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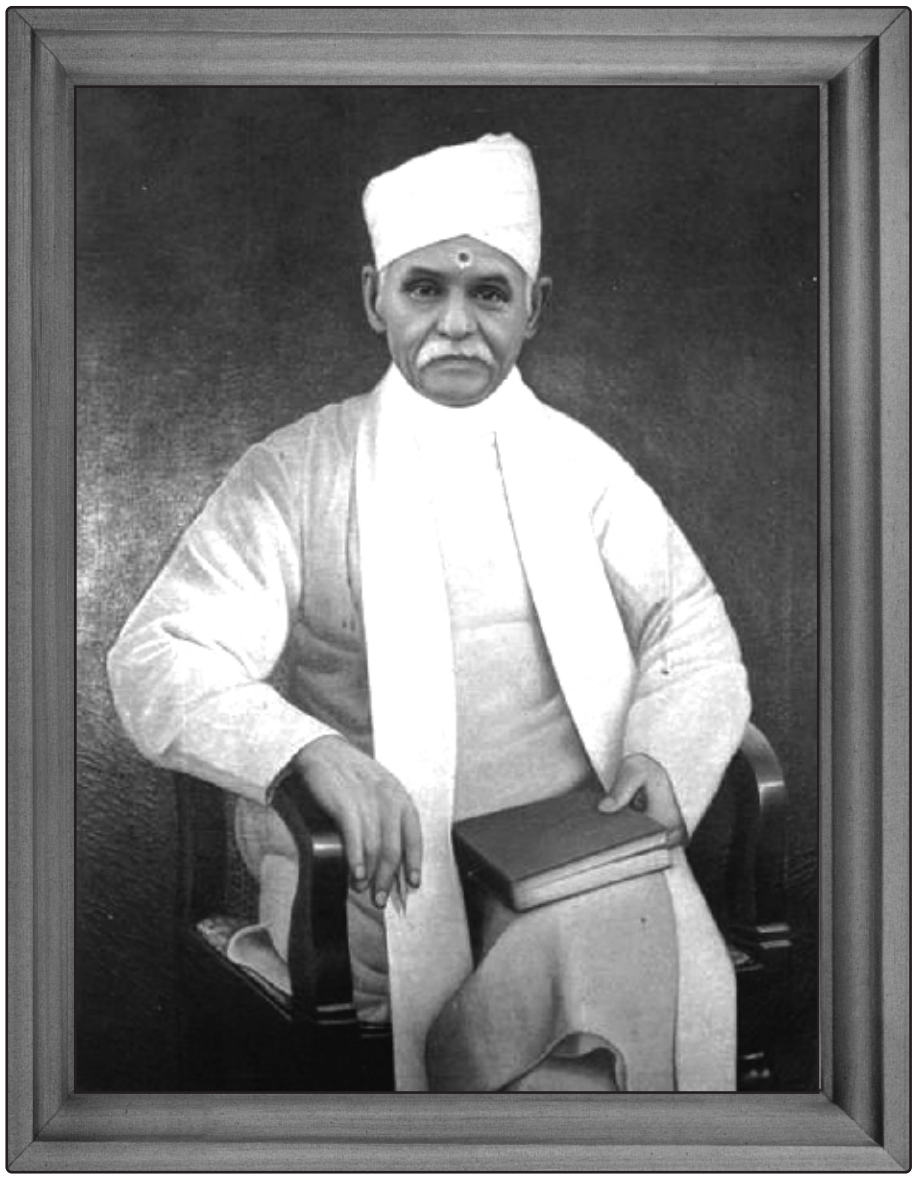

Mahamana Madan Mohan Malaviya

(25 December 1861 – 12 November 1946)

Editorial

This issue of the journal is being published for the readers amidst the winter chills. The natural cold has not hampered our zeal rather it has given us an opportunity and strength to work in team for the academic sharing of knowledge in the form of the present issue.

This issue includes ten articles and research papers. They are related to various interesting areas in education and allied fields. Mainly these papers are focused on the issues like Mathematics Learning, Sibling Configuration, Girl Child and Women Education, Inclusive education, Role of Judiciary in Teacher Education, Environmental Ethics Education, Concept maps in Chemistry and Use of Multi-media in Education. We hope that researchers in the field of Education and allied Disciplines will be certainly benefitted by the contents.

We are grateful to all the members of the advisory body, the members of the editorial committee, authors and the Seema Press who helped us to bring out the January 2013 issue of SPIJE in this form. Views of readers are always invited for improvement of the future issues. You can always communicate your views, critical comments and suggestions to us for further improvement. The academic fraternity is also invited to contribute articles, research papers and book reviews for wider dissemination through the print and electronic form of forthcoming issues of SPIJE.

Editor SPIJE

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THE ROLE OF JUDICIARY IN TEACHER EDUCATION IN INDIA

(Anupama Rai and H.C.S. Rathore, Research Scholar and Professor, Faculty of Education, B.H.U., Kamachha,Varanasi-10,U.P. ,India)

ABSTRACT

With the enactment of National Council for Teacher Education Act, 1993, the teacher education system of India was brought up under one common legislative umbrella. The reason behind this enactment was to ensure planned and coordinated development of teacher education throughout the country, but the system being regulated by four acts has witnessed a large scale judicial intervention due to various reasons. There has been continuous change in these rules and regulations. In this paper the effect of these amendments on judiciary as well as the effects of judicial interventions on the amendment has been discussed.

Key-words : Judiciary, Judicial Intervention, National Council for Teacher Education (NCTE) Act.

Introduction

Higher education of India is structured around centralized regulatory bodies with wide-ranging powers such as the University Grants Commission (UGC), All India Council for Technical Education (AICTE), Medical Council of India (MCI), Bar Council of India (BCI), and National Council for Teacher Education (NCTE).These bodies were established and empowered through legislative acts. These acts specify the role and the functions of these institutions or regulatory bodies for uniform and qualitative development of specific fields of higher education. But the lacunae and weaknesses in the regulations of these bodies have led to increased judicial interventions. The weakness and failures of the concerned legislation has been a critical factor in the judiciary's growing power in India.

In the field of teacher education the National Council for Teacher Education (NCTE) was set up in 1973 as an advisory body to the government at the center and the state on matter related to teacher education .But it was the year 1995 when the parliament of India empowered the council with statutory provisions and the entire teacher education system got a specific Act (i.e. NCTE Act-1993) for its regulation. Thus the teacher education system in India which was hitherto governed by three legislative Acts got the fourth (NCTE) act to regulate uniform qualitative development of teacher education in India. Hence today following four acts govern/monitor teacher education in India.

1. The University Grants Commission Act, 1956;
2. The State University Act, (state)
3. The Basic Education Act, (state)
4. The National Council for Teacher Education (NCTE) Act, 1993

Being governed and regulated by four Acts, teacher education has witnessed a number of judicial interventions due to inherent conflicts/contradictions in the norms/rules/policies if the above

acts. Often the courts have passed judgments which have compelled certain amendments in the acts/regulations of these bodies. In this article some important court cases related to teacher education which had led to amendments in the acts are reviewed. The purpose of this review is to suggest that all the four bodies (University Grant Commission, National Council for Teacher Education, State Universities and Basic Education Boards) must work in coordination in framing their regulation to avoid litigations in the field of teacher education.

The Court Cases and the Amendments related with Teacher Education Acts

Soon after its enactment, the NCTE Act was challenged in the High Court of Rajasthan by a private educational institution called Shah Goverdhan L. Kabra TeacherS College. The college challenged the order of the Northern Regional Committee of National Council for Teachers Education about rejecting the application of the institution for the recognition of its B.Ed. course. This case was further contested in the Supreme Court of India and became a leading case in establishing the validity of the Act. The Supreme Court in the Para 10 of the case observed that "on examining the statute as a whole and on scrutiny of the object and scope of the statute, we have no manner of doubt that even sub section 4 of section 17 is very much a law dealing with the coordination and determination of standards in institutions for higher education coming within entry 66 of the list III of the seventh schedule and thus the Union legislature did have the competence for enacting the said provision" (Union of India and Ors. vs. Shah Goverdhan L. Kabra Teachers College (2002).

The next noticeable judicial intervention was the direction of the Supreme Court in the case of St. Johns Teacher Training College vs. Regional Director, National Council of Teacher Education (2003). In this case the regulation 5 (e) and 5 (f) of the NCTE (Application for Recognition, the Manner for Submission, Determination of Conditions for Recognition of Institutions and Permissions to Start New Course or Training) Regulation 1995, which was related with the necessity of NOC from the State Government for getting recognition for starting a new course was challenged as ultra vireos and invalid. Mean time, during the pendency of this case, the council made fresh regulation on November 13, 2002. This was known as the NCTE (Form of application for recognition, the time of submission of application, determination of norms and standards for recognition of teacher education program me and permission to start new course or training) Regulation 2002. These Regulations were made through an amendment which came in effect on 6th June 2003 which was induced by the judgment of St. Johns Teacher training college case. As per this amendment, the state government has to take decision within a period of six months of the last date of receipt of application for the grant of NOC (sec 6 (ii).Prior to this judgment and amendment there was no time limit prescribed on the part of the state government for taking any decision in the matter of NOC. While the apex court observed that "the role of state government is certainly important for supplying the requisite data which is essential for formation of opinion by the regional committee while taking a decision under sub section (3) of the section 14 of the Act"(Para 11). Therefore, the Court directed the council to frame appropriate regulation in the matter with the observation "It will therefore be proper that the Council frames appropriate Regulation fixing the time limit within which a decision should be taken by the State Government on the application moved by an institution for grant of a NOC".

The NCTE Act was amendment another time in lieu of the judgment in the case of Basic Education Board vs. Upendra Rai and others where the Supreme Court observed that the NCTE Act had nothing to do with educational institutions at primary level. The Supreme Court interpreted that the NCTE Act only dealt with the second category of institutions (i.e. teachers' training institutes) and therefore it had nothing to do with the ordinary educational institutions referred to above.

Hence, the qualification for appointment as teacher in the ordinary educational institutions like the primary school cannot be prescribed under the NCTE act and essential qualifications are prescribed by the local act and rules in each state….." (Para 19).

After this judgment, the Ministry of Human Resource Development (MHRD) decided to amend the NCTE Act in order to clarify that the Act applies to schools and their teachers also. Through an Amendment (The National Council for Teacher Education (Amendment) Bill, 2010) NCTE was empowered to lay down the minimum qualifications for a person to be eligible as a teacher in primary and other schools. This clearly indicates that under the existing provisions of the Act, the Council did not have the power to specifically lay down minimum qualifications for school teachers. And the main purpose of bringing the proposed amendments in the Act is to remove this ambiguity only. (Para 4.5 of The National Council for Teacher Education (Amendment) Bill, 2010)

Several examples of judicial intervention on the teacher education system can be cited which were related to the issue of admission in B.Ed course. They were the cases of T.M.A. Pai vs. State of Karnataka (2002), Islamic Academy of Education and others vs. State of Karnataka (2003), P.A. Inamdar vs. State of Maharasthra (2005). The judgment passed in these cases became the basis of Government Order regarding the selection procedure, management quota and the fee structure. In the judgment of T.M.A. Pai vs. State of Karnataka the Supreme Court differentiated between the type of administration for government aided and self financed institutes. The Supreme Court Observed that:

"…. the essence of a private educational institution is the autonomy that the institution must have in its management and administration……. Bureaucratic or governmental interference in the administration of such an institution will undermine its independence.(Para 55) ……unaided professional institution are entitled to autonomy in their administration while at the same time, they do not forego or discard the principle of merit .It would, therefore, be permissible for the university or the government, at the time of granting recognition, to require a private unaided institution to provide for merit-based selection while, at the same time giving the management sufficient discretion in admitting students. This can be done through various methods. For instance a certain percentage of the seats can be reserved for admission by the management out of those students who have passed the Common Entrance Test held by itself or by the State /University and have applied to the college concerned for admission , while the rest of the seats may be filled up on the basis of counseling by the State Agency"(Para 68).

After the pronouncement of the judgment on 31st October, 2002, the State of Uttar Pradesh issued a Government Order dated 25th July2003 and withdrew certain provisions from the Government Order 11th November 97 which related to the classifications of seats, fee structure and percentage of classification.

The case of Islamic academy of education re-interpreted the judgment of T M A Pai's case and it become a landmark in deciding not only the quota of management seats but the admission procedure also. On 22nd April 2004, following the judgment of this case, state government issued the order declaring the ratio of the government and management quota seats will be 85:15 for the session 2004-2005. This decision of the Government, which came in light of the apex court judgment, prompted many writ petitions in the Court as this decision was also made applicable on the admission procedure in the unaided colleges. The judgment states that:

"……. *the management could select students, of their quota, either on the basis of the common entrance test conducted by the State or on the basis of a common entrance test to be conducted by an association of all colleges of a particular type in the state…… if any profession*

colleges chooses not to admit from the Common Entrance Test conducted by the association then that college must necessarily admit from the Common Entrance Test conducted by the state"(Para 16).

Following the Judgment of this case, an amendment was made in section 7, 12, and 14 of the Uttar Pradesh State University Act (Regulation of Admission to Courses of instruction for Degree in education in Affiliated, Associated and Constituent Colleges) Order, 1987. Through this amendment, the aided colleges were directed to conduct their entrance exam in association on the date other than the date of the university entrance test (7a,). However they were directed to take admission strictly on the merit basis as per the list prepared under supervision of the concerned university (sec.12 and 14). This amendment was known as Uttar Pradesh State University Act (Regulation of Admission to Courses of instruction for Degree in education in Affiliated, Associated and Constituent Colleges) Order 2005.

The judgment in T. M.A. Pai case became the benchmark in the judgment of various other cases and associated decisions. This further regulated the teacher education in Uttar Pradesh. In the cases of Maa Sharda Maha Vidyalaya vs. State of U.P. and others, the High court of Allahabad directed that the fee which the management could charge from individual students would be uniform with a ceiling of Rs. 14,500/- (para26). These judgments lead to the formulation and enactment of new Act titled as The Uttar Pradesh Private Professionals Educational Institutions (Regulation of Admission and Fixation of fee) Act, 2006.

