially Elementary level. The research suggest that Environmental Ethics is the necessity of the hour. Inculcating responsibility, scientific and positive attitude about the environment among the Student Teachers is the main duty of the Teacher Educators and to carry out this noble task, education is a great tool.

Educational Implications
- The research has the capacity to serve as a point of reference for incorporating additional activities, such as study tours, visits to pertinent locations, and nature study, into the environmental education component of teacher education programmes. This would aid in fostering the environmental knowledge and sensitivity of student teachers.

- Incorporating environmental education as a required subject throughout all levels of school, with a focus on the Elementary and Graduate levels, is the focus of this study. The goal is to encourage future teachers-in-training to embrace sustainable lifestyles. The primary focus lies in imparting environmental education to the general public, and educators serve as the most efficacious medium for disseminating knowledge to students in educational institutions.

- Authorities may use the study's findings to determine environmental education priorities for various urban settlements based on its findings. The Environmental Ethics paradigm can be adapted more easily to address students' and the community's current concerns and obligations if a contextual framework for growing environmental issues is provided.

Conclusion

The swift expansion of population growth and urbanisation has significantly altered the societal lifestyle of human beings. The proliferation of developmental projects has resulted in a rapid decline in environmental quality, the disappearance of various forms of biodiversity, and the loss of numerous pristine habitats. These phenomena pose a significant threat to the survival of the human population and its ability to sustain itself in the future. In addition, the process of burning fossil fuels results in the emission of carbon dioxide into the Earth's atmosphere, which contributes to the phenomenon of global warming. The lack of scientific information is not the only obstacle to solving the problem of environmental deterioration; the lack of will to take action is also a major factor. In light of the aforementioned scenario, it is imperative to raise awareness and provide education on the significance of the environment and sustainable development in ensuring a more favourable future environment. In this particular context, environmental education assumes a critical function in raising awareness among individuals regarding the judicious utilisation of natural resources and the perils associated with environmental contamination. Prospective teachers are deemed highly significant as they serve as the driving force behind forthcoming social change, as asserted by the Kothari Commission during the years 1964-66. The Teacher Education Programme should develop a comprehensive framework for the design and implementation of environmental education and its associated ethical considerations. Therefore, an inquiry into the Environmental Ethics of prospective educators who will be instructing future generations holds significant implications for addressing environmental issues.

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NEP 2020 towards 21st Century Teacher Education Program

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ABSTRACT

Teacher Education main aim is to produce capable and efficient teachers and its programs giving training in behavioural aspects and also in pedagogy towards perception, appreciation, attitudes, value orientation, motivation, etc. These are changing their shape from ancient time to present time to make the quality teachers for the society and different aspects are developing in teacher education from time to time to meet the challenges of the 21st century world. Teaching is the oldest and prominent professions of the world and teachers play a vital role in this process to change their roles to cater the society in various aspects. Modern teachers need to know the latest changes of the world, various aspects related to the present teacher educational programs which are highlighted in the present paper. The proposed NEP 2020 is providing some necessary changes which are changing the scenario of Indian teacher education system and the possibility of implementing the teacher education programs suggested by the new education policy on various levels, results after implementation of the new policy are discussed towards new aspects to be incorporated regarding the duration, pedagogical, non-pedagogical aspects, etc in the new education policy.

Keywords: NEP 2020, Programs, Teacher Education, Student Teachers, Teacher Educator

Introduction

Teacher Education (TE) programs are changing their shape from ancient time to present time to make the quality teachers for the society. So, different aspects developing in teacher education are changing time to time to meet the challenges of the world. Teaching is the oldest and prominent professions of the world. So, Teachers play a vital role in this process to change their roles to cater the society in various aspects. Teacher education is stage-specific it means programs of teacher education are different according to the needs of pre-primary, primary, secondary, higher education and vocational education. There are different strategies and methods for classroom transaction at different stages and there is no uniformity in teacher education programs in the country, these programs widely diverge in process and content from one state to another state. One can say that teachers are born with talent and a passion for teaching and further they are also made by enhancing their talent and developing new skills. For the enhancement of such skills, it has to be more advanced and it refers to the process of nurturing a teacher with proper skills, knowledge, attitude, behavior, etc. to make them work in the classroom and outside efficiently and effectively. Since its independence, the government of India has made every possible effort to develop the condition of teacher education with an effective suggestion, recommendations, and the establishment of various bodies like the University Grants Commission (UGC), National Council of Educational Research and Training (SCERT), National Assessment and Accreditation Council (NAAC), National Council for Teacher Education (NCTE), etc. and NAAC has its own importance in TE by focusing on quality in higher education. Organizing seminars, workshops, conferences, etc. to improve the quality of education played its role well and the significance of TE in India can't be overemphasized, they are the ones to imbibe ethical values and principles in student teachers, thereby helping in nation-building. TE makes the teachers competent to face any challenges and prevent failure. It helps the teachers to choose

the authentic learning materials and a way of teaching. As teaching prepares future teachers, TE should be effectively mentored to set with the new situation and effective TE helps the one to swiftly adopts new techniques and innovation from time to time in the 21st century.

Objectives of the Study
- To study about various teacher education programs in India
- To assess the teacher education proposal of NEP 2020
- To highlight types of teacher education programs
- To view the implementation challenges of NEP 2020
- To provide suggestions towards integrated teacher education programs

Methodology

The present study is mainly established on secondary data which are gathered from renowned research articles, journals, position papers, etc. and are all related to "NEP 2020 towards 21st Century Teacher Education Program".

Types of Teacher Education Programs
- Pre-primary Teacher Education: Pre-primary teacher training courses are of various types like Kindergarten, Montessori, Nursery etc. and the minimum qualification for admission this course is higher secondary and the duration is one year.
- Primary Teacher Education: It has been a huge development of such training institutions during five-year plans and the course duration is two years and the minimum qualification higher secondary for entrance.
- Secondary Teacher Education: These training Colleges get ready graduate teachers for secondary/higher Secondary classes and it is two years course now with an emphasis on methodology and principles of teacher leading to B.Ed. degree and the minimum qualification for entrance is graduation.
- Higher Education
- Two years M.Ed. Course: Those who have B.Ed. degree are eligible for this course. Along with either Master's degree in Arts or Science with M.Ed. Qualification are eligible to become lecturers in colleges and training schools (pre-primary and primary

level) and also various administrative posts in NCERT, NIE's and SCERT's.
- Two-year M.A in Education: Graduates are eligible for the course and this is equivalent to M.Ed. and is regarded as applied side of education and it is considered as basic/pure side of education.
- Three–Five years Ph.D. course after M.Ed./ M.A. Education: Many Universities are offering Ph. D in education those who have passed M.Ed./M.A. in Education and besides the Ph.D. course and one year research course M.Phil. has been provided in the Universities.
- Vocational Teachers Training
- Two years course in Physical Education.
- Training courses for teachers of Dancing, Fine Arts, Painting, Music, etc.
- One year training programs to prepare teachers for Home Science.
- Certificate courses in Arts & Crafts.
- Teacher Education as proposed in NEP 2020
- Foundational and preparatory school generalist teachers
- Subject teachers for Middle and Secondary School
- Special education teachers
- Art teachers
- Vocational education Teachers
- Physical education Teachers
- Types of Teacher Education Program
- 4-year integrated teacher education program: By 2030 the minimum degree qualification for teaching will be a 4-year integrated B.Ed. degree that teaches a range of knowledge, content and pedagogy and includes strong practicum training in the form of student-teaching at local schools.
- 2-year B.Ed. program: The 2 years B.Ed. program will also be offered, by the same multidisciplinary institutions offering the 4 years integrated B.Ed. and will be intended only for those who have already obtained Bachelor's Degrees in other specialized subjects.
- 1-year B.Ed., program: The B.Ed. program may also be suitably adapted as 1 year B.Ed. program, and will be offered only to those who have completed the equivalent of 4 years multidisciplinary Bachelor's Degrees or who have obtained a Master's degree in

a specialty and wish to become a subject teacher in that specialty.

- Challenges towards NEP 2020 Implementation
- Preparing a uniform curriculum for different levels across the country in pre service teacher education.
- Identifying the capable and qualitative teacher educators for training the teachers.
- Training preservice and in service teachers for 21st century skills.
- Preparation of existing teachers to face the latest challenges as per NEP 2020.
- Preparing and training teachers for varying roles and responsibilities.
- Changing the attitude of the teacher educators as per the changing roles and responsibilities at the multidisciplinary institutions.
- Attracting capable students to become teacher at different levels.
- Need to encourage learning and progress of all the teacher aspirants by testing higher-order skills
- For the internship in preservice training program, connecting of local schools to the multidisciplinary training institutions.
- Need to shift assessment methods from content to competencies by stressing on optimized learning and growth of the students at school and teacher education level.
- Providing infrastructure facilities according to the needs of multidisciplinary training institutions.
- Recruitment of faculty based on the needs of integrated teacher education programs.
- Role of Teacher Educator
- The teacher should keep pace with the times and unveil new knowledge.
- He/she should have a research mind.
- He/she will constantly inspire the students in this work.
- He/she has to have a progressive mindset because it is essential for a teacher to have a progressive mindset to keep abreast of the changes that are constantly taking place in the world society, and human thinking.
- He/she teacher needs to have the knowledge and stay up to date with technology.
- He/she teacher needs to have a clear idea about the classroom teaching method and pedagogy and knowledge of the content because it is important to know which teaching method will make learning enjoyable according to the needs and abilities of the students in the classroom.
- He/she can inspire the students before the lesson through his inspirational speech to make the teaching understandable.
- He/she needs to know various subjects besides thematic knowledge in addition to just thematic knowledge.
- He/she must know multicultural and multi-language.