In 2006, the State Government declared to conduct joint entrance test for B.Ed admission in the state universities and its associated and affiliated colleges. This step was taken by the State Government in view of the law as laid down by the apex court in the cases of P.A. Inamdar vs. State of Maharasthra (2005) in which Hon,ble Supreme Court examined various aspects to impart education of professional courses like B.Ed. in various institutions and colleges. The Supreme Court held that the admissions for professional course should be made on the basis of entrance test under single window system and until the institutions themselves were not able to evolve an effective mechanism for such entrance tests ensuring transparency and merit. Responding the observation of the apex court, the state had to step in and arrange for such an entrance test.

Thus it can be seen that there has been continuous intervention of judiciary to keep transparency, responsibility and efficiency as the guiding principles in the teacher education system. Judiciary, while reinterpreting the central law had pointed towards various deficiencies in the law and made useful suggestions and gave direction to the state governments as well the council. Such suggestions from the Courts have caused positive changes in nearly all the aspects of teacher education.

The Judicial Intervention due to Amendments in Acts

Judicialisation in teacher education is viewed not only as the effect of judiciary in term of changes in acts an regulation causing change in the entire system. It is also evident, when the changes have raised bunch of writ petition. As said above various amendment in the regulation and act law been made due to the concerned authorities decision and judicial intervention. These amendments have raised dispute related with admission, recognition, affiliation, management quota seats and fee issue.

As said earlier, due to the Islamic Academy case, the state government fixed the management quota as 15% of total intake. This decision change by the government in the admission procedure was challenged in the court, when the state regulation made the provisions of common entrance test to be conducted by all the universities on date. The amendment in NCTE Norms and the

Regulation1987 under the State University Act related with eligibility criteria had led to the largest category of disputes.In1983the State Government following the provisions of 28(5) (b), framed the Rule of 1983 regarding academic qualification for admission in B.Ed. It mandates that any candidate having graduate degree in any discipline can apply. Further the changed regulation 1987 induced the criteria of cut off marks as 45%, NCTE after it inception made its provision in 2002 and followed the same criteria, but in 2005, 2007 and 2009, it kept on switching its criteria from 45% to 50% and 50% to 45%.This switch over and the differences between NCTE and the state university act led to a blunder mistake by the authorities raising judicial intervention in term of writ petition not only in U.P. but also in Maharastra and Delhi. The changes/amendment in the norms pertaining to recognition has also led to court cases. When the NCTE made a temporary arrangement of granting recognition even in absence of NOC, this amendment led to dispute related with the government policy, causing bunch of writ petition demanding affiliation from the State Governments for running BTC course (*Dau Dayal Mahila PG College vs. State of UP*). Similarly when in Madhya Pradesh NCTE issued an order of withdrawing recognition of various B.Ed. the colleges, a division bench of High Court held that frequent changes in the norms and standards, prescribed by the NCTE, would not apply to colleges established in keeping with previous norms and standard regulations. The Bench said that norms and standards, revised from time to time with regard to "non alterable characteristics" like physical infrastructure, land building, size of classrooms, and qualification of teaching and non-teaching staff cannot be applied to previously recognized colleges(*The Times of India, 2012*)

Conclusions

Based upon the above analysis of some prominent court cases and their judgments, it is clear that the intervention of judiciary has led to several amendments in the NCTE and State Government Acts relating to teacher education. Further, it is also evident that frequent changes in policy by both bodies has also led it litigation in the field of teacher education. Hence it would not be out of place to suggest that both NCTE and State Government should consult each other before taking any policy decision which is in contravention to the Act/Statutes of both bodies. As far as possible ad-hoc /contingency decisions by regulatory bodies should either be avoided or if they needed, then should be taken consultation after arriving at a consensus. This will lead to minimization of litigation in teacher education, there by saving resources, avoiding hardship of students and ensuring time bound completion of teacher education courses.

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CONSTRUCTION AND USE OF CONCEPT MAPS FOR THE TEACHING LEARNING PROCESS OF ORGANIC CHEMISTRY

(Kanak Sharma, Meenakshi Singh, Research Scholar and Associate Professor, Faculty of Education, B.H.U., Kamachha,Varanasi-10, U.P. ,India)

ABSTRACT

Chemistry has gained a secure position in the curricula of schools, technical colleges and universities. In India all aspirants of professional courses related to the science stream such as Medical, Engineering Agriculture, Pharmacy, Environmental Sciences, Earth Sciences have to study Organic Chemistry in order to procure admission. Being a fundamental content area in Chemistry, Organic Chemistry has important applications in mineralogy, metallurgy, material science environmental science, medicine, pharmacy and others. As a result of its inherent complex nature, Chemistry is often full of abstract concepts and may lead to extensive misconceptions among students. It is important to find various new as well as interesting ways that can lead towards meaningful Chemistry learning. One way to accomplish this is to apply Concept maps as a device of meaningful learning based on Ausubel's theory. ***Ausubel's assimilation theory of cognitive learning*** *places central emphasis on the influence of students' prior knowledge on subsequent meaningful learning. The use of concept maps as teaching strategy was first developed by* ***Joseph D. Novak of Cornell University in the early 1980's.*** *This paper discusses the use of Concept Maps in the teaching and learning of Organic Chemistry. Concept Maps on the topic of 'Amines, have been taken as example to explain he construction and use of Concept Maps in Organic Chemistry.*

Key- words: Concept maps, teaching & learning, Organic Chemistry, Ausubel's Assimilation theory, Meaningful learning

Introduction

The importance of Chemistry is, now recognized by all educationists. Chemistry has gained a secure position in the curricula of schools, technical colleges and universities, both as an essential part of general education for life and as a separate branch of science.

In India all aspirants of professional courses related to the science stream such as Medical, Engineering Agriculture, Pharmacy, Environmental Sciences, Earth Sciences and even Home Science not only have to study Organic Chemistry but have to excel in it in order to procure admission through competitive exams.

According to Chen (2004) "Being a fundamental content area in Chemistry, Organic Chemistry has important applications in mineralogy, metallurgy, material science environmental science, medicine, pharmacy and others".

Chemistry is often full of abstract concepts resulting from its inherent complex nature. It may lead to extensive misconceptions among students (Gable, 1999). It is also a common problem in Chemistry that even if students do well in examinations, they still may fail in solving basic textbook problems, which is a sign of rote learning (Pendley et al., 1994).

It is important to find various new as well as interesting ways that can lead towards meaningful Chemistry learning. One way to accomplish this, is to apply Ausubel's theory of meaningful learning. Concept maps were devised as a device of meaningful learning which can be regarded as the counter and effective replacement of rote learning.

The use of concept maps as teaching strategy was first developed by Joseph D. Novak of Cornell University in the early 1980's. His Work was based on important idea in Ausubel's (1968) assimilation theory of cognitive learning which places central emphasis on the influence of students' prior knowledge on subsequent meaningful learning.

What are Concept Maps?

Concept map is analogous to a road map. It is a device for representing the conceptual structure of a subject/discipline in a two-dimensional form. A concept, as defined by Novak, is regularity in objects or events designated by a specific label.

Concept map is a way of representing relations between ideas, images or words, in the same way that a sentence diagram represents the grammar of a sentence, a roadmap represents the location of highways and towns and a circuit diagram represents the working of an electrical appliance. Concept maps are graphical tools for organizing and representing knowledge. They include concepts, usually enclosed in circles or boxes of some type, and relationships between concepts or propositions, (indicating by a connecting line and linking word) between two concepts.

Concept maps are diagrammatic representations which show meaningful relationships between concepts in the form of propositions which are linked together by words, circles, and cross links. Concepts are arranged hierarchically with the super ordinate concepts at the top of the map, and subordinate at the bottom which are less inclusive than higher ones. “Cross links” are used to connect different segments of the concepts hierarchy which indicate syntheses of related concepts, a new interpretation of old ideas, and some degree of creative thinking.

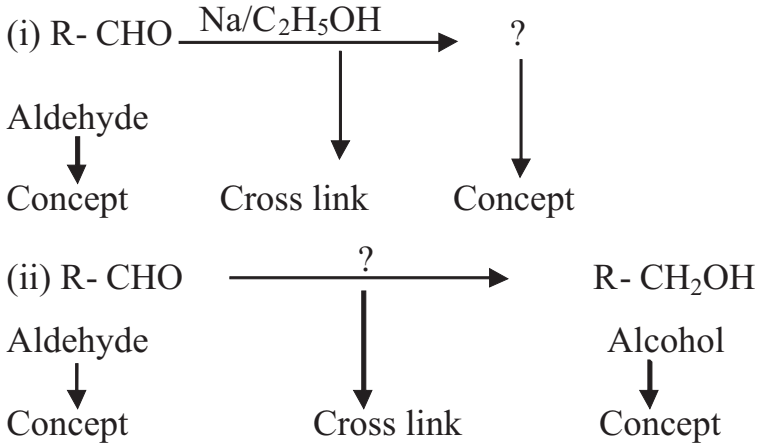
Why Use Concept Maps for Organic Chemistry Teaching?

A thorough review of the literature suggests Concept mapping may be a way for students to achieve meaningful learning by connecting new facts to already existing knowledge. Meaningful learning requires intentionally connecting new ideas or concepts with previously acquired knowledge (Novak & Gowin, 1984). A meta-analysis of 19 studies by Horton et al. (1993) showed a generally positive effect of Concept Mapping on students' achievement and attitude when used as an instructional tool. In the process of mapping, a clear picture is presented of what students are thinking. Obvious errors or misconceptions can be corrected by feedback from the teacher (Heinz-Fry & Novak, 1990).

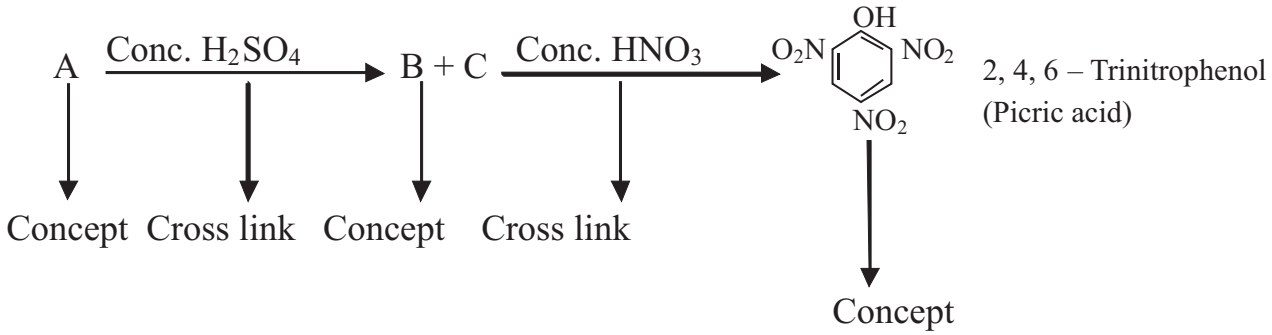
The use of concept map has also been widely investigated in the field of Chemistry. According to Francisco et al., (2002) and Nicoll et al., (2001), concept maps are a useful learning tool in

Chemistry. Concept maps can improve understanding of chemical concepts and help build connections among abstract concepts. Concept maps can also be used as a misconception correction tool. These concept maps bind concepts with linking words that help students see connections among them and organize their knowledge hierarchically, based on scientific knowledge. (Francisco et al., 2002; Nicoll et al., 2001).

Above all the nature of Organic Chemistry adheres very well to the basic framework of concept maps. All reactions with laboratory conditions may be thought of as links. In Organic Chemistry we generally learn the chemical reactions in similar manner of a concept map –



(iii) In the given reaction find out the Compound 'A' –



2, 4, 6 – Trinitrophenol (Picric acid)

It is clear from the above examples that concept maps have an underlying similarity with Organic Chemistry reactions. We can use concept maps in Organic Chemistry:

- To clarify thinking and reinforcing understanding.
- To stimulate creative thinking.
- To integrate new knowledge.
- To identify misconceptions.

- To correct misconceptions.
- To solve complex problems.
- To solve rote learning problems
- To revise previously learned concepts.

How to Construct Concept Maps?

The concept maps are user friendly and easy to draw. To begin with, the mapper selects a topic of interest and reads the topic.(for example Amine (Figure 1)). While reading, around 10-15 major concepts are identified. For instance Aliphatic Amines, Aromatic Amines, Physical Properties, Chemical Properties etc.. The concepts are enclosed within an ellipse outline. These concepts are arranged from general to specific levels, by placing the most important concept (Super ordinate concept) on the top of the map and lesser important concepts (Subordinate concept) on a layer below the top concept. This is followed by labeling links by drawing lines to these concepts. These links provide meaning to the concepts, and few such linking words are: in case of, which are, can be, are derivatives of, shows etc. which are written on the lines connecting the concepts.

The process of preparing a concept map generally comprises following five major steps:

1. The students are given the material pertaining to the lesson/ unit and given instruction to read the material and select the key concepts. The concepts are listed on the blackboard as they are identified. Discussion is held with the students as to which concept is more important and most inclusive in the lesson/unit.

2. The most inclusive or super-ordinate concept is placed at the top. The most general and inclusive concepts are list next working through the first list until all concepts are rank ordered.

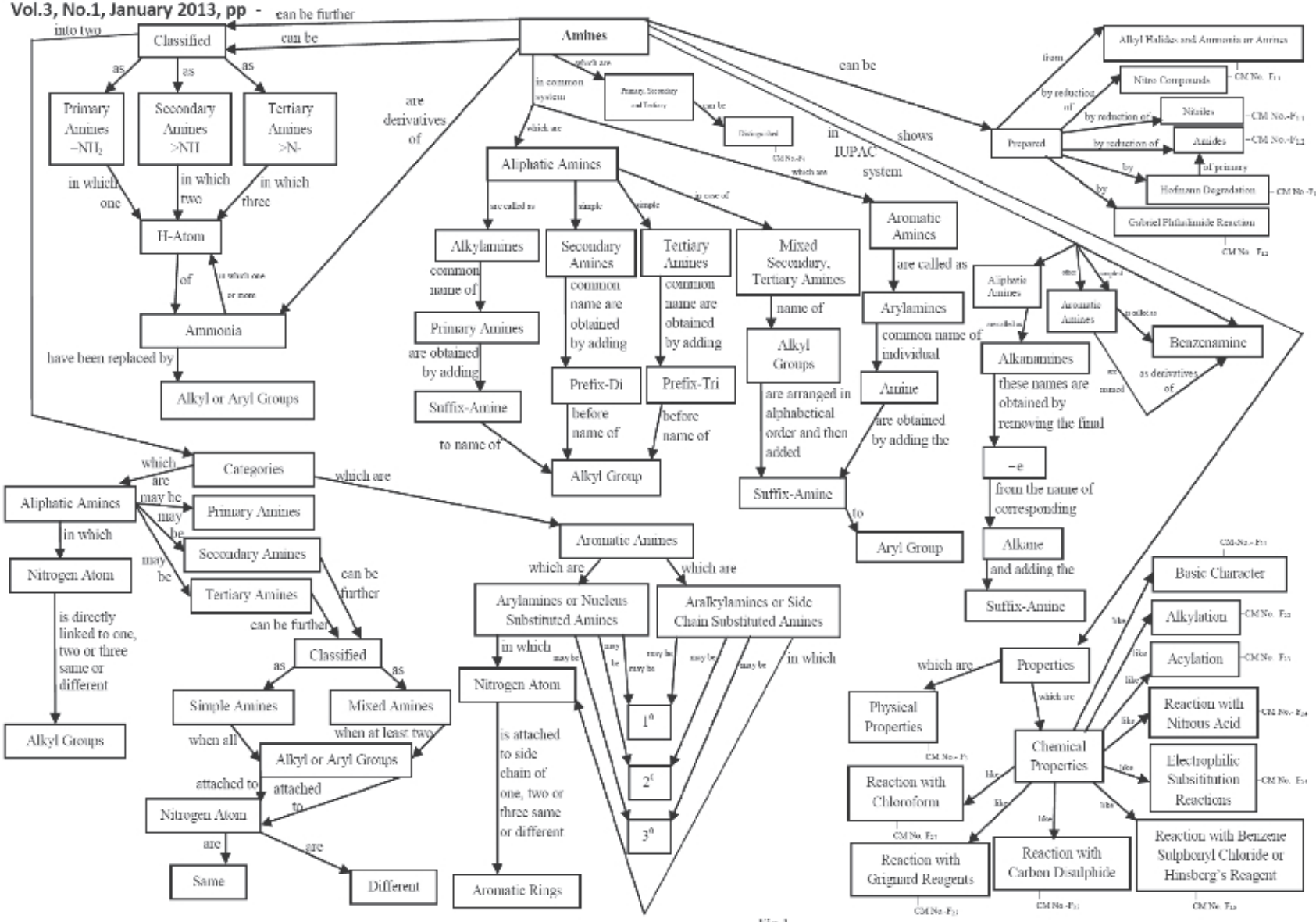
3. Students are asked to help in choosing good linking words to form the prepositions shown by the lines on the map.

4. Cross-links between concepts in the concept map are made with the help of students. The concepts are either circles or put in small boxes.

5. Maps are reconstructed if they are poor symmetry or as poorly clustered.

Concept Maps in the Teaching Learning Process of Organic Chemistry

In Organic Chemistry as a teaching strategy, concept maps can be used to help students to solve rote learning problems and to clarify their misconceptions so that the students' achievement in Organic Chemistry will be higher. Figure 1 to 12 presents concept maps on preparation, properties, reactions, and types of Amines. These concept maps enable one to understand how Organic Chemistry can be taught through Concept mapping in an effective manner following the five broad steps described above.


Amines
Classified
can be further into two
can be
as
Primary Amines –NH2
Secondary Amines >NH
Tertiary Amines >N-
in which one
in which two
in which three
H-Atom
of
in which one or more
Ammonia
have been replaced by
Alkyl or Aryl Groups
are derivatives of
which are
Aliphatic Amines
Aromatic Amines
Mixed Secondary, Tertiary Amines
Alkylamines
Secondary Amines
Tertiary Amines
common name of
Primary Amines
are obtained by adding
Suffix-Amine
to name of
Alkyl Group
common name are obtained by adding
Prefix-Di
Prefix-Tri
before name of
name of
Alkyl Groups
are arranged in alphabetical order and then added
Suffix-Amine
to
Aryl Group
are called as
Arylamines
common name of individual
Amine
are obtained by adding the
Aliphatic Amines
Aromatic Amines
Alkanamines
these names are obtained by removing the final
-e
from the name of corresponding
Alkane
and adding the
Suffix-Amine
Benzenamine
as derivatives of
can be
Prepared
from
Alkyl Halides and Ammonia or Amines
by reduction of
Nitro Compounds
CM No. P11
by reduction of
Nitriles
CM No.-P11
by reduction of
Amides
CM No.-P12
by
of primary
Hofmann Degradation
CM No -P12
Gabriel Phthalimide Reaction
CM No P12
shows
in IUPAC system
Categories
which are
Aliphatic Amines
may be
Primary Amines
Secondary Amines
Tertiary Amines
in which
Nitrogen Atom
is directly linked to one, two or three same or different
Alkyl Groups
can be further
Classified
as
Simple Amines
Mixed Amines
when all
when at least two
Alkyl or Aryl Groups
attached to
Nitrogen Atom
are
Same
Different
Aromatic Amines
which are
Arylamines or Nucleus Substituted Amines
Aralkylamines or Side Chain Substituted Amines
in which
Nitrogen Atom
is attached to side chain of one, two or three same or different
Aromatic Rings
1°
2°
3°
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which are
Physical Properties
Chemical Properties
Basic Character
Alkylation
CM No. P13
Acylation
CM No. P13
Reaction with Nitrous Acid
CM No.- P14
Electrophilic Substitution Reactions
CM No. P14
Reaction with Chloroform
CM No. P13
Reaction with Grignard Reagents
Reaction with Carbon Desulphide
Reaction with Benzene Sulphonyl Chloride or Hinsberg's Reagent
CM No. P14

Fig-1

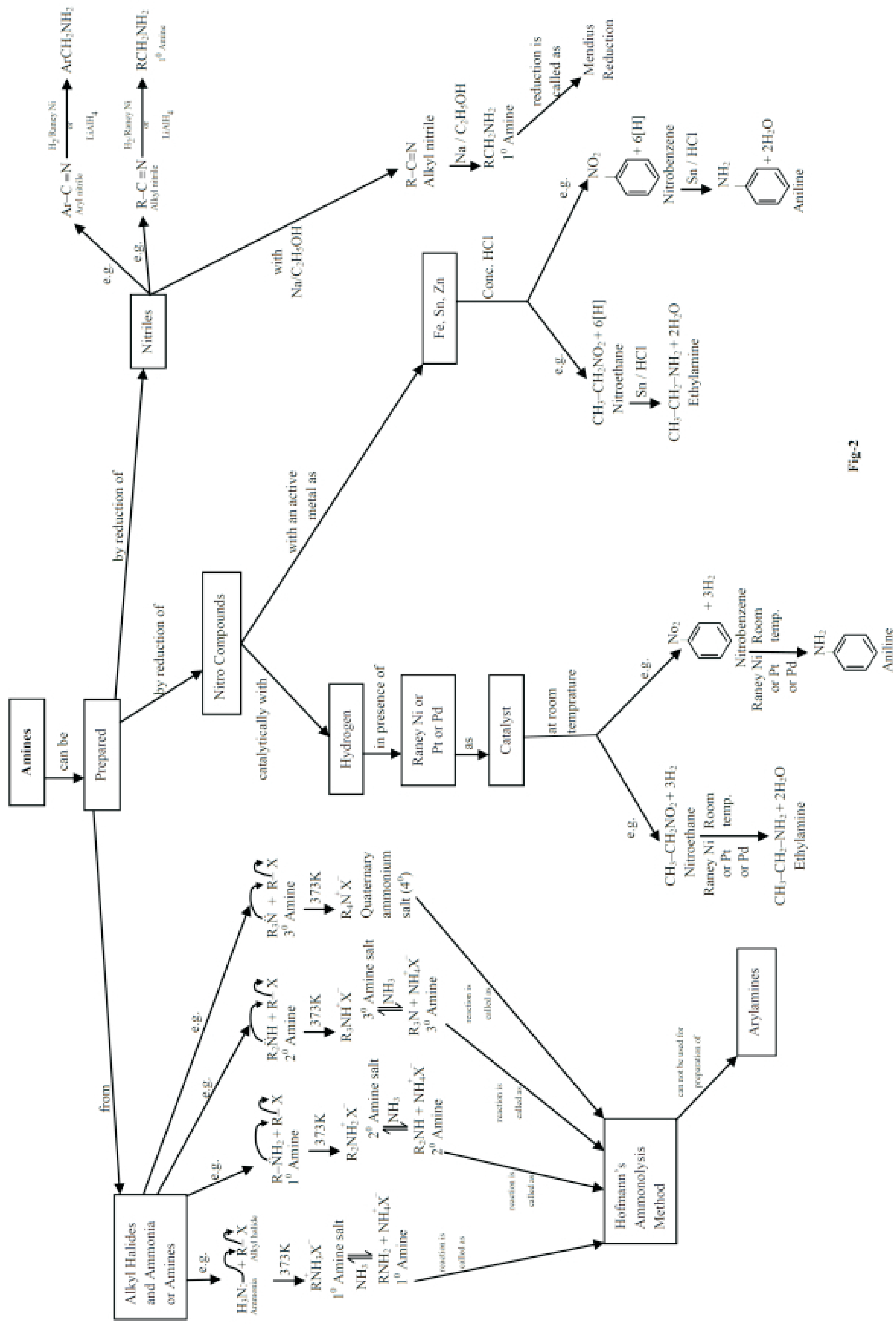

Amines
can be
Prepared
from
by reduction of
by reduction of
Nitriles
Nitro Compounds
Alkyl Halides and Ammonia or Amines
catalytically with
with an active metal as
Hydrogen
in presence of
Raney Ni or Pt or Pd
as
Catalyst
at room temprature
Fe, Sn, Zn
Conc. HCl
with Na/C2H5OH
e.g.
R–C≡N Alkyl nitrile
Na / C2H5OH
RCH2NH2
1⁰ Amine
reduction is called as
Mendius Reduction
Ar–C≡N Aryl nitrile
ArCH2NH2
RCH2NH2
1⁰ Amine
H2/Raney Ni or LiAlH4
CH3–CH2NO2 + 6[H]
Nitroethane
Sn / HCl
CH3–CH2–NH2 + 2H2O
Ethylamine
NO2 + 6[H]
Nitrobenzene
Sn / HCl
NH2 + 2H2O
Aniline
CH3–CH2NO2 + 3H2
Nitroethane
Raney Ni or Pt or Pd
Room temp.
CH3–CH2–NH2 + 2H2O
Ethylamine
NO2 + 3H2
Nitrobenzene
Raney Ni or Pt or Pd
Room temp.
NH2
Aniline
H3N: + R–X
Ammonia Alkyl halide
373K
RNH3X
1⁰ Amine salt
NH3
RNH2 + NH4X
1⁰ Amine
R–NH2 + R–X
1⁰ Amine
373K
R2NH2X
2⁰ Amine salt
NH3
R2NH + NH4X
2⁰ Amine
R2NH + R–X
2⁰ Amine
373K
R3NHX
3⁰ Amine salt
NH3
R3N + NH4X
3⁰ Amine
R3N + R–X
3⁰ Amine
373K
R4NX
Quaternary ammonium salt (4⁰)
reaction is called as
Hofmann's Ammonolysis Method
can not be used for preparation of
Arylamines