Conclusion, Discussion and Summary

The National Policy in Education was prepared to improve the quality of education in the country and was focused on providing education facilities to all the citizen of the nation. The new education policy must be help recruit the very best and brightest to entire the teaching profession at all levels. Teacher education is vital in creating a pool of school teachers that will shape the next generation and teacher preparedness is an activity that requires multidisciplinary perspective and knowledge. Education is a dynamic process and teacher performance is the most crucial input in the field of education. The education gives a new shape to the individual and the nation as well and it plays major role in bringing social change, economic and political development of any society. It helps people to learn right actions at right time. Such an education requires efficient teachers, it is a well-known saying that teacher is the nation builder. A teacher is the central figure in the formal teaching learning process and 21st century students depend upon the teachers. The place and importance of teacher in society can never be under estimated and the quality of teacher education programme needs to be up graded. TE has not come up to the requisite standards and teachers are not able to think critically and solve the issue related to teaching methods, content, organisation etc. TE programme needs a comprehensive reform and restructuring curriculum of TE programme needs to be revised according to changing needs of society. The present study focus on the various problems faced by TE in India. Education gives a new shape to the individual and the nation as well. It is a well-known saying that a teacher is a nation-builder. No doubt a lot of stress is given to teacher-education courses in India. In light of NEP 2020,

the time has come for Indian teachers to grab the opportunity and become makers of their intentions. They need to dream and work hard to achieve them and the NEP will play an important role in taking the education system to a new level and is extremely important in maintaining the quality of the education system and it will help to present the education system of India in an outstanding context. However, it is important to emphasize how quickly the implementation of the new education policy is possible and how the new education policy can be implemented by solving the various problems of the previous education before implementing it.

Educational Implications and Suggestions

- Minimum requirements for teacher educators to work at multidisciplinary institutions have to be specified.
- Practical oriented teacher preparation courses have to be focused and importance to online teacher preparation courses.
- Research opportunities have to be given and promotion to up gradation to the teachers and teacher educators.
- Equal weightage can be given to curricular, co-curricular and extra-curricular activities during assessment and evaluation in teacher training programs.
- Differently abled aspirants should be given preference in teacher education.
- Special provisions should be given to the teacher aspirants from tribal, backward, women students and/marginalized groups in order to promote the policy of access and equity to education.
- Training institutions should be established separately for all levels of teacher education.
- Setting up of multidisciplinary institutions for integrated teacher education programs.
- Encouragement for multidisciplinary research can come into lime light in teacher education.
- New pedagogy of teaching subjects can be implemented in near future like pedagogy of Commerce, pedagogy of Chemistry, etc.
- The teacher education programme should be modified so that teachers are equipped for the different roles and functions imposed by new technologies.
- The socio-economic status of the teachers must be raised so as to attract talented people towards the profession.
- Teachers should train about stress management mechanism so that they could help students in managing the stress and sustaining themselves in this time of social isolation, parental pressure and cut throat competition.
- Teacher education programmes should enable the teachers to develop the relief skills among students.
- Teacher education is vital in creating a pool of schoolteachers that will shape the next generation.
- Emphasis on multidisciplinary perspectives, values, language, and ethos including tribal tradition Improving the quality of teacher education and measures have been taken to stop commercialization in the field of teacher education.
- Special emphasis has been laid on the introduction of Integrated Teacher Training.
- To maintain the quality of teacher education steps have been taken in the new national education policy to improve the infrastructure of educational institutions.
- To maintain the quality of teacher education, it has been proposed to introduce an entrance examination in the admission of students in press service teacher education.
- All TE programs must be conducted within composite multidisciplinary institutions.
- In-service continuous professional development for college and university teachers will continue through the existing institutional arrangements and ongoing initiatives.
- The government has set itself an ambitious goal of improving the quality of teacher education.
- All teachers are well-trained and knowledgeable about their subjects.
- Teachers need to have a deep understanding of the content they teach, as well as how students learn best.
- The curriculum needs to be revised and updated.
- Teachers need to be well-trained in the subjects they teach.
- New and innovative techniques can be used for the transaction of the curriculum.
- The teacher education program should be modified so that teachers are equipped for the different roles and functions imposed

by new technologies.

- Teachers should train about stress management mechanisms so that they could help students in managing their stress and sustaining themselves in this time of social isolation, parental pressure, etc.
- Techniques help them to reflect on their own and do something new.
- There is a need for a specific time frame for the improvement of private teacher education institutes and those teacher educational institutions which are weak in terms of infrastructure and teaching equipment.

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RESEARCH TRENDS IN MULTICULTURAL EDUCATION: A QUALITATIVE STUDY

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ABSTRACT

This study focuses on "Multiculturalism, A Recent Trend in Education" This study examines how multiculturalism influences on teaching and learning. This study was conducted on a sample of 50 B. Ed students from Thrissur (Dt). A Questionnaire and an informal discussion were used to collect the data. In modern context, trend is very common in all the fields of life. The direction of change or development of a situation is called trend. Thus, trends in education are teaching and learning methods being highly applicable and bringing great value to people. Modern trends in education are all about innovation, accessibility, suitability that can bring positive changes in the world. Modern trends encourage the children into more practical and innovative for knowledge building and productive help them to compete globally. One of the trends in education is multicultural education. India is a land of diverse cultural, received foreign culture for showing generosity in her deeds and actions. The nation benefits from the ethnic, cultural and linguistic diversity in higher education. Multicultural education promotes respect and justice among the various cultural groups, making them active humans in the society. Multicultural education is predicated on the principle of educational opportunities and success for students from different cultural backgrounds. In the multicultural background students feel to develop self - esteem, interpersonal skills, promoting social peace and harmony. Today's fast - paced world or life multicultural education is needed and significant in our classrooms and we can implement some effective strategies. Findings show that multiculturalism is recent trend as well as a positive approach in the education stream.

Key words   research, trends, multicultural, education, qualitative

Introduction

Trend is called the changes or suggestions on the direction or a progressive form of a context or situation. The world always running behind the trends in all aspects of human life whether it is educational, social, economic, or technological aspects. In current scenario, trend is highly influenced in teaching and learning process makes application-level increases in the practical skills of students, providing great value to the society. Thus, trends in education are teaching and learning methods being highly applicable and bringing great value to people. Now, multicultural education is the new trend of education system.

Multiculturalism means the support or togetherness of various cultures or groups within the society.

Multicultural Education deals with any form of education or teaching that connects the histories, texts, values, beliefs, and perspectives of people from different cultural backgrounds. Multicultural education brings equality, equity and justice and maintaining a balanced environment provides social peace and harmony.

In the multicultural context the children receive different types of language, culture, values, food and dressing in the traditional and they get group cohesiveness, various types of personal, social values and make interpersonal skills.

Culture and Multiculture

Culture is a broad term that incorporates people belonging to different races, ethnicities, nationalities, languages, religions, class, genders and manifests the same in their values and behavior pattern. The multicultural policies help to create and nurture relationships between ethnic minorities and the state. Multiculture develops positive self - concept by providing knowledge about the histories, culture and contributions of diverse groups. It provides structural equality in organizations.

Need And Significance of The Study

Multicultural education is a recent trend in education system. In the multicultural context, students develop a positive attitude towards Life and adjusting, problem solving skills, creativity, cooperativeness, patience, respect, mutual respect also. This promotes self-respect among the students. In this competent world speaking language is very important, they more opportunities for achieving their goals, improve the confidence to face all the challenges of life and builds confidence and deep knowledge about ethnic groups and develop interpersonal skills.

Multicultural background promotes team work, respect and social harmony and teachers must know how to meet student's needs, attitudes, understanding, appropriate learning aids application, teaching strategies that motivates all types of students. Education is a tri- polar process and schools are operated as the main stream of this, After the education, students are moving to society for searching jobs at that time they are facing a multicultural society. So multicultural education needs in the present condition to achieve the goals of students.

Review Of Literature

From the different studies the researcher collected the reviews about Multicultural education is an educational reform movement offers balanced educational opportunities and environment to all the students regardless of their culture, race, ethnicities and making security for their social relationships.Besides these, this promotes a smooth functioning of societial activities, respecting eachother inside and outside the classroom, creates a peaceful social life to the society.

In the current situation especially in Kerala follows monocultural education, students get very less chance to interact.. They use only their regional language, culture, to express their views and opinions.Due to this students can not get the to develop the language. If they follow Multicultural education and celebrates different cultural programmes raise the brotherhood feeling and cultivates values moulding best citizens for the society.

Principles of multicultural education

- Delivery
- Content
- Teaching and learning materials
- Perspective
- Critical inclusivity
- Social and civic responsibility
- AssessmentAssessment

Dimensions of Multicultural Education

Content Integration

Content is explained with examples related to real life situations of the various culture and races and illustrate key concepts, generalization and challanges within their subject area.

Knowledge construction process

Students get the chance to develop their critical thinking skills, problem solving, creativity and exploring through the learning process and realizes their strength and weakness of their ability.

Prejudice reduction The classroom provides opportunity to respect their caste, ethnicity and culture to remove their infeiority complex and develop positive attitudes to education.

Equity pedagogy

Equity pedagogy provides equal opportunities to all students and teachers must modify the activities and aids to ensure equality in classroom.

An Empowering school culture

Multicultual Education brings equal status and equality to all the students from diverse culture. This really creates a positive environment, healthy relationship and Democratic values.

Objectives
1. To know about Multicultural background

in the current scenario

2. To analyze the Multicultural Education as a recent research Trend in the current scenario.

Research Questions

1. Why do you think Multicultural Education is a recent trend in education?

2. What are the problems and challenges facing the system in promoting Multicultural Education?

Statement Of the Problem

The study entitles as the "RESEARCH TRENDS IN MULTICULTURAL EDUCATION: A QUALITATIVE STUDY " among Teacher Educators in Thrissur.