Fig-2

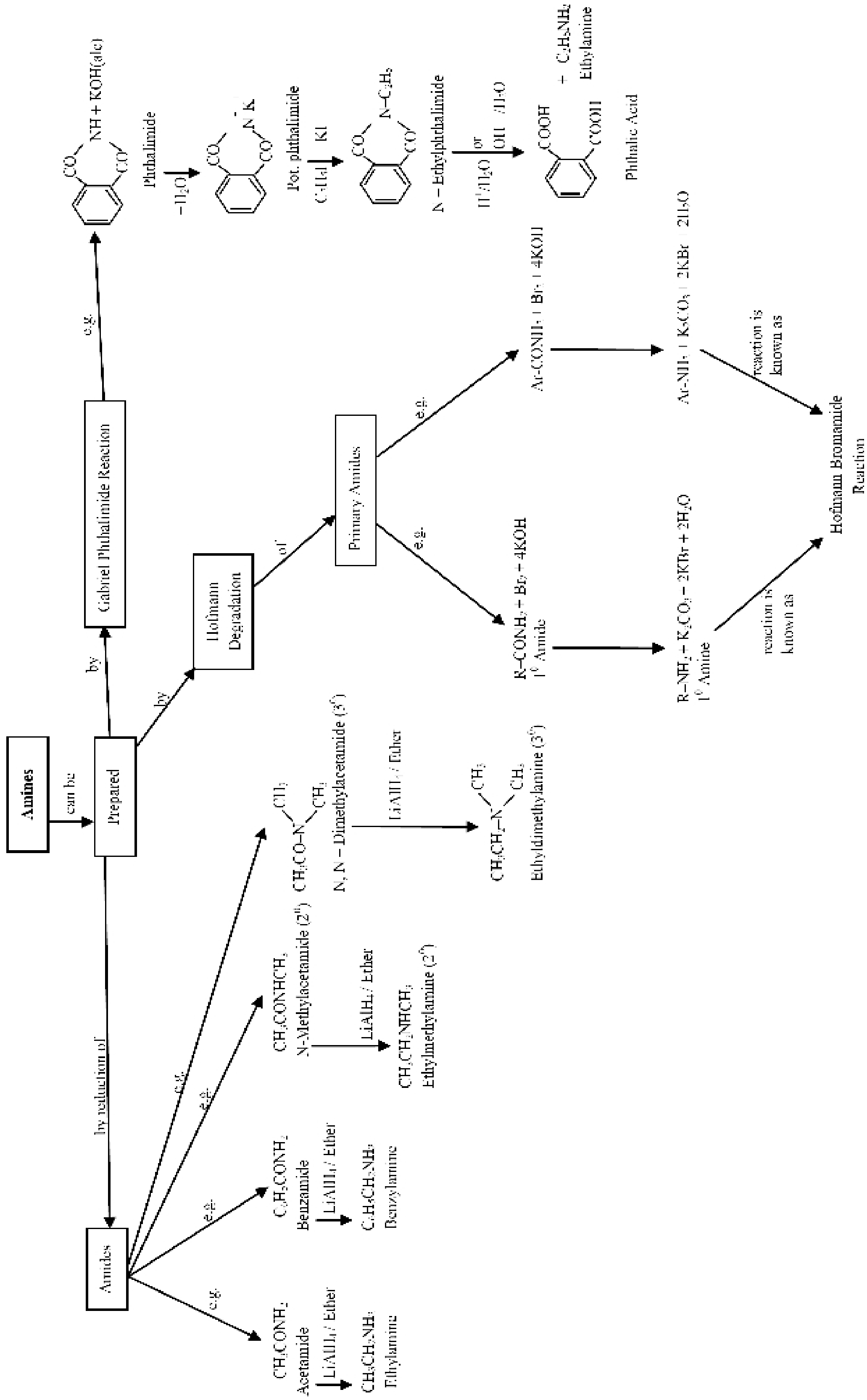

Amines
can be
Prepared
by reduction of
Amides
by
Gabriel Phthalimide Reaction
Hofmann Degradation
of
Primary Amides
e.g.
Acetamide
LiAlH4 / Ether
Ethylamine
Benzamide
Benzylamine
N-Methylacetamide (2°)
Ethylmethylamine (2°)
N, N – Dimethylacetamide (3°)
Ethyldimethylamine (3°)
Phthalimide
Pot. phthalimide
N – Ethylphthalimide
Phthalic Acid
Ethylamine
1° Amide
1° Amine
reaction is known as
Hofmann Bromamide Reaction

Fig-3

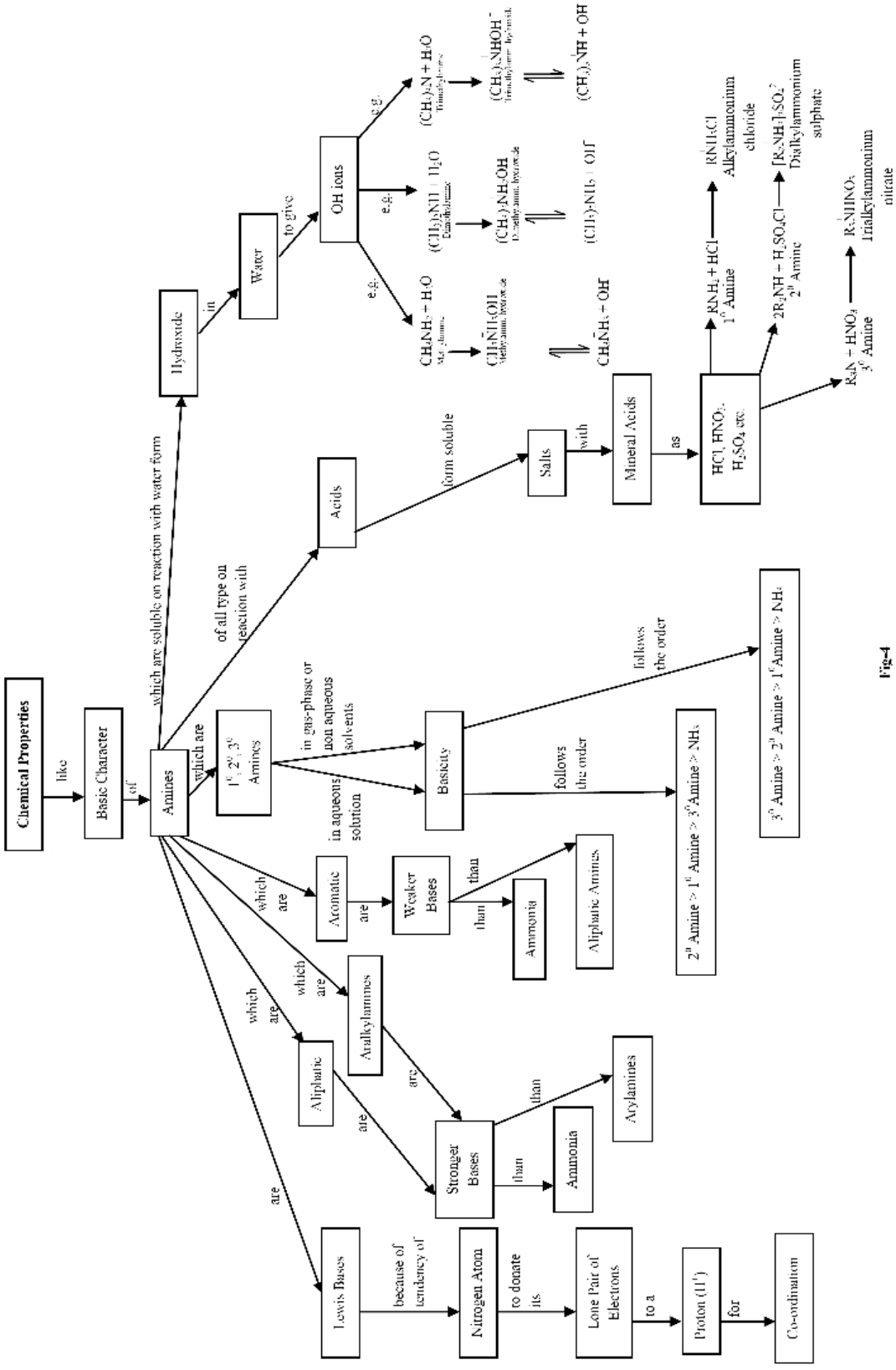

Chemical Properties
like
Basic Character
of
Amines
which are
1°, 2°, 3° Amines
which are soluble on reaction with water form
Hydroxide
in
Water
to give
OH ions
e.g.
e.g.
e.g.
of all type on reaction with
Acids
form soluble
Salts
with
Mineral Acids
as
HCl, HNO3, H2SO4 etc.
in gas-phase or non aqueous solvents
in aqueous solution
Basicity
follows the order
3° Amine > 2° Amine > 1° Amine > NH3
follows the order
2° Amine > 1° Amine > 3° Amine > NH3
which are
Aromatic
are
Weaker Bases
than
Ammonia
Aliphatic Amines
which are
Aralkylamines
which are
Aliphatic
are
Stronger Bases
than
Ammonia
Arylamines
are
Lewis Bases
because of tendency of
Nitrogen Atom
to donate its
Lone Pair of Electrons
to a
Proton (H+)
for
Co-ordination

Fig-4

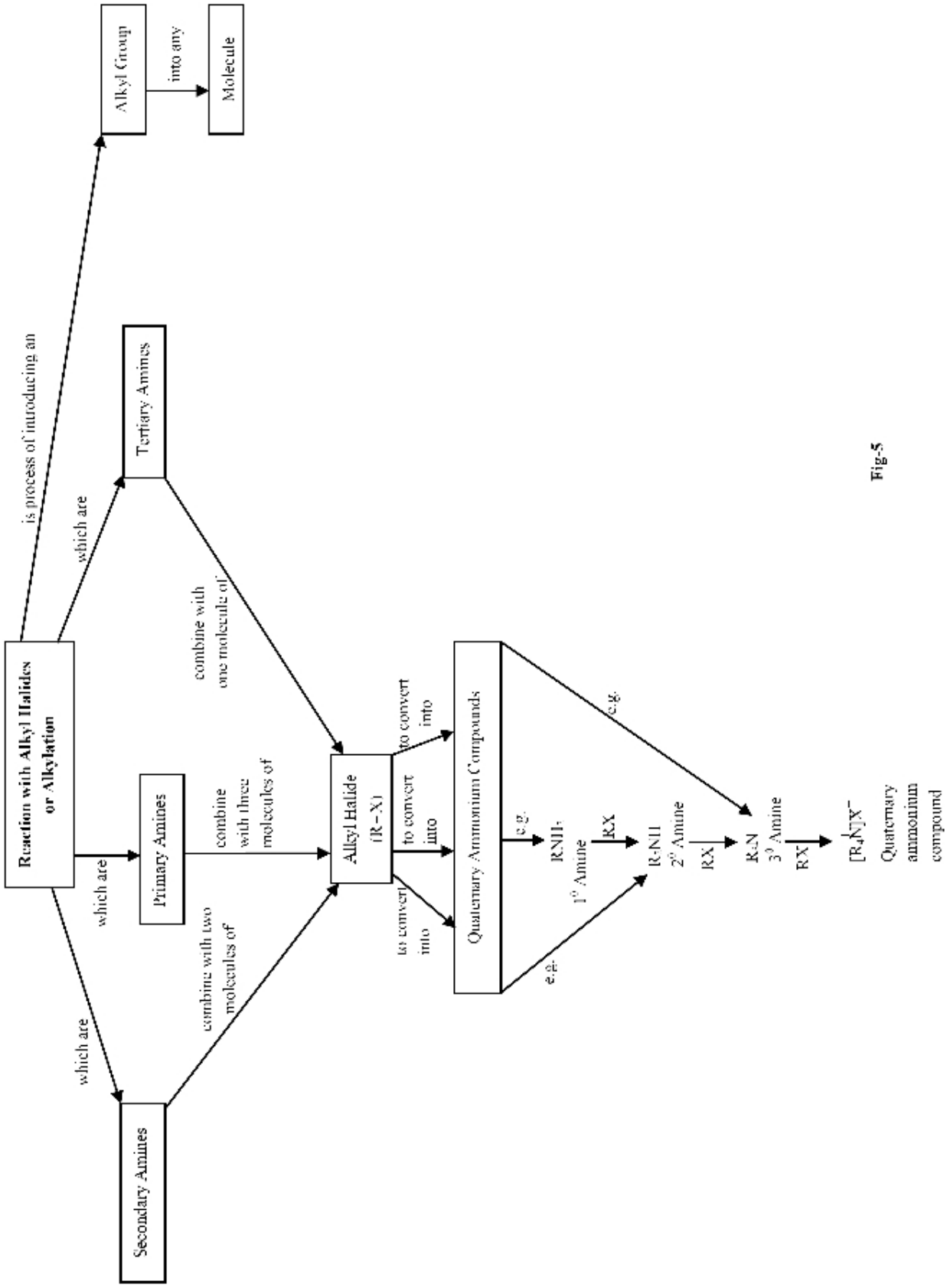

Reaction with Alkyl Halides or Alkylation
is process of introducing an
Alkyl Group
into any
Molecule
which are
Tertiary Amines
combine with one molecule of
which are
Primary Amines
combine with three molecules of
which are
Secondary Amines
combine with two molecules of
Alkyl Halide (R–X)
to convert into
to convert into
to convert into
Quaternary Ammonium Compounds
e.g.
RNH2
1° Amine
RX
R2NH
2° Amine
RX
R3N
3° Amine
RX
[R4N]X−
Quaternary ammonium compound
e.g.
e.g.

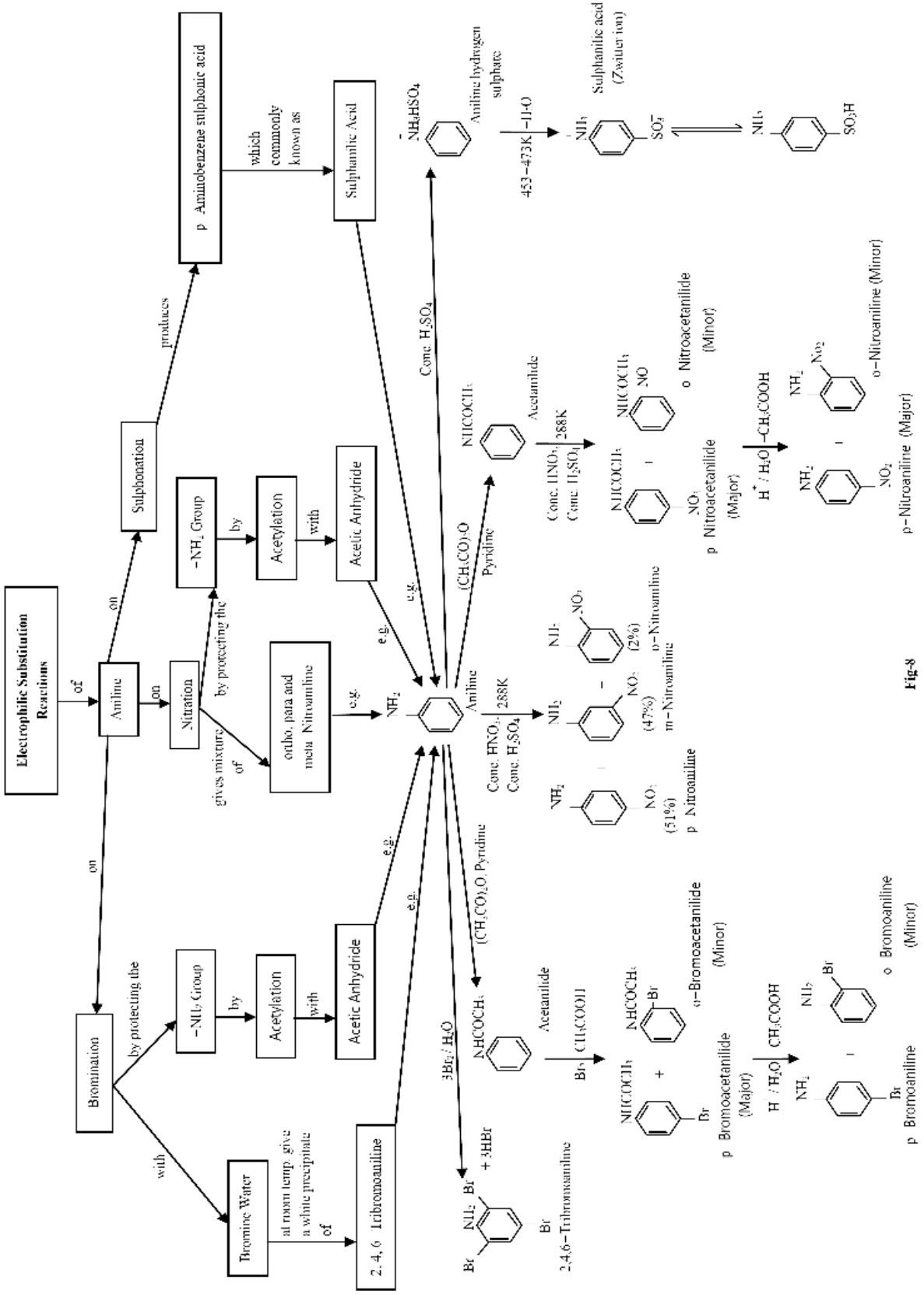
Fig-5

Acylation
is process of introducing an
Acyl group
R–C–
into any
Molecule
if
Benzyl Chloride
is used as an
Acylating Agent
process is called as
Benzoylation
with
Aromatic Amines
e.g.
Aniline
Benzoyl chloride
aq. NaOH
Benzanilide
with
Aliphatic Amines
e.g.
Methanamine
Benzoyl chloride
N–Methylbenzamide
Aromatic Amines
e.g.
Aniline
Acetyl chloride
Pyridine
Acetanilide
Aniline
Acetic anhydride
drop of Conc. H_2SO_4
on CH_3COOH
Acetanilide
if
Acetyl Chloride or Acetic Anhydride
is used as an
Acylating Agent
process is called as
Acetylation
with
Aliphatic Amines
e.g.
Ethylamine
Acetyl chloride
N–Ethylacetamide
e.g.
Diethylamine
Acetyl chloride
N, N–Diethylacetamide
e.g.
Ethylamine
Acetic anhydride
N–Ethylacetamide
Acetic acid
with
Aromatic Amines
e.g.
Aniline
drop of Conc. H_2SO_4
on CH_3COOH
Acetanilide

Fig-6

Reaction with Nitrous Acid
when
Aliphatic Primary Amines
Aromatic Primary Amines
Aliphatic Secondary Amines
Aromatic Secondary Amines
Aliphatic Tertiary Amines
Aromatic Tertiary Amines
react with cold solution of
Nitrous Acid
give
Alcohol
with quantitative evolution of
Nitrogen Gas
e.g.
$RNH_2 + HONO$
273 - 278K
$R-OH + N_2 + H_2O$
Alcohol
form
Arenediazonium Salts
e.g.
NH_2
$+ HNO_2 + HCl$
Aniline
273 - 278K
$N \equiv NCl^-$
$+ 2H_2O$
Benzenediazonium chloride
reaction is called as
Diazotisation
react with
give
N Nitrosoamines
which being insoluble in dilute
Mineral Acids
separate out as yellow oily compounds
e.g.
$(CH_3CH_2)_2NH + HONO$
Diethylamine
$((CH_3CH_2)_2N-N=O + H_2O$
N-Nitrosodiethylamine
(Yellow oil)
e.g.
CH_3
NH
$+ HONO$
N Methylaniline
CH_3
N-N=O
$+ H_2O$
N Nitroso N methylaniline
(Yellow oil)
react with
undergo
Nitrous Acid
form soluble
Nitrite Salts
e.g.
$(CH_3CH_2)_3N + HNO_2$
Triethylamine
$[(CH_3CH_2)_3NH^+]NO_2^-$
Triethylammonium nitrite
(Soluble)
Electrophilic Substitution Reaction
in the ring to form green coloured
p-Nitrosoamines
e.g
CH_3
N
CH_3
$+ HONO$
N,N Dimethylaniline
CH_3
N-N=O
CH_3
$+ H_2O$
p Nitroso N,N dimethylaniline
(Green)

Fig-7


Electrophilic Substitution Reactions
of
Aniline
on
Bromination
by protecting the
–NH2 Group
by
Acetylation
with
Acetic Anhydride
e.g.
p Bromoacetanilide (Major)
o Bromoacetanilide (Minor)
Bromine Water
at room temp. give a white precipitate of
2,4,6 Tribromoaniline
Nitration
by protecting the
gives mixture of
ortho, para and meta Nitroaniline
p Nitroaniline
m Nitroaniline
o Nitroaniline
p Nitroacetanilide (Major)
o Nitroacetanilide (Minor)
Sulphonation
produces
p Aminobenzene sulphonic acid
which commonly known as
Sulphanilic Acid
Aniline hydrogen sulphate
Sulphanilic acid (Zwitter ion)
Acetanilide
Pyridine
288K
453–473K
Fig-8

Reaction with Benzenesulphonyl Chloride or Hinsberg's Reagent
with
Primary Amines
form
N Alkylbenzenesulphonamide
which is soluble in KOH solution
SO2Cl + RNH2
1° Amine
Benzenesulphonyl chloride (Hinsberg Reagent)
SO2–NHR + HCl
N–Alkylbenzenesulphonamide (Soluble in KOH (aq.))
with
Secondary Amines
give
N, N–Dialkylbenzenesulphonamide
which is insoluble in KOH solution
SO2Cl + R2NH
2° Amine
Benzenesulphonyl chloride (Hinsberg Reagent)
SO2NR2 + HCl
N, N–Dialkylbenzenesulphonamide (Insoluble in KOH)
with
Tertiary Amines
give
No Reaction

Fig.9

Chemical Properties
reaction with Chloroform
reaction with Carbon Disulphide when
reaction with Grignard Reagents
when
Primary Amines
which are
Aliphatic
Aromatic
warmed with
heated with ethanolic
Carbon disulphide
and solid KOH
form
gives
Dithioalkylcarbamic Acids
N, N ' – Diphenylthiourea
which decomposed on heating with HgCl2 to give
which on treatment with Conc. HCl gives
Alkyl Isothiocyanates
Phenyl Isothiocyanate
which have smell like
Mustard Oil
e.g.
Secondary Amines
react with
Grignard Reagents
form
Alkanes
corresponding to
Alkyl Group
of Grignard Reagent
Chloroform
and an alcoholic solution of KOH produce
Isocyanides or Carbylamine
which have
Unpleasent Odour
when warmed with
Aniline
Phenyl isocyanide or Phenyl carbylamine
Carbylamine Reaction or Isocyanide Test
reaction is called as
Hoffmann Mustard Oil Reaction
Fig-10

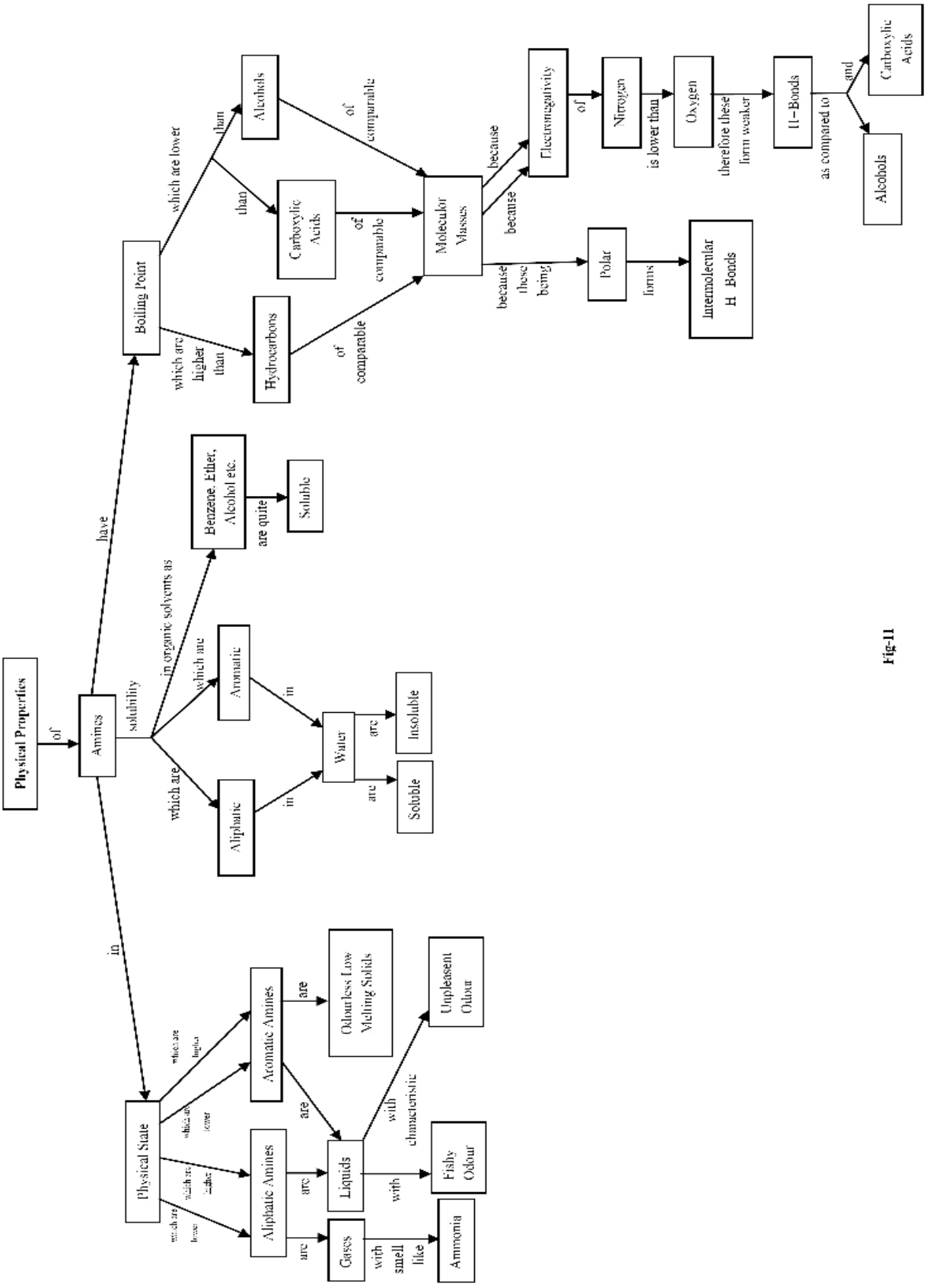

Physical Properties
of
Amines
have
Boiling Point
which are lower than
Alcohols
of comparable
than
Carboxylic Acids
of comparable
than
which are higher than
Hydrocarbons
of comparable
Molecular Masses
because
Electronegativity
of
Nitrogen
is lower than
Oxygen
therefore these form weaker
H-Bonds
as compared to
and
Carboxylic Acids
Alcohols
because
Polar
forms
Intermolecular H Bonds
because these being
solubility
in organic solvents as
Benzene, Ether, Alcohol etc.
are quite
Soluble
which are
Aromatic
in
Water
are
Insoluble
are
Soluble
which are
Aliphatic
in
in
Physical State
which are higher
Aromatic Amines
are
Odourless Low Melting Solids
which are lower
Aliphatic Amines
are
Liquids
with characteristic
Unpleasent Odour
with
Fishy Odour
which are lower
Gases
with smell like
Ammonia