Methodology

The present study is carried out to know the importance and influence of Multicultural Education as a recent trend. The researcher conducted a qualitative research method on a sample of 50 B. Ed students from Thrissur. A Questionnaire and an informal discussion with some questions regarding about multicultural background. The collected data was then interpreted using percentage analysis.

Questions And Analysis

1. Most of the students interested in English language. What is the reason?
- English is a global language
- Friendly language
- High job opportunities.
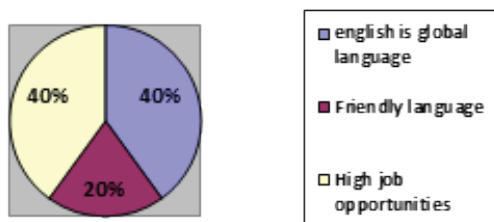
2. Do you like the multicultural celebrations in your institution?
- Yes
- No
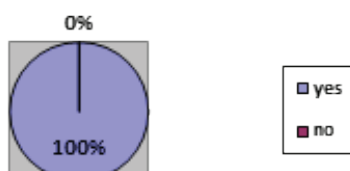
3. Which language helps you in understanding content clearly and deeply?
- English
- Regional language
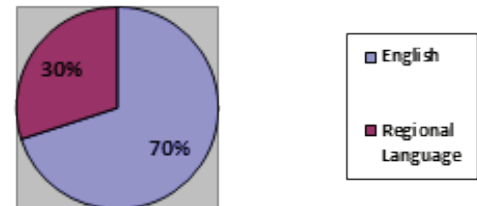
4. Do you think learning in English would be helpful for academic performance?
- Yes
- No
- Maybe
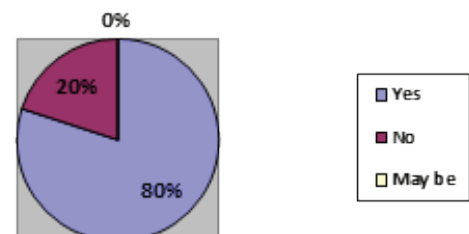
5. Do you feel that your institution is a multicultural institution?
- Other district students
- Other state students
- Respecting diversity
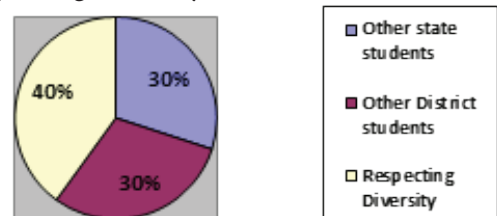
6. what are the difficulties do you face in learning English
- Grammar
- Spelling
- Teaching problem
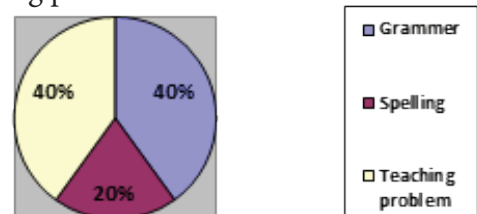
7. Do you get comfort in multicultural class room?
- Yes
- No
- Sometimes
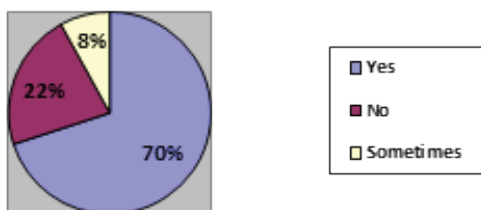
8. Which language do you prefer to your learning?
- English
- Hindi
- Malayalam.

9. Do you respect all the religious beliefs in multicultural classroom?
- Yes
- No
- Always.

10. How can we improve our English language skills?
- Reading books
- Watching English Films
- Communicating in class room

Major Findings
- Majority of the students like multicultural education
- Students think that multicultural education is really a positive approach.
- Students believe Multicultural education has an important role learning English language to obtain good job.
- The young generation prefer to Multicul-

tural education to develop universal brotherhood.

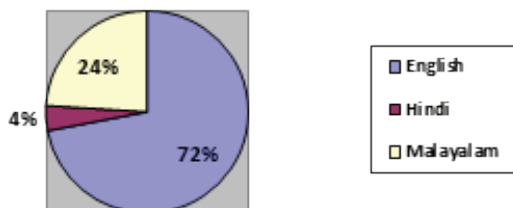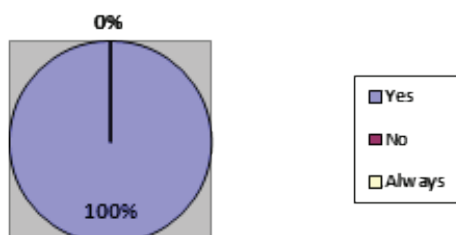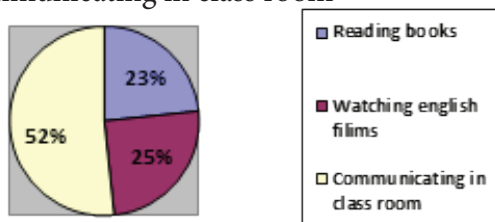## Informal Discussion Questions
1. What is multicultural thinking?
2. What is pluralism? Does Multiculturalism bring a positive change in our society?
3. What are the problems and challenges facing the school in promoting Multicultural education?

In this informal discussion students sincerely expressed their views, tensions challenges facing the future. They shared that young generation concentrating their studies but not bother about human values. In the present context children turned into materialistic and deteriorating the values. In this competent world multicultural education highlights personal, social, and moral values. Multicultural education brings a platform to the students to drawout their innate abilities to perform in the classroom. English is the global language but the students feel that it, s very difficult to speak in a monocultural background. When they practice multicultural background students can easily achieve the global language and clear their path for fulfilment of their dreams. Not only teaching but all the job opportunities demand English language for communication. So in this informal discussion, students highlights the importance of multicultural education creates an open environment to achieve success. They expressed that multicultural education develops all round development of children and moulds them better personalities.

Challenges
In multicultural context, the classroom needs competent teachers to satisfy the needs of students. Teachers need mastery in subject knowledge, communication skills, creative thinking and practical skills to face the classroom. Teachers are facing a heterogeneous classroom of different race, ethnicity, culture. Teachers encourage critical thinking skills, preventing prejudice and discrimination, providing equal opportunities for all students.

Suggestions.
- Equity pedagogy
- Collaborative approach
- Cooperative learning

- Heuristic approach
- Innovative solutions
- Professional communication
- Avoid gender discrimination

Conclusion

In the present context, especially in Kerala the ordinary classroom changes into Multicultural background.Students respect their culture, food, language. behavior attitudes, it will create a miracle in classroom and society. Multicultural education develops multi-talented personalities. Education is the strongest weapon for the development of society. The nation expects the best citizens from multicultural classroom , social harmony and social respect are the symbols of multicultural classroom. The government should be evolved constructive educational policies to achieve multiculturalism which needs essentially to unite the nation. At present people make the violence because of arrogance. But multicultural education removes this reflects normalities to lead a successful journey for the students

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A Study on Emerging Challenges and Issues in Teacher Education Programs and New Perspectives in the 21st Century Educational Systems

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Abstract

The present study explores emerging challenges and issues in teacher education programs (TEP) and new perspectives in the 21st-century educational systems. TEP is an approach to teaching that places a premium on giving teachers the theoretical and practical tools they will need to succeed in the classroom and the professional attitudes they'll need to inspire and motivate their students. Most early educators were academics or religious leaders who were specialists in their fields but needed more pedagogy or classroom management training. All countries' economic and social conditions have improved thanks to investments in higher education. But in the business world, there are always pressing issues that need fixing, challenging problems that must be overcome, and exciting opportunities that must be seized and built upon. Increased pressure is being placed on TE institutions to remain effective in a world where rapid, widespread, and profound change is the norm. To take full advantage of TEP's performance under these conditions, this essay delves deeply into the topic, presenting insights, analyses, and examples of some of the most pressing challenges and exciting opportunities for TEP to move forward with new perspectives in the 21st-century educational systems. It's commonly believed that teachers are born, not made. Only when pedagogy had become solid did its significance as a discipline become generally acknowledged. The Indian government has prioritized raising the quality of education across the country, focusing on strengthening higher education and preparing future educators. There is a variety of literature and scholarly works on TE that can be found in institutions worldwide. Critical issues of the twenty-first Century include the definition and development of educational slang and its effect on students' academic achievement. The paper's final section evaluates current TEP practices and discusses remaining challenges. Several scholarly works on various topics related to education and classroom dynamics are cited. The benefits to learners of creating favourable profiles of teachers are discussed further in the study. It's often understood that to be an effective educator, one must have extensive knowledge of the subject, strong communication skills, and prior teaching experience. Since the early 20th Century, this has been a well-established fact. These ideas have been the cornerstone of TEP worldwide into new perspectives in the 21st-century educational systems.

Keywords: Emerging, Challenges, Issues, Teacher Education Programs, New Perspectives, 21st Century, and Educational Systems

Introduction

The TE is a training program for future educators. The methods used to study TEPs are continuously developing. As time passes, it changes to accommodate the needs of today's pupils and the influence of current media, fashion, and technology. However, the positive effects of this change will only emerge with planned actions. After India gained its independence, the nation devoted more resources to studying TEPs to better prepare its economy for the chal-

lenges it would face. Due to its broad nature, a study in the field of education for teachers can address various issues. There should be no standalone research on TEPs. The adverse effects it has on society are what define a TEP. Problems can arise at any point in the life of a TEP, from the initial idea to the design of the TEP's physical environment, the development of its curriculum, its assessment, and beyond. This paper aims to provide a broad overview of recent trends in TEP and new perspectives in 21st-century educational systems, what the National Council for TEP calls a program of learning, study, and training of persons to teach at all levels, from kindergarten through college. In India, educators follow their students from primary school through higher education.