Fig-11

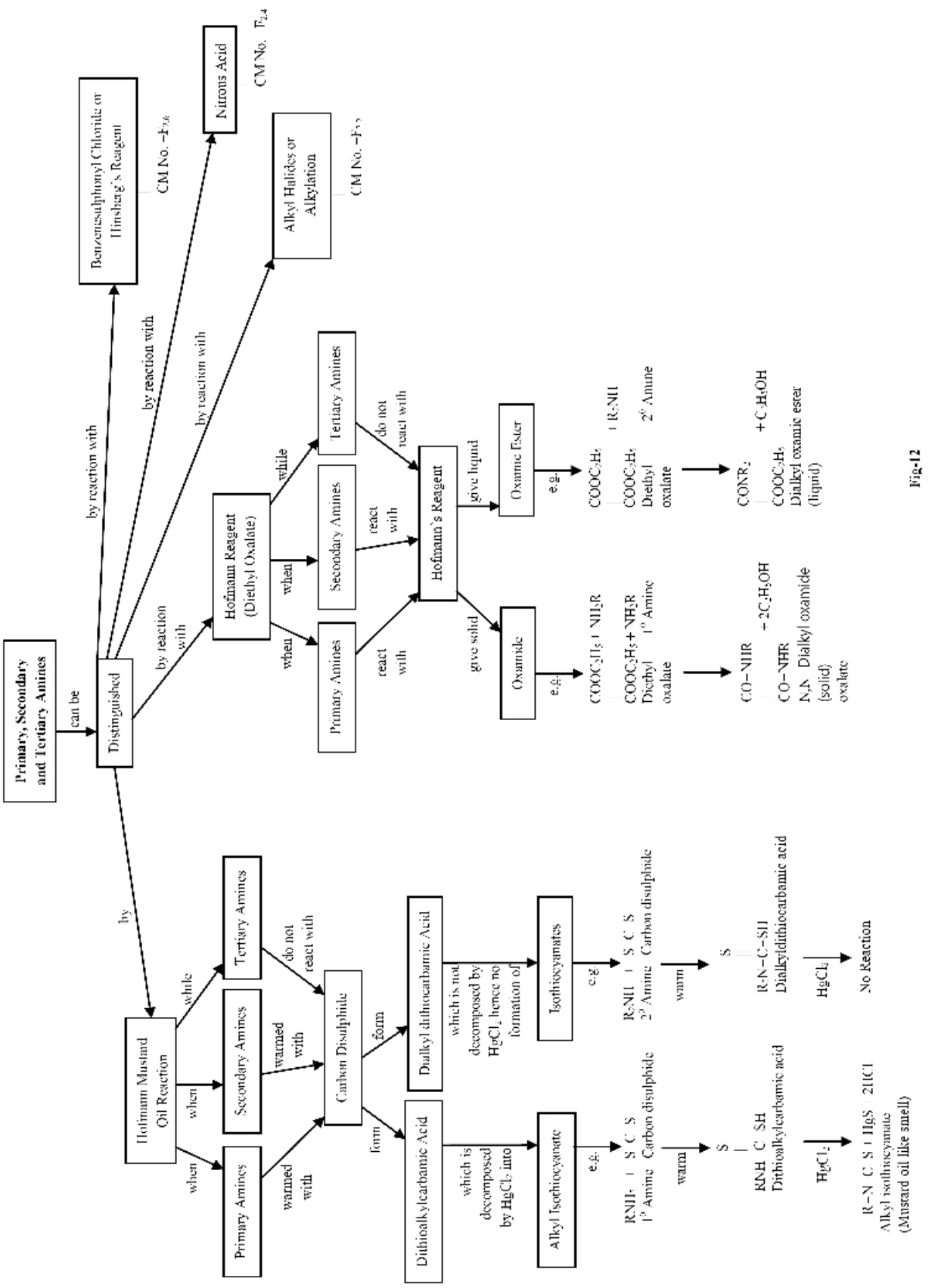

Primary, Secondary and Tertiary Amines
can be
Distinguished
by
by reaction with
by reaction with
by reaction with
by reaction with
Benzenesulphonyl Chloride or Hinsberg's Reagent
CM No. –F76
Nitrous Acid
CM No. F24
Alkyl Halides or Alkylation
CM No. –F55
Hofmann Reagent (Diethyl Oxalate)
when
when
when
while
Primary Amines
Secondary Amines
Tertiary Amines
react with
do not react with
Hofmann's Reagent
give solid
give liquid
Oxamide
Oxamic Ester
e.g.
COOC2H5
CONH2
COOC2H5
+ RNH2
COOC2H5
Diethyl oxalate
1° Amine
2° Amine
CONR2
+ C2H5OH
COOC2H5
Dialkyl oxamic ester (liquid)
CO–NHR
+ 2C2H5OH
CO–NHR
N,N Dialkyl oxamide (solid)
oxalate
Hofmann Mustard Oil Reaction
when
when
when
while
Primary Amines
Secondary Amines
Tertiary Amines
warmed with
warmed with
do not react with
Carbon Disulphide
form
form
Dithioalkylcarbamic Acid
which is decomposed by HgCl2 into
Dialkyl dithiocarbamic Acid
which is not decomposed by HgCl2 hence no formation of
Alkyl Isothiocyanate
Isothiocyanates
e.g.
e.g.
RNH2 + S C S
1° Amine Carbon disulphide
warm
S
RNH C SH
Dithioalkylcarbamic acid
HgCl2
R–N C S + HgS + 2HCl
Alkyl isothiocyanate
(Mustard oil like smell)
R2NH + S C S
2° Amine Carbon disulphide
warm
S
R2N–C–SH
Dialkyldithiocarbamic acid
HgCl2
No Reaction

Fig-12

Conclusion

In the teaching learning process of Organic Chemistry, the use of concept maps as teaching strategy is useful for the students as well as the teachers. The procedure adopted for teaching through concept maps ensures that the mental map of a concept is built gradually in the minds of the students by their contribution and not imposed upon them. During the construction of Concept maps, difficult concepts can be clarified and can be arranged in a systematic order. Concept maps can reinforce students' understanding and learning by the visualization of key concepts and the inter-relationships of subordinate concepts. Concept maps help in retention of concepts to a large extent.

Concept mapping in teaching helps teachers to be more aware of the key concepts and relationship among them. This helps teachers to convey a clear general picture of the topics along with the different properties, reactions and inter-related concepts with emphasis on their relationships. By doing so, it is less likely to miss and misinterpret any important concept.

It can also assist teachers in evaluating the process of teaching. They can assess the students' achievement by identifying misconceptions and missing concepts. Students' achievement can also be tested or examined by Concept mapping. An efficient use of Concept maps in teaching learning of Organic Chemistry will go a long way in overcoming the misconceptions and popularization the subject and result in more effective lessons.

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PREPAREDNESS OF STUDENTS IN FIRST YEAR MATHEMATICS: IMPORTANCE OF PLACING THE FOCUS AND RESPONSIBILITY OF LEARNING ON STUDENTS

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ABSTRACT

Australia is presently experiencing a decline in student numbers in higher mathematics courses. It is then critical to address some fundamental issues affecting the learners in mathematics classrooms. Observations of high schools students and new university entrants to first year mathematics show that students are not being prepared for learning itself or for learning environments generally; let alone for mathematics learning environments. The author's in class observations over years show that students fail to actively take part in learning voluntarily; or even fail to motivate themselves even when " gently pushed" by teachers. The non-learners tend to become a burden for high school teachers to manage and when teachers themselves are not mathematically prepared the problem becomes harder. The dealing of management issues leaves less teaching time to teach mathematics or provide sufficient help to those who are prepared to extend their learning of math. There should be more research to detail the loss in "teaching time" in classrooms for this may be significant. This paper addresses "student preparedness" in the first year mathematics by examining self-directed approaches to learning and determination to succeed. The results show that student preparedness is an important factor in success. This preparedness issue in learning is a great challenge for all; in particular, for parents, carers, early, primary and high school and tertiary institutions. It is critical for researchers to address student preparedness variables in classroom contexts to investigate their effect in the learning of mathematics and indeed in student education more generally.

Key words: student preparedness, first year mathematics, strategies for mathematics learning environments, multivariate methods

Reflection on learning environments

The situation concerning mathematics learning in Australia does not appear to be satisfactory given that undergraduate students continue to choose degree options away from those with significant amount of mathematics (Chinnapan et al, 2007; Rubinstein, 2011). This situation is not only noted in the universities but also in high schools where fewer numbers of students are now undertaking math C for example (Queensland, Australia) (Wright, 2007). Chinnapan et al (2007) identified a number of difficulties concerning the learning of mathematics in Australia such as: lack of quality and qualified teachers, inadequate primary teaching of mathematics and science, lack of access to advanced high school mathematics courses, lack of appropriate university prerequisites, lack of understanding of the role of mathematics including a decline in student doing higher math. Others such as Britain, US and Ireland also appear to be battling similar issues (Hong et al, 2009). Clearly, there are problems in the teaching and learning of mathematics including inappropriate beliefs and attitudes towards the importance of mathematics itself, but the author believes that the causes are more closely related to student variables in" learning environments" generally; and more particularly, to the level of student self "preparedness" for learning environments (Frey, 2010).

There has been years of research on teacher related variables (Hong et al, 2009) with clear benefits but equally important is to search for answers in the assessment of the learner themselves - 'student preparedness related variables'; for example, the makeup of the 'modern student' needs to understood better (Higgins et al, 2010). In class observations show some disconnect in the modern learning environments. Students tend to be rather inactive and potentially disengaged learners in classrooms. The key attributes, characteristics and behaviours during learning contexts need to be understood better and only then instructors may begin to instil long term learning skill and attributes useful for lifelong learning.

In this paper, the author explores mathematics learning in tertiary studies, particularly focusing on the student preparedness in higher mathematical studies. The levels of preparedness of students in mathematics learning environments are examined in terms of overall performance using multivariate methods. The reflective and qualitative analyses are also undertaken based on observations, student interviews and indeed the author's work in the field of tertiary lecturing to all levels over three universities. In terms of self-determination and preparedness variables, tertiary institutions appear to be important field sites where student preparedness for learning and intrinsic motivations may be assessed. Essentially, students are expected to be self-prepared, motivated and self-directed regarding their investments of time and/or engagement; and in choosing approaches to learning unlike high schools where work is more directed. In this manner, tertiary institutions are where one can test or at least observe, given years of early and high school learning and instruction, the levels of "preparedness".

Research on learner preparation and its assessment

There have been rather few studies into preparedness of tertiary students (Albion et al, 2010; Wilkes, 2010). Such work mostly concerns content preparedness or and teacher preparations such as improving content delivery and methods of teaching. Biggs (1996) stated that learning approaches are not intrinsic characteristics of students but rather the learning environment influences the process; prior experiences, motives and intentions influence learning. Inherently, this suggests separate preparations for learning itself; that is, student needs to learn about learning itself and acquisition of expertise. Byrne and Flood (2005) found that students entered university because of a mixture of intrinsic and extrinsic goals and had positive expectations of tertiary studies. Yet around 25% lacked confidence and did not believe they would succeed. Students expected lower levels of work commitments at tertiary level when research shows time and effort invested often determine success. Byrne and Flood (2005) suggested further study regarding the influence of motives, preparedness and expectations. The authors noted that intrinsic motivations lead to deeper learning while surface type understanding is connected to extrinsically motivated learning. However, Byrne and Flood argued that more study on motives, preparedness, or learning approaches are needed to determine which factor or factors lead to deeper learning and are related to academic performance. It appears that self-assessment ability aids in one becoming a 'mature and progressing' learner (Yorke, 2001). Byrne and Flood (2005) concluded that a better understanding of the factors that influence students' assessments of their capabilities is needed.

Factors such as willingness to learn, developing a want to learn and more importantly, making an active decision to learn or to become a learner in a learning environment appear critical. Being prepared for learning involves active engagement that requires one to self-develop strategies on how to be a prepared student. Most students believe that the essence of studying is to "pass a test or exam"; although an important factor, it is argued that for a prepared learner this is not only what learning is about. Preparedness includes self-derived efforts to conduct concentrated and 'independent study' in and outside of learning environments.

The account of the preparedness of the learners may be noted in the early work of Sternberg's (1996) triarchic theory of intellectual abilities (TTIA) and the mental self-government (TMSG). In his framework, thinking styles, biographical information and past achievement help predict academic performance. Sternberg argues that student learning and thinking style together with ability levels are important. TMSG is related to the nature of thinking styles providing individuals their preference of thinking patterns, while the TTIA focuses on the ability itself. In essence, TMSG refers to different thinking styles that dictate the preference in the use of abilities. Sternberg also defined the concept of 'successful intelligence' as an alternative to IQ that includes a number of characteristics such as whether students: know their strengths and weaknesses, are goal setters, are highly motivated, are able to follow through with promises made, are high in self efficacy, know the problems that needs addressing and whether students can translate their thoughts to actions to achieve real world achievements. A number of these are noted in student preparedness variables. The preferences of thinking styles can be guided by preparedness for learning environments and this may be in turn based on biographical information (Sternberg, 2001).

The process of quantifying and monitoring important affective factors or indeed assessing the nature of the role they play in mathematics is not an easy task(Byrne and Flood, 2005; Kelson and Tularam, 1998; Tularam and Kelson, 1998; Tularam 1998). M*athematical self-concepts* and *intrinsic motivations* tend to be the two main interest areas in which less work appears on understanding student preparedness for learning environments itself, their *willingness to study mathematics* or their *approaches to learning when in classroom full of students; whether students optimize learning opportunities*. The self-concept includes mathematics talent, confidence, self-efficacy, and anxiety; while student interest, enjoyment, intellectual stimulation, reward for effort, valuing mathematics, diligence relate to motivational factors. Carmichael & Taylor (2005) note the factors such as *confidence, motivation, and engagements* are often used with without clarifications. Bandura (2005) has argued for the stricter definitions of *self-concept, confidence,* and *self-efficacy* are needed. A learner may be confident within one part of the content while not in another within the same course content thus an overall measure is the meaningless. A student may have high level of self-efficacy (attribution of failure to changeable factors) for finding the derivative of a polynomial but a low level for a cubic. The assessment will need extra data regarding preparedness for learning, self-determination or *willingness to self- study mathematics and so on*.

It is true that preparedness for learning can be based on beliefs, norms and values held in cultures. Kennedy (2002) says: 'often researchers suggest that for example the Chinese learners have to be weaned off 'inferior' or 'old-fashioned' modes of learning onto 'deeper' ways of understanding. Cort[a]zzi and [Jin]cautions against such cultural imperialism: 'there is no reason to suppose that oneculture of learning is superior to another . . . this needs to be kept in mind when teaching methodologies migrate around the world' (1996: 174). In fact, a better understanding of such 'Chinese learning styles' as 'deep memorization', collaborative group learning (Kember 2000) and the pastoral role teachers play outside the classroom (Pratt et al, 1999) could well benefit the Western learner' (p. 442). Clearly, students from Singapore, Hong Kong, China, China Taipei and Japan do extremely well in mathematics tests; not only recalling of facts and routine problems but also in non-routine, reasoning and problem solving domains. However, this aspect willbe addressed in another paper.This study examines the relationship between preparedness and performance by examining over the semester performances of the first year environmental undergraduate mathematics in Australia.

The study - qualitative and quantitative methods

This study is of a reflective nature concerning tertiary students but also includes high school

class observations conducted over 5 years. More particularly, this study concerns the first year mathematics students selected for the environmental sciences major students from three different schools. The tertiary student marks from various instruments and tests during semesters have been used in this study. The tests included the solving of both routine and non-routine as well as research type problems. The other assessments included 'attendance and input level marks (12%)'; as determined by tutors who interacted with the same students for 13 weeks in a one to one manner. Observations and measures from 6 one hour sessions per week of workshop conducted by the lecturer-optional but available for students who needed help. The workshop attendance was recorded weekly while the lecture attendance recording was random(20). The attendance to tutorials, workshops and lectures all provided an insight into voluntary efforts made by students when in learning environments. The mid semester test (30%) examined knowledge gained during semester (6-7 weeks); while the final exam of (40%) was deemed to be a measure of overall achievement (15 -17 weeks from the start).