The primary focus of TE programs is to prepare teachers to address the issues that arise daily in the classroom effectively. Indian TEP has been present for quite some time. However, the country's rapidly developing educational system necessitates frequent updates. Scholars in India began investigating this issue around the time of the country's independence when they grappled with preparing the next generation of educators for the challenges they would face in the classroom (Panigrahi, S. P., & Naaz, I, 2021). Concerns that matter to teachers, their students, and the institutions in which they work form the basis of TEP. The quality of teaching, student engagement, and instructor disposition are just a few facets of a classroom that can be assessed. The ultimate goal of any study should be to provide helpful information for use in the school. Confidence in one's ability to deal with the rigors of daily life is more common among those who have completed their formal education. TEP is gaining popularity and importance. It pays to be mindful of how things are done in related fields worldwide to make a reputation for yourself. Teachers in the twenty-first Century who aspire to make a real impact will need to learn more about their subject matter and how to teach it best. TEP has to grow to meet the demands of the educational system. They educate teachers on promoting students' academic and social development through TEP and new perspectives in 21st-century educational systems.

Teacher Education in the 21st Century

Every school should have a talented and devoted teacher. We can secure 21st-century teacher quality by selecting and educating competent personnel. The restructuring of the TEP needs to be the primary concern at this point. There has to be more excellent uniformity in terms of the level of challenge, the duration of the courses, and the way they are organized for continual professional development and teacher training. TEP should be elevated to the status of a higher education institution, with longer and more challenging classes, to better prepare teachers for the demands of the classroom. This is especially important when one considers the significance and challenge of the teaching profession. In addition, it is necessary to employ novel and innovative methods in training future educators. The ability of an institution to develop and innovate is one of the most critical factors that determine the organization's continued success (Sharma, S, 2014). Educating future teachers with the understanding, values, and behaviors in addition to the skills they need to effectively carry out their responsibilities in the classroom, the school, and the larger society is the goal of the TEP, which stands for the policies and procedures that are designed to achieve that goal. TE is a training course created to assist educators in obtaining more excellent knowledge and expertise in their chosen fields. This would empower the educator with the support they require to address the challenges of their vocation and the certainty to do so successfully. The educator would be better able to handle the stresses of their profession with this in place.

As a result, the teacher would be able to fulfil all of the duties associated with their profession. The development of teachers' abilities and abilities is closely tied to TE. TEP is also linked to educators' professional knowledge and skill acquisition growth. What we mean by TEP here is the Teacher Effectiveness Project. Also, in the context of educational systems in the 21st Century, TEP is connected to the growth of educators' domain-specific knowledge and expertise. In regards to TEP, this is important. TEP has made it possible to forge this relationship. Like other professional education programs, the TE curriculum promotes application and depends on the theoretical foundations of related fields.

TEP is more than just a collection of ideas

and concepts taken from other fields; instead, a distinct gestalt, emerging from the conceptual blending, can be accurately described. Teachers have more success when dealing with children of the same age. This shows enough diversity and competence across stages to develop workable strategies for training new teachers to carry out each stage's tasks. Preparing teachers to assist children in a simulated learning environment with limited resources and a focus on developing a positive frame of mind is a top priority. The most effective teachers inspire their students to think as creators, observers, induces, and generalizes. Training for teachers, like every other form of educational intervention, can only enhance the facets of teachers' responsibilities that can be improved. We can't make teachers more patient or understanding, but we can assist them in being those things to their students. Identifying TEP independently of other problems is presently impossible. Concepts for teaching and managing that may be used with any age group. Educational institutions of all levels now must devote significant resources to this cause. As an outcome of globalization, schools in the twenty-first Century have taken a more personalized approach to education that understands the value of new perspectives on TEP in 21st-century educational systems.

New Curriculum Concepts Improve Teacher Education

The educational system would have been effective with TEP. It is closely related to society and is influenced by the national ethos, culture, and character. TEP needs to set up a venue where issues like identity, gender, equity, and poverty may be discussed, in addition to the heterogeneous nature of modern Indian society and its challenges. This can help teachers in their learning context since they will better know the significance of education and how it affects culture and the human race. Since the classroom provides a space for debate, development of discussion, and the opportunity to appreciate other points of opinion on a particular issue, it is essential to comprehend the classroom as a social setting. Teachers must be consulted at every stage in creating a new educational system. A program's goals, learning experiences, teachers, and assessment strategies are reflected in its curriculum design if it is to be

successful (Guide to curriculum development, 2006). Since the 1960s (Kothari Commission, 1964–1966), the need to educate teachers to enhance student outcomes has been highlighted. For the Commission, TEP needed to be brought into the mainstream of the academic life of the colleges on the one hand and of school life and educational developments on the other. Concerns have been raised about the ongoing presence of independent teacher-training institutes, even though many teacher-training programs are based within established colleges. It might cover a wide range of endeavours in on a particular issue. It has to be an actionable manual that helps teachers design engaging lessons and find the materials they need to use in TEP.

Even though proposals in policy papers and Commission reports to increase the active agency of the teacher, TEP has been preparing teachers to satisfy the criteria of a system in which education is regarded as the transmission of information and learning repeated from textbooks for the previous 30 years. This can be seen by the fact that the TEP sector has stayed primarily untouched despite several changes in the curriculum structure. With TEP, the educational system would fail. It is intricately entwined with society and is shaped by the people's values, traditions, and personalities. An innovative educational system must, among other things, appropriately adapt to the goals of the constitution, the tenets of state policy, socioeconomic concerns, the advancement of knowledge, new demands, and educational developments. These elements provide a framework for thinking about TEP. The principles of a secular society, freedom, equality, fraternity, justice, and world peace are what TEP should work to achieve. The outcomes of each school's TEP and the development of new ideas must be held accountable by the educational systems of the twenty-first Century.

Emerging Issues and Challenges in Teacher Education

A new study on educational quality has evaluated several elements that improve instruction and offered suggestions for encouraging better classroom learning. Quality has become more significant in many countries. In resource-constrained nations like India, expanding access to primary education typically results in a gener-

al decline in educational quality. Programs in countries and academic work increasingly focus on teachers, schools, cultures, and society as the causes behind the quality, with teacher quality being the central area of focus, in the quest for these components. TEP has transformed as an outcome of the new challenges and issues they face due to the rapid societal shifts. The standard of a country's education can only rise in line with the quality of its teaching force. Students' academic success depends upon their teachers' level of knowledge, expertise, commitment, and happiness in the classroom. Governments worldwide are scrambling to find a solution to an acute lack of trained educators. There are currently more expectations placed on teachers than in the past because of globalization, new educational and psychological theories, and the emergence of ethical and social attitudes. Today's TEP calls for forethought and creativity.

TEP requires thorough examination, modifications, and preparation. There are now three primary focuses for training educators effectively. Education scholars have examined various problems, such as teacher scarcity, deteriorating cultural standards, and divergent views on the field's overarching purpose (Akhter, S., & Mir, T. R., 2018). Modern texts and a need for more resources in TEP. National professional guidelines and innovative pre-service TEP. Colleges and educational institutions should collaborate more on workshops to enhance teacher preparation. Teachers are creating a foundation for their ongoing professional development by guiding and training newcomers. Create communities and networks for teacher learning while providing educational leaders professional development opportunities. Generating funds for transparent TEP for appraising personnel and peer observation methods are now being developed. The following are the emerging issues and challenges in teacher education.

Inadequate Use of Acquired Skills

Life skills, techno-pedagogical skills, informational skills, emotional skills, human development skills, and spiritual talents are all critical components of the TE curriculum. At the same time, it's essential to stress analytical thinking, innovative problem-solving, and in-

terpersonal management. However, these skills are separate from national TEP (Goel, D. R., & Goel, C, 2012).

Insufficient period Allotted for Teacher Education

It is widely accepted that the first year of college, or the first six to seven months of recessional employment in India, is more than sufficient time to develop a broad worldview, firm moral beliefs, and numerous interests. The deadline has been extended to 2017 while NCTE continues to work towards a resolution. The long-term repercussions of this choice remain unclear, although they will undoubtedly have both positive and negative outcomes. Nonetheless, discussions continue. This survey is unusual for NCTE since it asks respondents to predict when the first round of reforms could be enacted.

The Problem with Choosing

Choosing the process for TEP includes some defects that outcome in the deterioration of the quality of teachers. Better selection processes and the appropriate method are needed to improve the quality of prospective teachers and, in turn, their training. Including tests of general knowledge, school subjects, language, intelligence, aptitude, interest, and attitude by suitable methods coupled with interviews of candidates will be a good move.

Unfinished Preparation for Teachers

Due to insufficient resources and time, the current TEP needs to sufficiently prepare future teachers to address the challenges that face today's classrooms. That's why it's so essential for initial TEP to mirror actual classroom practice. A positive first move would be to extend the internship time frame.

Ineffective and Unsatisfactory Methods of Teaching

A significant issue in the private school system is that inexperienced future educators need to learn something from their practicum experiences and then repeat the same problems in their classrooms.

Lack of Adequate Knowledge of the Subject

Prior learning is not heavily weighted in the B.Ed. Program. Success requires attention to

both content knowledge and details in teaching. A student's ability to study at school would suffer without it.

Ineffective Methods of Teaching

Many teachers in India are on the fence about adopting new methods in the classroom. They must be updated on the best practices for integrating technology into the classroom.

Failed to Monitor and Respond Properly

Students in teacher preparation programs should benefit by actively seeking and responding to constructive feedback. After hearing your praise, they felt better about themselves. Lesson preparation, classroom management, and related concerns seldom receive more than a passing thought from experts in a specific profession.

The Separation of Schools

There is now a more significant gap between TEP and the other components of the educational system. There may be an immediate need to repair relationships between TEP and academic institutions by investing in extension services. Every level of the TEP system, from elementary schools to colleges and governments, requires an extension services department. A fully operational school is essential to any educational institution. Regular travel would benefit staff at partner schools and teacher training courses. Forming an Alumni Association to bring together past students and their teacher educators might improve the existing teacher training system.

Lack of Commitment to One's Career

Children's academic accomplishments can be significantly impacted by teachers' excitement and dedication to their success. Passion like that for a career is exceptional in the literary world. The National Council for TEP needs to promote more action research in TE and provide in-service training programs to recognize and reward those who take this initiative.

New Perspectives in Teacher Education

Historically, TE has been studied, discussed theoretically, and used practically, mainly in institutions in English-speaking countries. In the classic TEP approach, known as "propaga-

tion," more experienced teachers mentor their less-qualified counterparts. In this way, teachers may have a more significant effect on their student's progress. The best method for a teacher's development is to split their time between direct classroom experience, reflective study, and observation of more seasoned colleagues. The following are the main elements of an integrated approach to teacher education (Dhal, P. K, 2015).

An Integrated Approach to Teacher Education: There is a pressing need for highly trained teachers who can ensure their students an excellent education, and an integrated plan is the only way to attract and retain such professionals. The ultimate goal of integrated TEP is to provide teachers with the tools they need to give their students the best possible education possible. The development of both students and teachers is a top priority. TEP, which considers the whole picture places a premium on teachers' opportunities for professional development.

Preparing teachers to be professionals: Taking on a professional code of conduct might profoundly influence educators. Knowing that one's efforts are helping the more extensive welfare of society or even the country may do wonders for one's feeling of purpose and meaning in life.

Responsibility as a Teacher: The curriculum development covers the entire educational process, from teaching to grading to management.

Development of Curriculum: Access to suitable performance evaluation categories and techniques is essential for initial educators' effectiveness as learners and teachers.

Pedagogical Approaches: Both children and teachers can benefit by engaging in discourse. As a result, today's best practices in the classroom are cantered on fostering students' learning, development, and growth as people and contributors to society.

Methods of Evaluation: Since this new technology has been set up, every aspect of education has improved. Practical evaluation of novel pedagogical approaches requires evidence of improvement in students' knowledge, skills, or performance or of shifts in students' cognitive processes that augur well for their future success.

Effective Classroom Management Strategies: Providing teachers with the tools they must differentiate instruction based on student's prior knowledge and interest in themes like history, culture, and dedication to democratic principles is the most effective way to maintain students' engagement in the classroom (Dhal, P. K, 2015). Thus, effective classroom administration calls for knowledge across many different areas of education, including but not limited to setting goals, time management, and making the most of educational and community resources.

The Spread of Globalisation: With the world becoming ever more interdependent, it is more important than ever to communicate and work with people of different cultural backgrounds effectively. Some of the most severe difficulties we face today are healthcare, economic development and interdependence, environmental quality, racial tensions, the denial of human rights for all people, international alliances and war, and so on. The flexibility of today's tools can be seen in the common practice of looking up a term's meaning on the internet. Desktop computers, satellite communications, and the web are all instruments that have become a hallmark of globalization that TEP must adopt.

Conclusion

The mission of TEP is to cultivate good people who will improve society. Still, we shouldn't put constraints on our imaginations. Teachers in the global future will play an essential role in developing the new culture. Everything is constantly shifting. TEP in our country needs to snap out of their complacency and spearhead the movement to rethink and realign education at all levels. TEPs aim to equip future educators with the tools they'll need to address the challenges they face in the classroom. Training and classroom time are beneficial for both teachers and students. TEP study has only been going on for a short amount of time. It evolves to meet the requirements of modern students while also educating them for tomorrow's technological and social world. However, its advantages will remain obscure once this change has been thoroughly studied and applied. TEP is essential in other contexts because it increases students' access to learning opportunities. The current situation of education in India is quite concerning. One's chances for learning and the tools accessible are both flexible and ever-evolving. We cannot prepare educators to meet the demands of today's pupils because of flaws in our TEP. Ensuring a quality education for future generations requires action to address the problems we've highlighted. Teachers should have enough information from TEP to think about their classroom situations and develop creative methods to deal with problems. TEP quality development challenges may be mitigated via national strategic planning and the hard work of teachers at all levels. More oversight is needed to enhance and ensure the quality of TEP in the twenty-first Century. The people who work in a country's educational system are one of its greatest strengths. The power of education to mould both individuals and communities cannot be overstated. Teachers have been called a nation's backbone on more than one occasion. TEP needs to improve its quality. Preparation for teachers has yet to advance nearly enough. Students' inability to think profoundly and generate solutions impacts teachers' practices, resources, and administration. Environmental challenges need a shift in TEP, but integrating contemporary issues and concerns into the curriculum presents an impossible challenge and new perspectives in the twenty-first century educational systems.

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EFFECT OF EMBEDDED STRATEGIES ON DELAYED MEMORY IN ECONOMICS OF HIGHER SECONDARY STUDENTS BASED ON LOCALE

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ABSTRACT

The study was designed with a view to see the effect of certain Strategies, like Cognitive, Metacognitive, Social, and Resource Management Strategies which were Embedded (implies to surround with and implant) in the teaching-learning process, and to see its effect on the Delayed Memory(retaining capacity) of Higher Secondary School Students based on Locale of Kerala. The study also made comparisons of the Experimental and Control Groups based on Locale. The findings of the study show that Embedded Strategies have significant effect on Students delayed memory capacity.

Keywords: Embedded Strategies, Delayed Memory, Economics

Introduction

The deep learners process longer memory, the longer retain ability involves thinking and guessing which involves in information processing which led to deeper engagement with the input, which in turn strengthened memory retention. For deeper engagement, certain strategies has been embedded these strategies are

1. **Cognitive strategy:** Cognitive strategies may also be referred to as procedural, which provide a structure for learning when a task cannot be completed through a series of steps. Deep learners generally utilize the objective of cognitive strategy.

2. **Metacognitive Strategy:** refers to higher-order thinking, which involves active control over the cognitive processes engaged in learning. Activities such as planning how to approach a given learning task, monitoring comprehension, and evaluating progress toward the completion of a task are metacognitive in nature. Because metacognition plays a critical role in deep learning.

3. **Macrostategy:** Macro strategy is more related to motivational and emotional factors. Motivation has a major role in promoting personal commitment in the learning process; which enhances the deep learning process. Only those students who are more motivated to learn are likely to use task more effectively, this enhances their self-efficacy beliefs, maintain a positive effect, and use Metacognitive, Cognitive, Social, and Resource Management strategies to promote Deep learning.

4. **Social strategy:** Social strategy is a philosophy of interaction and personal lifestyle. Consequently, under this, learning is a philosophy in which individual chooses to accomplish a task. It can refer to an instruction method in which students at various performance levels work together in small groups towards a common goal. The students are responsible for one another's learning as well as their own. Thus, the success of one student helps other students to be successful.

Objectives of the study

The objectives of the study were to see the effectiveness of Certain Embedded Strategies of Teaching in the Delayed Memory of Higher Secondary School Students based on Locale.

Hypotheses formulated for the study

It was hypothesized that the Delayed Memory of Higher Secondary School Students, taught using Certain Embedded Strategies will improve significantly as compared to those students taught using the Constructivism Strategies based on Locale

The method adopted for the conduct of the experiment

The Experimental Method with the Non-Equivalent Two Groups Pre-Test and Post-Test Design was found to be appropriate for the study.

The sample comprised of 432 Higher Secondary School Students of Kerala based on Locale.

- The Delayed Memory Questionnaire was used for gathering data. It was administered initially to the Experimental and Control groups and the scores obtained were taken as the Pre-Test.

- Lesson Transcripts for Teaching with Embedded Strategies were used for instructional purposes with the Experimental group, while Lesson Transcripts for Teaching with Strategies based on Constructivism were employed for instruction with the Control group.

- The Inventory on Delayed Memory was again administered on both Experimental and

- Control groups and the scores obtained were taken as the post-Test.

- The data thus collected were tabulated and analyzed using statistical techniques like. The correlation was used.

Analysis of the Data and Interpretation of the Results

At the Higher Secondary level, the acquisition of knowledge should be based on deep learning, as it delivers an intelligent approach to the subject of study, thereby resulting in long-term memory. Longer retention comprises thinking and guessing, and involves information processing, which leads to deeper engagement with the input and strengthens memory retention. In this study, the investigator is interested to know whether the employment of Certain Strategies Embedded within the instructional process improves the Retention Capacity of the students. A Delayed Memory Test in Economics was used to check the Retention Capacity of Higher Secondary School Students. A couple of weeks after the experimentation and conduct of the Academic Achievement Test in Economics both the Experimental and Control groups of Higher Secondary School Students were subjected to the Delayed Memory Test in Economics. The Correlation between the scores of students in the two Tests viz. Academic Achievement Test in Economics and Delayed Memory Test in Economics – was computed. The Correlation between the scores of the Academic Achievement Test and the Delayed Memory Test were computed for the Experimental group as well as for the Control group using Karl Pearson's Coefficient of Correlation. Details of Correlation Ratio are given in figure1.

The scores pertaining to Academic Achievement in Economics and Delayed Memory in Economics of Higher Secondary School Students in Experimental and Control groups of the Urban (N=106), Rural (N=100), Coastal (N=116), and Tribal (N=110) Locales were analysed separately. Their Means, Standard Deviations, and Correlation Ratios were computed, the details of which are consolidated and presented in Table 1.