Students developed an A4 focus learning sheet instrument (one for each exam). This sheet facilitated qualitative assessment demonstrating the level of preparedness for exams in terms of organisation of sheets; that is, whether focus was on concepts, rules, examples, level of detail, and whether the sheet was utilized in an efficient manner. Student determination to succeed, level of attention to detail, including their learning strategies could be exposed in such writing. Student revision and learning strategies were examined over 5 years of focus sheet analysis for certain groups of students: four sheets each form High ($x > 85\%$), Medium ($75\% < x < 55\%$), and Low ($x < 35\%$).

The dataset of 80-120 students yearly was analysed also using multivariate methods to understand significant relationships. This process was followed by partial least squares regression (PLS) to analyse the correlated data. The detailed solutions of problem sets and student attendance to lectures, workshops and tutorial related to students' preparedness: self-motivated effort, independent efforts and general preparedness for attending learning sessions. Student preparation for the mid semester was also critical for the lecturer could examine sustained efforts; that is to maintain work levels to achieve. Proxy measures of such type have been used in the past; for example, Bahr et al. (2004) relied on demographic variable as a rough proxy measure for academic preparedness (a synthesized college-level indicator for the average academic preparedness). Palmer et al. (2011) studiedpersonal and dispositional characteristics, achievement motivation, conscientiousness, academic discipline and commitment to study for success at university, by means of interviews, portfolios, essays, reports and evidence of extra-curricular activities. Therefore, personal and dispositional characteristics, were examined through observations and interviews during workshops, lectures and tutorials during the semester and before after exam periods. This study investigated the influence of marks attained in the three (Problem sets, Attendance and input to tutorials, and Mid-semester) to final/total mark in a similar manner to Hemmings (2011), who used the multiple regression (MR) analyses showing a test state-wide test explained much of the variance in examinations. Also, Stols and Kriek, (2011) used stepwise regression to identify the critical predictors and verified the results using partial least squares.

Main objectives and research design

The overall objective of this paper was to examine the relationship between student preparedness variables and performance in first year mathematics in environmental sciences; that is, the relationship between student preparedness to learn and successful performance in both qualitative and quantitative manner. The preparedness to learn variable measure was determined via the examination of a number of measures such as students attempts to contact lecturers and tutors

outside of normal time, time and effort invested in solving problems set during the semester, level of attendance at tutorials and lectures, and performance in mid-semester test. The information gathered helped determine the overall level of active persistence and effort during the semester. Student focus sheets were also examined to better understand the student focus of work and nature of investment in the course. Each of these aspects above was examined in light of final performance in the course as well as together using multiple and partial least squares regression (PLS).

A sample of 90 students was examined over 5 years from the first year mathematics course. The students work analyzed in detail in terms of the above objectives using statistical methods such as multiple and partial regression techniques. However, clinical interviews were conducted with 10 students per year with regard to the objectives mentioned. Also, 30 student focus sheets were examined yearly with the sheets labeled, high low and medium with regards to student revision and learning strategies. Finally, three different types of high school classrooms were visited over 5 years to observe year 12 students who were soon intending to attend university or tertiary level work to understand prior learning before attending university. Ad hoc notes were taken with regards to the level of student investment in productive work as well as their attitudes towards teachers and students in mathematics classrooms when required to do mathematical work.

More specifically, the first objective of the study was to study the relationships between problem set, attendance and mid semester efforts to overall performance by studying correlations and partial correlations; the second objective was to study the level of student self-direction, determination to learn, independent work attitude, attendance, and effort during the semester by examining student tutorial efforts and the work presented in focus sheets; the third objective was to conduct interviews to study in more depth and examine students' beliefs about learning mathematics as well as to gather data to further verify the level of self-determination and motivation to succeed in order to determine whether higher effort was placed throughout rather than close to assessment periods.

Results

The correlations among the assessments items are presented in Table 1. The problem set, attendance, mid semester are correlated with each other and with the final. The stepwise MR analysis selects problem set and mid semester as the main predictors while attendance factor is eliminated due to collinearity. Both variables were investigated further and the two models found were significant(Table 2 and 3); suggesting much of the variance in the final score may be explained by the student preparedness variables. 'Probset' in which the well-researched and detailed solutions attained higher problem scores; self-determined efforts to attend lectures, workshops and tutorials to obtain help to gain a better understanding were related to the 'Attend' - attendance and self-motivated input variable; and finally, maintaining sustained effort to succeed over the months in a semester in an effort score better in the mid semester concerned the 'Mid' variable.

Table 1: Correlations between assessment variables with *p* values (* 0.01)

	Probset	Attend	Mid	Final
Probset	1			
Attend	0.74*	1		
Mid	0.59*	0.41*	1	
Final	0.67*	0.45*	0.73*	1

Table 2: Multivariate regression model 1 with problem set and mid semester

Model 1	Coeff	Beta	Sig
Const	-8.744		.005
Mid	0.877	0.508	.000
Probset	1.084	0.368	.000

Table 3: Multivariate regression model 1 with attendance and mid semester

Model 2	Coeff.	Beta	Sig.
Const	-6.435		.083
Attend	0.808	0.183	.022
Mid	1.125	0.652	.000

Table 2 shows that Model 1 involves problem set and mid semester as the main predictors while Table 3 shows Model 2 with attendance and mid semester variables being regressed with final. Both models give strong R2 values of 0.62 and 0.56 respectively; when attend alone is regressed with final an R2 of 0.45 was noted; almost half of the variance in the final mark explained by attendance variable.

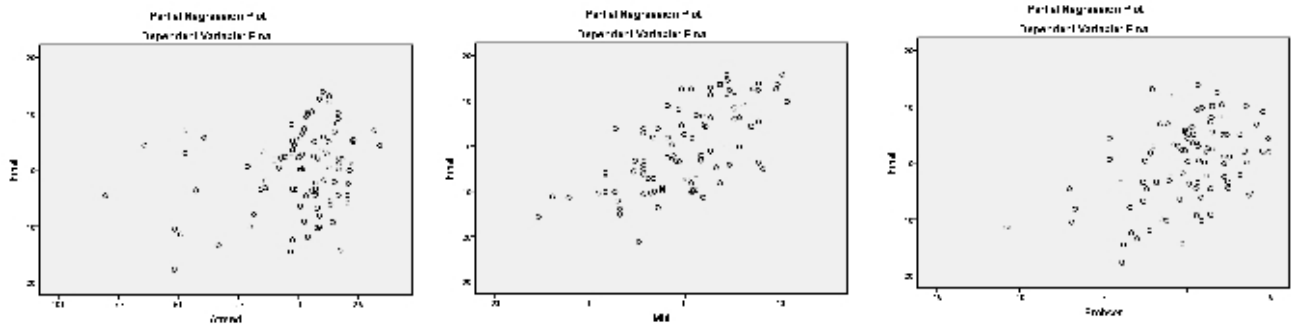

Figure 1: Partial regression plots of Probset, Attend and Mid with Final

Figure 1 shows the clear trends in each variable when partially regressed. The variance inflation factor (VIF)confirmed in both cases that no serious collinearities in the two models.

Further analysis using the partial least squares (PLS) with the final mark as the dependent led to the following model equation with significant coefficients:

$$\text{Final} = -14.32 + 1.32*\text{ProbSet} + 0.36*\text{Attendance} + 0.71*\text{Mid} \quad (1)$$

Figure 2 shows about 60% of the variation was explained using PLS with final. Figure 2 shows the percentage of variance explained by each of the scores reported and model fit. The student preparedness factors were found to be significant and the model predicted the final score with someaccuracy. Table 4 shows problem set explained most of the variance followed by attendance and mid semester scores. PLS components explained around 76%, 20% and 3% respectively with each component relating to problem set, attendance and mid semester performances in term of the final. Thus, suggesting student preparedness led to higher level of strategic inputs throughout the semester.

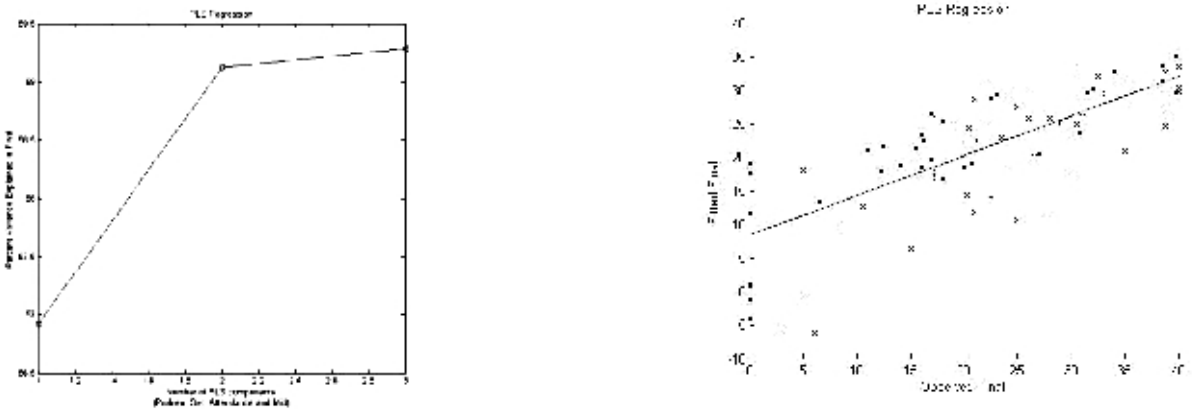

Figure2: PLS regression – percentage variance explained and model fit

Table 4: Percentage of variance explained in PLS results

PLS Model	Percent Variance Explained		
	Problem Set	Attendance	Mid
PLS Comp	0.762	0.207	0.0308
Final	0.5692	0.022	0.00161

Summary of qualitative analyses

Both types of analyses highlighted the importance of problem set and attendance being strongly correlated and that problem set and mid semester were major contributors. The students who demonstrated self-direction, determination to learn, independent work attitude, high attendance, high effort and sustained work towards mid-semester scores and final, performed well. The level of self-determination and motivation to succeed seemed to determine whether higher effort was placed throughout rather than close to assessment periods. High level of students' self-belief was noted in successful students; positive belief in ability to successfully complete and attribution to effort were important. Those who believed that they were not good at math and the work was not in their capability indeed performed lowly; and even when they passed, their mark was only a lower level pass mark; while those who believed they were lowly but capable appeared to strategically place their efforts in the areas of weaknesses and actively sought help; performed rather well in the final. This relates to what Sternberg (1996, 2001) labelled 'successful intelligence'. Some realised the critical factors for success and developed strategies to cope; importantly, successful students knew they had to translate their strategies into actions and this was evidenced in effort, motivations, and interest developed to perform well. The high "preparedness" type students were determined to plan strategies to direct their learning and effort and this led to their success. In the main,thesestudents learned with persistence and diligence even when they had lower prior mathematics levels (see also Table 5). It is to be noted that 20% withdrew and about the samefailed in the course in 2011; the average failure rate is around 17%. Over the years, students who failed this course were insufficiently 'prepared for learning environments'.

Discussion and Conclusion

Although Sternberg (2001) advocates that teachers ought to allow for individual learning and cognitive styles in teaching to maintain student learning at efficient levels, Kennedy (2002) argued there were many styles; he noted that students from different learning styles and methods can

perform equally well in other learning environments. The self-motivated and prepared learners appear to include the novel styles if they enhance their learning. It has been argued that Chinese learning is based on memory modes of learning rather than the so called deeper ways of understanding. However as noted earlier, Cortazziand Jin (1996) cautions against such cultural imperialism. Kennedy argued that Chinese learning is much more than simply memorization but rather, a deeper and comprehensive type of connective learning; therefore, this method of learning should not be discarded as unrelated to deep learning. Rather, the learning has been referred to as 'deep memorization' – followed by repeated reflections conducted over time. More importantly, Kennedy noted that Chinese teachers play a "wisdomic" care role outside of classroom learning (not while math content is being learned); that is they identify difficulties of students and address them outside of class in a pastoral care type session strategies (Kember 2000; Pratt et al, 1999). This may be a type of opportunity our schools could use as a way of teaching students learning and preparedness related factors for early learners that ultimately will help them become amply prepared for any learning environment; that is, passing on critical ideas or instilling "student preparedness "virtues for learning environments. Of course, pastoral care occurs in Australia, but often there is barely enough time for the marking of attendance rather than actively engaging in perhaps in imparting any deeper learning. Tertiary institutions should also include preparedness for learning sessions during within their orientation programs. Clearly, remedial sessions are routinely held but not student preparations for study environments. The idea of lifelong learning is now accepted and given that students are entering universities from a diverse set of backgrounds, universities should prepare students for learning environments.

It is noted earlier that Hong Kong students of ten attribute their academic success to effort rather than to ability (Kennedy, 2002) and this way of thinking allows them to become prepared learners in that the students actively search for ways of improving performance. In contrast, many Australia and NZ students attribute their failure or success to their parents' lower levels, their genes, and intelligences and so on; high schools students see higher performers as highly gifted students; in essence, these are often things they cannot change. However, within this study some students who were identified as well prepared for learning students progressively increased their effort and determination applying learning strategies that led to success in the end. Hence, some minimal level of motivation and determination is needed to deal with novel or non-routine tasks or else participation in learning appears limited.