Table 1

Consolidated Results of the Difference of the Correlation (r) between Academic Achievement Test scores and Delayed Memory Test scores in Experimental and Control Groups based on Locale

Locale	Groups	Test	N	M	SD	r
		Achievement Test	52	32.2	3.1	
	Experimental					
Urban		Delayed Memory Test		30.6	2.9	
	Control	Achievement Test		16.2	2.9	
			54			0.330
		Delayed Memory Test		11.2	3.8	
		Achievement Test		26.3	5.3	
			50			0.912
Rural	Experimental	Delayed Memory Test		25.6	5.9	
	Control	Achievement Test		14.7	3.6	
			50			0.345

Locale	Group	Test	N	Mean	SD	Correlation Ratio
		Delayed Memory Test		9.0	1.5	
		Achievement Test	59	22.9	3.0	0.8202
Coastal	Experimental	Delayed Memory Test		22.7	3.1	
		Achievement Test		12.2	3.3	
			57			0.244
	Control	Delayed Memory Test		4.1	1.4	
		Achievement Test		20.7	3.5	
			52			0.867
	Experimental	Delayed Memory Test		21.8	4.0	
Tribal		Achievement Test		12.6	3.3	
			58			0.341
	Control	Delayed Memory Test		12.1	5.2	

From the above table, it can be seen that the obtained Correlation Ratio between Academic Achievement and Delayed Memory of Urban students in the Experimental Group is 0.779 and that of Urban students in the Control group is 0.330. From this, it can be inferred that there is a high Correlation between Academic Achievement and Delayed Memory of Urban students in the Experimental group as compared to urban students in the Control group. This indicates that the Embedded Strategies employed for instruction are capable of

enhancing Retention Capacity in Urban as compared to the Strategies based on Constructivism.

From the above table, also shows that the obtained Correlation Ratio between Academic Achievement and Delayed Memory of Rural Students in the Experimental Group is 0.912 and that of Rural Students in the Control group is 0.345. From this, it can be inferred that there is a very high Correlation between Academic Achievement and Delayed Memory of Rural Students in the Experimental Group as compared to Rural Students in the Control group. This indicates that the Embedded Strategies employed for instruction are capable of enhancing Retention Capacity in Rural Students also as compared to the Strategies based on Constructivism.

From the above table, it can also be seen that the obtained Correlation Ratio between Academic Achievement and Delayed Memory of Students of the Coastal Locale in the Experimental Group is 0.8202 and that of their counterparts in the Control group is 0.244. From this, it can be inferred that there is a high Correlation between Academic Achievement and Delayed Memory of Students of the Coastal Locale in the Experimental group as compared to their counterparts in the Control group. This indicates that the Embedded Strategies employed for instruction are capable of enhancing Retention Capacity in students of the Coastal Locale as compared to the Strategies based on Constructivism.

Table1 also shows that the obtained Correlation Ratio between Academic Achievement and Delayed Memory of Students of the Tribal Locale in the Experimental group is 0.867 and that of their counterparts in the Control group is 0.341. From this, it can be inferred that there is a very high Correlation between Academic Achievement and Delayed Memory of Students of the Tribal Locale in the Experimental group as compared to their counterparts in the Control group. This indicates that the Embedded Strategies employed for instruction are capable of enhancing Retention Capacity in Students of the Tribal Locale as compared to the Strategies based on Constructivism.

Thus, it can be seen that the Embedded Strategies employed for instruction are more effective than the Strategies based on Constructivism for enhancing Retention Capacity among Higher Secondary School Students belonging to the Urban, Rural, Coastal, and Tribal Locales.

The Superiority of the Urban, Rural, Coastal, and Tribal Higher Secondary School Students in the Experimental group with regard to Retention Capacity are presented in Figure 1.

Figure 1

Correlation between Achievement and Delayed Memory in Experimental and Control Groups based on Locale
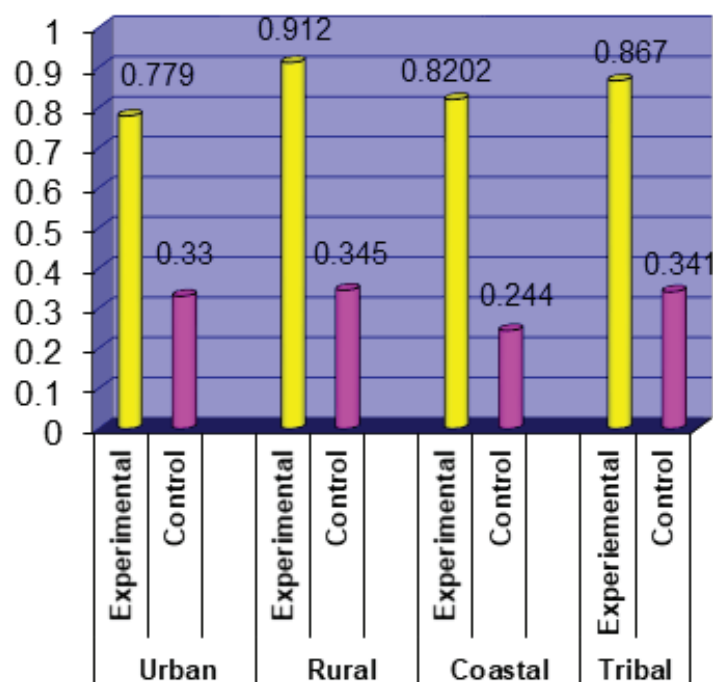
The results of the Correlation between Academic Achievement and Delayed Memory of Higher Secondary School Students in the Experimental and Control groups

Conclusion

The selected Embedded Strategies are more effective than the Constructivism Strategies in improving the Delayed Memory of Higher Secondary School Students with regard to locale.

Tenability of the Hypothesis

The Delayed Memory of Higher Secondary School Students based on locale, taught using Certain Embedded Strategies showed significant different as compared to those students taught using the Constructivism Strategies.

Implications of the study

The results of the study show that the Delayed Memory of Higher Secondary School Students taught using Certain Embedded Strategies has improved significantly as compared to those students taught using the Strategies based on Constructivism. Student learning has involved both acquiring high-level knowledge and knowing how that knowledge becomes usable in fundamental issues. Thereby, there will be an increase in the efficiency and confidence with which the learner approaches a learning task as well as in his ability to develop a product, retain information, or perform a skill.

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Outcome based education –Need of the hour

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ABSTRACT

Abstract: This systematic review examines the implementation of outcome-based education (OBE) in higher education and its impact on student learning outcomes and employability. The findings indicate that OBE provides a paradigm shift from content-focused approaches towards learner-centered education. The key steps of OBE implementation, including the identification of clear learning outcomes, curriculum alignment, student-centered teaching strategies, and authentic assessment methods, were consistently observed across the studies. The review highlights the positive effects of OBE on student engagement, critical thinking, problem-solving skills, and the acquisition of industry-relevant competencies. Moreover, OBE was found to enhance students' employability by preparing them with practical skills and knowledge applicable in real-world contexts. However, challenges in OBE implementation were identified, including faculty readiness, assessment design, and resistance to change. Further research is needed to explore the long-term impact of OBE on graduates' career success and to investigate effective strategies for faculty development in OBE. The findings of this review contribute to the growing body of knowledge on OBE and provide valuable insights for higher education institutions seeking to adopt or enhance OBE practices.

Introduction

Outcome-based education (OBE) is an approach to education that focuses on defining specific learning outcomes or desired results for students and then designing instructional strategies, assessments, and curriculum to help students achieve those outcomes. OBE shifts the emphasis from teaching inputs, such as content coverage and instructional methods, to measurable outputs, which are the desired knowledge, skills, and competencies that students should acquire.

In outcome-based education, the learning outcomes are typically defined in terms of what students should be able to do or demonstrate at the end of a course, program, or educational experience. These outcomes are often expressed as clear and measurable statements of knowledge, skills, attitudes, or values that students are expected to attain.

The key principles of outcome-based education include:

1. Clarity of learning outcomes: Clearly defined and specific learning outcomes are essential for effective implementation of OBE. These outcomes should be measurable, observable, and achievable.

2. Alignment: There should be alignment between the intended learning outcomes, the teaching methods employed, the assessments used to measure student performance, and the curriculum design. All instructional components should work together to help students achieve the desired outcomes.

3. Competency-based approach: OBE often focuses on the development of competencies, which are a combination of knowledge, skills, and attitudes relevant to a particular field or domain. Competencies are seen as practical and transferable abilities that prepare students for real-world situations.

4. Authentic assessments: OBE emphasizes the use of authentic assessments that directly measure students' abilities to apply knowledge and skills in real-life situations. These assessments can include projects, portfolios, presentations, performances, or other forms of demonstration.

5. Continuous improvement: OBE promotes an ongoing cycle of assessment, feedback, and improvement. The results of assessments are used to inform instructional practices and make adjust-

ments to the curriculum, ensuring that students are progressing towards the desired outcomes.

Outcome-based education has gained popularity in various educational contexts because it focuses on the development of relevant and practical skills, rather than solely emphasizing content knowledge. By clearly articulating the expected outcomes and aligning instruction and assessment accordingly, OBE aims to enhance the quality and relevance of education, better preparing students for their future careers or further education.

Literature Review

Several literature reviews highlight the need for outcome-based education (OBE) in higher education, emphasizing its significance in addressing the limitations of traditional content-focused approaches and enhancing the quality, relevance, and employability of graduates. Smith, Johnson, and Brown (2018) explore the paradigm shift that OBE brings to higher education, emphasizing the importance of clear learning outcomes, curriculum alignment, and student-centered learning. Chen and Wong (2017) discuss how OBE enhances quality and relevance in higher education, emphasizing the benefits of improved student engagement and practical skill development. Lee and Lee (2019) focus on preparing graduates for the 21st century, synthesizing research on the impact of OBE on learning outcomes and lifelong skills. Johnson and Smith (2020) provide an international perspective, examining different models and best practices of OBE. Gupta and Verma (2021) emphasize the role of OBE in bridging the skills gap and ensuring graduates' successful transition into the workforce. Collectively, these reviews emphasize the importance of defining clear outcomes, aligning curriculum and assessment, fostering practical skill development, and collaborating with industry stakeholders to meet the evolving needs of higher education and the job market.

Multiple literature reviews emphasize the pressing need for outcome-based education (OBE) and its transformative potential in higher education. Building upon the existing research, Andrews and Jackson (2019) conduct a comprehensive review on the implementation and impact of OBE in various educational contexts. Their study investigates the challenges faced during the transition to OBE, the effectiveness of assessment methods, and the overall outcomes achieved. Additionally, Garcia and Torres (2020) explore the role of technology in enhancing OBE, specifically focusing on the integration of digital tools and online platforms to support curriculum design, learning activities, and assessment practices. Their review highlights the advantages of technology-enabled OBE, such as increased flexibility, personalized learning, and real-time feedback. Furthermore, Tan and Ng (2021) delve into the importance of faculty development in OBE. Their review examines the strategies and initiatives employed to support educators in implementing OBE, including training programs, collaborative learning communities, and pedagogical support. The review emphasizes the significance of empowering faculty with the necessary skills and knowledge to effectively deliver outcome-based instruction and assessment. Overall, these literature reviews contribute to the growing body of research on OBE, shedding light on its implementation challenges, technological integration, and the critical role of faculty development in driving successful outcomes.

Despite the growing body of literature on outcome-based education (OBE) in higher education, there is a notable research gap concerning the long-term impact and sustainability of OBE implementation. While existing studies have explored the benefits and challenges of adopting OBE, there is a need for longitudinal studies that track the outcomes of graduates over an extended period. Such studies would examine the extent to which OBE prepares graduates for their chosen careers, their long-term success in the job market, and their ability to adapt to evolving industry needs. Additionally, further research is needed to investigate the effectiveness of faculty development programs in supporting educators in implementing OBE and addressing their concerns and professional development needs. Understanding the long-term impact and exploring effective strategies for sustaining OBE implementation will contribute valuable insights to inform policy decisions, curriculum design, and faculty training initiatives.

Evolution of education till outcome bases education

The evolution of education leading up to the development of outcome-based education (OBE) can be traced through several key educational movements and approaches. Here is a brief overview of the major milestones:

1. Traditional Education: Traditional education, also known as teacher-centered or content-focused education, dominated for centuries. It emphasized rote memorization, lecture-style teaching, and a fixed curriculum. The focus was on transmitting knowledge from the teacher to the students, with little emphasis on individual student outcomes.

2. Progressive Education: In the late 19th and early 20th centuries, progressive education emerged as a reaction to traditional methods. Advocates such as John Dewey emphasized a more child-centered approach, with an emphasis on experiential learning, problem-solving, and hands-on activities. The focus shifted towards engaging students in active learning experiences.

3. Competency-Based Education: In the mid-20th century, competency-based education gained attention. It emphasized the mastery of specific skills or competencies rather than just the accumulation of knowledge. The focus was on what students could do with their learning, rather than what they knew.

4. Standards-Based Education: As education systems became more centralized, standards-based education gained prominence. This approach defined specific learning standards or outcomes that students were expected to achieve at each grade level. The focus shifted to aligning curriculum and instruction with these standards and assessing student performance against them.

5. Outcome-Based Education: OBE emerged as a response to the limitations of standards-based education. It sought to address concerns about curriculum overload, lack of relevance, and a focus on surface-level learning. OBE shifts the focus from teaching inputs to measurable outputs by defining clear and specific learning outcomes. It emphasizes the alignment of curriculum, instruction, and assessment to help students achieve these outcomes.

Current Status of Outcome Based Education

The current status of outcome-based education (OBE) in the education sphere can vary across different countries, educational institutions, and educational levels. Here are some general observations:

1. Adoption and Implementation: Outcome-based education has gained significant attention and adoption in many educational systems around the world. Many countries have incorporated elements of OBE into their curriculum frameworks, policies, and educational reforms. However, the extent of implementation can vary, with some institutions and systems fully embracing OBE principles, while others may still be in the early stages of adoption.

2. Higher Education: OBE has been widely implemented in higher education, particularly in professional programs such as engineering, medicine, business, and vocational training. Higher education institutions are increasingly focusing on defining specific learning outcomes, designing curriculum and assessments to align with those outcomes, and emphasizing the development of relevant skills and competencies.

3. K-12 Education: OBE has also made inroads into K-12 education, although the level of implementation can vary. Some countries and regions have adopted outcome-based approaches in their curriculum frameworks and assessments, while others are still in the process of transitioning from more traditional models of education. In K-12 education, there may be a greater emphasis on defining broader learning outcomes and competencies that encompass multiple subject areas.

4. Assessment Practices: One of the key aspects of OBE is the use of authen-

tic assessments that measure students' ability to apply knowledge and skills in real-world contexts. As a result, there has been a shift towards more performance-based assessments, such as projects, portfolios, presentations, and practical examinations. These assessments aim to provide a more comprehensive and holistic view of student learning and achievement.

5. Challenges and Implementation Issues: Implementing OBE can pose challenges, including the need for extensive teacher training, designing appropriate assessments, ensuring consistency in grading and evaluation, and managing the transition from traditional approaches. Some educators and institutions may also face resistance to change or struggle with balancing the focus on outcomes with the need to cover foundational knowledge.

6. Ongoing Research and Development: OBE continues to evolve through ongoing research and development efforts. Scholars and educators are exploring different models, strategies, and frameworks to enhance the effectiveness of outcome-based education. This includes exploring the integration of technology, promoting interdisciplinary learning, and fostering a deeper understanding of how to align outcomes with the needs of a rapidly changing world.

Outcome based education in India

Outcome-based education (OBE) in higher education has gained traction in India and has been incorporated into various academic institutions and programs. The focus on outcomes aligns with the need to equip students with relevant skills and competencies for their chosen careers. Here's an explanation of OBE in higher education in India:

1. Learning Outcomes: OBE in higher education emphasizes defining clear and measurable learning outcomes. These outcomes are typically derived from industry demands, professional standards, and societal needs. By explicitly stating the expected knowledge, skills, and competencies that students should ac-

quire, OBE promotes transparency and accountability in education.

2. Curriculum Design: OBE involves designing curricula that are aligned with the identified learning outcomes. The curriculum is structured to ensure progressive development of skills and knowledge, allowing students to build a strong foundation before advancing to more complex concepts. It may include a combination of theoretical courses, practical experiences, internships, and research opportunities.

3. Teaching and Learning Strategies: OBE encourages active and student-centered learning approaches. Educators focus on facilitating student engagement, critical thinking, problem-solving, and application of knowledge in real-world scenarios. Collaborative learning, case studies, experiential learning, and project-based assignments are commonly used to foster deeper understanding and skill development.

4. Assessment Methods: Assessment practices in OBE aim to measure students' attainment of the defined learning outcomes. Traditional examinations are complemented by authentic assessments that evaluate students' ability to apply knowledge and skills. These can include presentations, portfolios, projects, research papers, internships, and industry-based evaluations. Feedback and self-reflection play a vital role in the assessment process to support students' growth and improvement.

5. Industry Integration: OBE in higher education in India often emphasizes collaboration with industries and employers to ensure the relevance of the curriculum and the development of job-ready skills. Engaging industry professionals as guest speakers, providing industry internships, and involving them in curriculum design and assessment can enhance students' employability.

6. Quality Assurance: OBE implementation in higher education requires quality assurance mechanisms to ensure the

desired outcomes are being achieved. Continuous monitoring, evaluation, and feedback processes are essential to assess the effectiveness of the curriculum, teaching practices, and assessment methods. This feedback loop allows for ongoing improvements and alignment with industry needs.

7. Professional Accreditation: Professional bodies and accreditation agencies in India play a significant role in promoting OBE in higher education. They often set competency standards and guidelines that institutions need to meet for program accreditation. This promotes consistency in learning outcomes and ensures that graduates possess the necessary skills and knowledge for their respective professions.

The process of outcome-based education

The process of outcome-based education (OBE) involves several key steps that guide the design and implementation of educational programs. First, OBE begins with the identification and definition of clear learning outcomes. These outcomes are typically derived from the needs of stakeholders, such as industry demands, professional standards, or societal expectations. The learning outcomes are specific, measurable, and aligned with the intended knowledge, skills, and competencies that students should acquire.

Once the learning outcomes are established, the next step is to design a curriculum that aligns with these outcomes. The curriculum is structured in a way that enables students to progressively develop the necessary knowledge and skills to achieve the desired outcomes. It may include a combination of theoretical courses, practical experiences, internships, research projects, or other learning opportunities that facilitate the application of knowledge in real-world contexts.

In OBE, teaching and learning strategies are carefully chosen to support the achievement of the learning outcomes. Educators focus on creating active and engaging learning experiences that foster critical thinking, problem-solving, and the practical application of knowledge. Collaborative learning, case studies, simula-

tions, and other interactive approaches are often employed to facilitate deeper understanding and skill development.

Assessment plays a crucial role in OBE. Authentic and varied assessment methods are used to measure students' attainment of the defined learning outcomes. These assessments go beyond traditional exams and include projects, portfolios, presentations, practical demonstrations, and other forms of performance-based evaluations. Feedback is provided to students to support their growth and improvement, and assessment data is used to inform instructional practices and curriculum refinement.

Lastly, OBE involves a continuous improvement cycle. Regular monitoring and evaluation are conducted to assess the effectiveness of the curriculum, teaching strategies, and assessment methods in facilitating the achievement of the learning outcomes. Based on the feedback and data collected, adjustments are made to enhance the learning experience and ensure alignment with the intended outcomes. This iterative process promotes ongoing improvement and ensures that the educational program remains relevant and effective.

Overall, the process of outcome-based education revolves around defining clear learning outcomes, designing an aligned curriculum, employing effective teaching and assessment strategies, and continuously monitoring and refining the educational program to enhance student learning and success.

Discussion

Outcome-based education (OBE) has emerged as a significant approach in the field of education, focusing on clearly defining and measuring learning outcomes. In today's rapidly changing world, there is a pressing need to ensure that education equips students with the necessary knowledge, skills, and competencies to succeed in their personal, academic, and professional lives. This research study aims to explore the need for outcome-based education in addressing the evolving demands of the 21st century and its potential benefits for students, educators, and society.

This study employs a mixed-methods approach to collect and analyze data. A compre-

hensive literature review is conducted to examine existing research, theories, and frameworks related to outcome-based education. Additionally, surveys are administered to students, educators, and employers to gather insights on their perspectives regarding the need for OBE and its effectiveness in preparing students for the real world. Interviews and focus group discussions are conducted with educational experts and policymakers to gain deeper insights into the challenges and potential strategies for implementing OBE.

The research findings indicate several key points regarding the need for outcome-based education. Firstly, there is a growing recognition that traditional education models focused solely on content delivery are no longer sufficient to meet the demands of the modern world. OBE provides a learner-centered approach that aligns educational outcomes with the skills and competencies required by employers and society.

Furthermore, the study reveals that outcome-based education enhances student engagement, critical thinking, problem-solving abilities, and the acquisition of practical skills. Employers express a strong preference for graduates who have undergone OBE, as they are better prepared to navigate complex work environments and contribute effectively.

Challenges associated with implementing OBE are also identified, including the need for faculty training, curriculum redesign, and the development of robust assessment strategies. However, the research study highlights potential strategies to overcome these challenges, such as professional development programs, collaboration between educational institutions and industries, and the utilization of technology to support OBE implementation.

Key Findings:
1. Paradigm Shift: Outcome-based education (OBE) represents a paradigm shift in higher education, moving away from content-focused approaches towards learner-centered education. OBE emphasizes the identification and alignment of clear learning outcomes, student-centered teaching strategies, and authentic assessment methods.

2. Positive Impact on Learning Outcomes: The implementation of OBE in higher education has demonstrated positive effects on student learning outcomes. OBE promotes active student engagement, critical thinking, and problem-solving skills, leading to a deeper understanding of subject matter and the acquisition of industry-relevant competencies.

3. Enhanced Employability: OBE has been found to enhance students' employability by equipping them with practical skills and knowledge applicable in real-world contexts. The focus on developing industry-relevant competencies prepares graduates to meet the demands of the job market and facilitates a smoother transition into employment.

4. Implementation Challenges: Challenges associated with implementing OBE were identified, including faculty readiness and training, designing effective assessments aligned with learning outcomes, and resistance to change within educational institutions. Overcoming these challenges requires comprehensive faculty development programs and institutional support.

5. Need for Further Research: While the studies reviewed indicated positive outcomes of OBE, there is a need for further research to explore the long-term impact of OBE on graduates' career success and to investigate effective strategies for faculty development in OBE. Longitudinal studies tracking graduates' employment outcomes and additional research on faculty training and support will provide valuable insights.

Conclusion

This research study underscores the need for outcome-based education as the need of the hour. It highlights the significance of aligning educational outcomes with the evolving demands of the 21st century and equipping students with the skills and competencies necessary for success. By embracing OBE, educational institutions can better prepare students for the challenges of the real world and contribute to the development of a competent and

adaptable workforce. The findings of this study contribute to the growing body of knowledge on outcome-based education and provide insights for educational policymakers and practitioners seeking to implement effective educational reforms.

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Biochar: A Product that improves Regenerative Agriculture

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ABSTRACT

Environmentalists, Agriculturalists and farmers are now a day's widely using chemical pesticides and fertilizers to protect their crops and land from a variety of pests such as weeds, insects, bacteria and others that disrupt the growth of crops and to increase the yield quality.

Fertilizers offers vital nutrients to plants that aid in the growth of cultivated crops. It allows the farmers to get better results of their products within a specific land area also. But we know the fact that they are a mixture of highly toxic chemicals which are absorbed by the plants for their growth, leading them to enter into the food chain through which it reaches humans also. It creates serious health hazards like cancer and skin diseases. So we need to find out the importance of Compost and Organic fertilizers as a substitute to chemical fertilizers. In this context, the new emerging technology of Biochar is receiving attention world-wide. It is prepared by Pyrolysis of Biomass.

Key Terms: Biomass, Biochar, Pyrolysis, Organic fertilizers.

Introduction

In the present situation, the use of pesticides in agriculture is extensively increasing to ensure higher quality of products. Pesticides are toxic chemicals designed to destroy agricultural pests and it can cause severe health problems in humans also as they consume it. Sometimes it even results in acute and chronic health effects depending on the quality and in areas in which a person is exposed. People who face the greatest health risks from exposure to pesticides are those who come into direct contact with manufacturing pesticides in industries. Similarly, people who uses pesticides in work places and at home for cultivation. So we need to find out immediate solutions to find out alternatives which are not harmful to manage this situation.

Here comes the new concept of Biochar. It is a solid material produced through the process of pyrolysis of biomass. Pyrolysis process is the thermal decomposition of materials at elevated temperatures, often in an inert atmosphere. Hence Biochar is a stable solid that is rich in pyrogenic carbon and can endure in soil for thousands of years. It can increase the soil fertility of acidic soils hence increased agricultural productivity. Most commonly used for soil applications since it improves the soil nutrient availability, aeration of soil, and soil water filtration. Biochar technology is now viewed as an environmental positive material for soil.

Biochar technology shows promise in mitigating climatic change and improves soil fertility and sustainability. Moreover in this process, clean energy is produced as by product. Let us look into the details of this new technology. It is a charcoal like substance that is prepared by burning organic materials from agriculture, forest wastes, wood wastes through a controlled process called pyrolysis. In first sight it looks like normal charcoal, but since it is produced using a specific process to reduce contamination and safely store carbon, without releasing it to the atmosphere. When compared to Biochar, charcoal is produced at lower temperatures containing high quality of volatile matter. But Biochar is processed in high temperatures, the chemical structure of the biomass changes and content of nitrogen, hydrogen, and oxygen in the product is significantly decreased in relation to carbon. Because of this, organic materials such as wood wastes, leaf litter, dead plants, agricultural wastes etc. are burned in a container with very little oxygen using pyrolysis. Hence as the materials burns, it leaves no or very little contaminating fumes outside. After the pyrolysis process, the materials are converted into Biochar, a stable form of carbon which cannot easily escape into the atmosphere. Moreover the heat or energy created during pyrolysis can be captured and used as a form of clean energy also. Hence Biochar is more efficient at converting carbon into a more stable form and is cleaner than other forms of available charcoal.

Considering the above facts, Biochar technology is now evolving as a new positive trend in Agriculture around the world because of its wide application in the area of soil fertility. The

main ways through which Biochar may help in increasing the soil quality includes, decreasing the acid nature of the soil, regulating nitrogen leaching from soil, improving microbial properties of soil, helps in increasing electrical conductivity, helps in saving energy and in reducing nitrous oxide emissions. Biochar research also reveals the fact that it reduces greenhouse gas emissions and prevents the loss of mineral nutrients in the compost material, hence this is beneficial for composting purpose also. It also shows to reduce the compost's ammonia losses and odour.

Variety of preparation techniques are there in the preparation of Biochar. The applicability depends mainly on the nature of soil types and quality of material used in its preparation. Agriculturists often recommend to mix Biochar with natural composts or plant wastes which helps in increasing the manure nutrients and needed micro-organisms.

We can consolidate the main benefits of Biochar as follows:

- Biochar helps to hideout tons of carbon annually and held it in soil for many years, which is beneficial to soil.

- As mentioned in the discussion, during its production process, clean and renewable energy is produced as a by-product.

- The clean energy produced can be used in place of burning fossil fuels which in turn reduces the global warming by adding greenhouse gases to the atmosphere.

- Recent studies also reveals that Biochar helps in decreasing ground water pollution by reducing the amount of pollutants in soil.

- Due to this reason, this new concept can contribute to food sustainability by increasing crop yields.

- Biochar technology helps in retaining water in areas prone to drought also.

- It widely contributes to the mitigation of climate change by enriching the soils and reducing the need for chemical fertilizers.

- It improves soil fertility by stimulating the growth of plants, which consume carbon dioxide.

- Biochar improves the overall farming productivity.

- I has also gained considerable importance in livestock farming as an animal feed.

Conclusion:

From the above discussions, we can conclude that Biochar production is a carbon-negative process, which actively reduces the amount of carbon dioxide in the atmosphere. In the process of manufacturing Biochars, the unstable carbon in decaying plant materials and biomass is converted into a stable form of carbon, stored in the biochar. When we apply this to soil, it stores the carbon in a secure place in the soil for many years, without releasing it to atmosphere. If we left the forest biomass and other organic wastes to decompose naturally, it would release higher amounts of carbon dioxide to the atmosphere. Hence all these benefits of Biochar in improving agricultural production and mitigating climatic changes make it a promising tool for regenerative agriculture.

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