The results together show the importance of student preparedness in overall performance but there is a need for more research into the level of 'student preparedness' for learning environments in actual classroom contexts. It is clear that student preparedness is critical to success - the nature of approaches taken, strategies developed much earlier in the semester with a determination to perform throughout the semester, students placed more effort to complete independent tasks and attended as many tutorials and workshops as needed to gain a better understanding; in an aim to better their overall performance (10 students wanted to learn for leaning sake and were happy to continue even when they failed course). The importance of the strategies and approaches to learning including investment of time and effort in learning environments to comprehend ideas and concepts during learning was related to success. The learning aspect is aptly noted in Claxton (1998): "Learning also comes from 'emotional intelligence', imaginative insight or after a period of rumination when the 'metaphorical apple falls on the prepared mind' (Claxton, 1998: 67); and importantly, the learner preparedness aspect is concisely summarized in "Learning to *be* is as important as learning to *do*"(Kennedy, 2002, p 437). Other countries including the US realizes that "Advancements in technology usually lead to expanding applications of mathematics, and more workers with knowledge of mathematics will be required in the future." Moreover, the US departments note that

both industry and government will continue to hire mathematicians in future (US Bureau of Labor Statistics, 2011). If Australia and NZ are to be competitive, they should both realize the significance of improving mathematics education.

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SIBLING CONFIGURATION AFFECTING EDUCATIONAL ATTAINMENT: AN EXPLANATION BY CONFLUENCE MODEL AND RESOURCE DILUTION HYPOTHESIS

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ABSTRACT

This paper discusses the effect of sibling configuration on educational attainment and their possible respective explanation by Confluence Model (CM) and Resource Dilution Hypothesis Model (RDH). Studies on family background often explain the negative effect of sibship size on educational attainment by one of the two theories: the Confluence Model or the Resource Dilution Hypothesis. However, as both theories – for substantively different reasons – predict that sibship size should have a negative effect on educational attainment. Most studies cannot distinguish empirically between the CM and the RDH. In this paper the author discusses the different theoretical predictions in the CM and RDH on the role of cognitive ability as a partial or complete mediator of the sibship size effect to identify a unique RDH effect on educational attainment.

Key words: Family background, Educational attainment, Sibship size, Confluence Model, Resource Dilution Hypothesis.

Introduction

Sibship (i.e. a group of children of the same parents) size, also referred to as the number of siblings, is often studied as a determinant of children's schooling. This study focuses on two theoretical models that explain the impact of sibling configuration (i.e. sibship size, birth order position, and spacing between children) on educational attainment of the children. The way children are raised has been of interest for social and behavioural scientists for several years. Most scientists agree that environmental factors may be important for children's cognitive development (e.g. Bussey & Bandura, 1999; Fischer & Bidell, 1998; Gibson & Pick, 2000; Siegler, 1998; Vygotsky, 1986). Several scholars (e.g. Brackbill & Nichols, 1982; Scarr, & Weinberg, 1977; Retherford & Sewell, 1991; Zajonc & Bargh, 1980) have been involved in exploring the relationship between the configuration of siblings and performance on various measures of intelligence.

Sibship Size and Educational Attainment

In many studies, it has been shown that the size of the family in which children grow having many siblings is found to be detrimental to one's educational and, consequently, occupational opportunities. One of the most robust findings in the literature on family background and educational outcomes is that sibship size is negatively associated with children's intellectual and educational outcomes. In fact, among the sibship characteristics typically studied in the literature are: sibship size, birth order, birth spacing, and sibship sex composition. Only the negative relationship between sibship size and intellectual and educational outcomes has been consistently reproduced over time (e.g. Cicirelli, 1978; Ernst and Angst, 1983; Steelman et al., 2002). However, Mare (1980) found that the negative effect of size of sibship diminished in later educational transitions and that, given graduation from college, there was no relationship between size of sibship and post college attendance.

Two theoretical models are often used to explain this phenomenon: The Confluence Model (CM) and the Resource Dilution Hypothesis (RDH). The CM, originating in psychology, argues that the primary channel through which sibship size has a negative effect on children's educational success is through the creation of an inferior intellectual environment in families with many children (Zajonc and Markus, 1975). In contrast, the RDH, originating in sociology and demographics, argues that the increasing dilution in large families of parents' resources: economic, social, emotional, interpersonal etc. is the reason why children with many siblings obtain less education than children with few siblings (e.g. Blake, 1981, 1989; Downey, 1995, 2001).

There is an ongoing debate in literature on whether the CM or the RDH offers the more correct interpretation of the empirical regularity that sibship size is negatively correlated with children's intellectual and educational outcomes (e.g. Retherford and Sewell, 1991; Downey, 2001; Steelman et al., 2002). The major problem in this debate is that at face value findings from most empirical studies are equally consistent with the predictions from both the CM and the RDH. There is a large literature documenting that sibship size is negatively correlated with children's intellectual ability (e.g. Cicirelli, 1978; Steelman, 1985; Steelman et al., 2002). Furthermore, many studies also find that sibship size is negatively correlated with final educational attainment (e.g. Conley, 2000; Steelman et al., 2002; Sandefur et al., 2006).

Is it possible to distinguish empirically between the CM and the RDH when analyzing the effect of sibship size on educational attainment? In this paper the author uses a key theoretical difference between the CM and the RDH with respect to the role of cognitive ability as a partial or complete mediator of the sibship size effect to distinguish between the two theories. According to the CM, low cognitive ability caused by being raised in an intellectually poor environment is the principal reason why children from large families end up with less education than children from small families. By contrast, the RDH offers a more comprehensive explanation in which strains on several types of parental resources, and not just strains affecting cognitive ability, is the reason why sibship size has a negative impact effect on educational attainment. This difference between the two theories has important empirical implications because, according to the CM, the negative effect on sibship size runs *exclusively* through cognitive ability whereas, according to the RDH, there should be an *additional* negative effect of sibship size on educational attainment.

Birth Order and Educational Attainment

Different theories predict a significant effect of birth order on future educational and economic achievements. An important model in the psychological literature is the confluence model, which is discussed by Zajonc (1976). The confluence model predicts the intellectual growth of a child to depend on its intellectual environment, whereby the intellectual environment is defined as a function of the average of the absolute intellectual levels of its family members. A first child enters an environment with two adult parents, so the average intellectual level is high. A second born enters a lower intellectual environment than the first-born, because his older sibling is part of the intellectual environment, and decreases the average intellectual level. A third child enters an even lower intellectual environment than the second born because of two older siblings etc. Since the intellectual environment declines with birth order, this model predicts a negative relation between birth order and educational attainment. Zajonc however stresses the effect of child- spacing, the larger the age gap between two siblings the smaller is the difference between the two children in their intellectual environment, and the smaller is the effect of birth order.

Empirical studies have found different effects of birth order. Kantarevic and Mechoulan (2006) use the Panel Study of Income Dynamics and find that first-born children have a significantly higher

educational attainment. They also estimate birth order effects by family size but due to small sample sizes the estimates become imprecise for larger families. Belmont and Marolla (1973) examine, next to the effect of family size, the effect of birth order for given family sizes. They find a steady decline in the average score on a military examination with birth order. Blake (1981) also examines the effect of birth order and does not find a systematic difference in educational attainment between first and last born, and middle born children.

Birth Spacing and Educational Attainment

Much of the previous research on birth spacing comes from the medical literature, where the focus is on the effects of conceiving soon after a previous birth. However social scientists have also been interested in the effects of birth spacing. Building on a confluence model presented by Zajonc and Markus (1975), where family size and birth order influence the intellectual environment, Zajonc (1976) argues that the effects of birth order "are mediated entirely by the age spacing between siblings," and that greater spacing between siblings can reverse the negative effects of birth order. The argument is that children born into families with older children are born into more favorable intellectual environments. In this model, larger gaps may also positively affect first-born children, who have more time to develop before the birth of an "intellectually immature" younger sibling. Additional evidence is provided by Broman, et al., (1975), who found that children born after longer intervals scored higher on the Stanford-Binet scale than those born after shorter intervals. However, Galbraith (1982) finds that sibling spacing had no effect on intellectual development in a sample of predominantly Mormon college students.

THEORETICAL PERSPECTIVES

This section presents the two major explanations of the negative relationship between sibship size and children's educational success by: The Confluence Model (CM) and the Resource Dilution Hypothesis (RDH).

The Confluence Model

The Confluence Model (CM) was formulated by Zajonc and colleagues (Zajonc and Markus, 1975). They developed a mathematical model which is based on the mutual intellectual influences among children as they develop in the family context. A family's intellectual environment is considered as a function of the average of the weighted absolute intellectual levels (mental ages) of all members of the family. The larger the sibship, the more the intellectual environment suffers from the low mental ages of young children. That is why successive children are born in an increasingly inferior environment, which is a direct handicap to their own intellectual development.

The intellectual environment varies with number of newborn children in the family. Each family member contributes to the average intelligence in the family, and therefore, the average intelligence is changing over time. Change may be due to the addition of a newborn or a family member moving out. The average intelligence depends on the number of children and the intervals between births (Zajonc & Markus, 1975).

Parents have much higher intellectual skills than children, but the arrival of a new child with low initial intellectual skills decreases the total intellectual level in the family. Consequently, families with many children provide an intellectually 'immature' environment since '… larger families will be associated with lower intellectual levels because the larger the family, the larger is the proportion of individuals with low absolute intelligence' (Zajonc and Markus, 1975: 77).

Several scientists (e.g. Breland, 1974; Mascie-Taylor, 1980; Nisbet & Entwistle, 1967) note that verbal tests, in comparison with nonverbal tests, are more sensitive to the effects of family

configuration. Reduction in parental attention due to the birth of more children may negatively influence verbal development (Mercy & Steelman, 1982).

Research has also shown that the arrivals of newborns have an effect on home environment. Firstborn children have been reported receiving more attention and verbal stimulation from their parents during infancy and throughout upbringing in comparison to later-born children. It is reasonable to believe that this interaction with adults may explain why the first-born is reported to learn to walk, talk, and read at an earlier age (Pfouts, 1980). Further research on family interaction (e.g. Irish, 1964) revealed that older siblings often informally teach their younger siblings.

The effect of time spent with friends has also been examined, and the results give further support for the confluence model. The data revealed that time spent with friends was negatively related to children's performance on intelligence tests (Mercy and Steelman, 1982).

The teaching function is another important factor that must be considered in the confluence model. In addition to sibship size, birth order has been reported to have a positive effect on the development of intelligence. Most of the time first-born children score at a higher level on intellectual tests than later-born children; for this reason, we can talk about a birth-order factor. Older siblings can assume a “tutorial function” by answering questions and helping their younger siblings to solve problems. By doing so (i.e., learning by teaching and rehearsal) this activity will provide the older sibling with an intellectual advantage in form of verbal fluency and set the stage for a birth-order effect. The birth order is a critical factor because neither the youngest sibling nor the only child will have the opportunity to teach their siblings. With this in mind, the confluence model expects a handicap for last born and only child with regards to the teaching function.

It is hypothesized that increasing family size decreases the average intellectual environment, whereas increasing age spacing between children increases the average intellectual environment. Birth order is mediated completely by the age spacing between siblings. A negative effect of birth order is expected with small spacing between children, whereas a positive effect is likely with large spacing between children (Galbraith, 1982). The confluence model assumes that longer birth intervals provide the older siblings with more time to mature, which leads to higher average intellectual performance (Markus & Zajonc, 1977).

Zajonc and Marcus (1975) point out that the confluence model illustrates the importance of the environment on intellectual development of individuals. The authors acknowledge other factors not included in the model that contribute to the intellectual development as well, such as genetic background and other environmental processes (e.g., child rearing practices and unique experience). However, the authors consider birth order as a strictly environmental factor.

In sum, the core of the confluence model is that the intellectual level within the family provided by adults and children is crucial for the intellectual development of each child.

The Resource Dilution Hypothesis

The history of the resource dilution model can be traced back to Dumont's (1890) work, which focused on the law of capillary action which states that the presence of siblings dilutes resources that are crucial for social mobility; however, Blake (1981) was the first to coin the term resource dilution model and has since been the prominent proponent.

The Resource Dilution Hypothesis (RDH) offers a simple resource explanation for declines in educational outcomes and in intellectual assessments. Most or all of the relationship found can be explained from the assumption that when the number of children in the family increases, the parents' resources decrease.

In order to understand the mechanisms by which socio-economic background and family structure affect educational opportunities, one needs to consider the processes and means by which status characteristics are passed on from one generation to the next. Parents' resources play a crucial role in educational careers, and the availability of these resources is highly associated with levels of parental education and occupation.

It is important to differentiate between basic parental resources that are important for survival (e.g., food, clothes, minimal supervision, and, of course, a place to live) and resources that enhance children's opportunities (e.g., one-to-one reading, hiring a math tutor, buying computers, and saving money for education) and therefore not essential for children's survival.

However, surplus resources enhance children's opportunities (Downey, 2001). With regards to surplus resources it has been reported that children with many siblings, in contrast to children with few siblings, are not engaged in activities that enhance intelligence and they spend less time together with their parents (Steelman & Powell, 1989).

One can also view that; the relevant resources can be distinguished into material and cultural resources. *Material resources* refer to the financial situation of a person's parents, and thus to the money they can spend on the educational careers of their children. The availability of material resources is often indicated by parents' occupational status or income level. It is plausible that material resources play a relatively important role when the cost of education is high. The financial cost of education can be both direct (fees, books, and other learning materials) or indirect in the form of opportunity costs, that is the loss of potential income during school attendance.

Cultural resources refer to parents' educational levels, their linguistic skills, and their attitude towards dominant cultural values (De Graaf, 1986). Parents' cultural resources provide children with the appropriate abilities and attitudes for being successful in school thus giving them a 'scholastic lead' which seems to increase throughout the remainder of the educational career.

Dilution theorists also believe that some resources play a larger role than others, depending on periods in children's life. One such resource is parental attention–the most important resource when the children are young–whereas money saved for education is more important when children are older (Downey, 2001).

Blake (1981) concluded that encouragement, attention, and interaction by parents are the most important factors. It has also been pointed out that close spacing of siblings leads to more competition between the siblings for similar parental resources (Downey, 2001).

Some authors (e.g. Ernst & Angst, 1983) believe that the inverse association between sibship size and educational achievement is in fact a function of socioeconomic status. Children from large families are disproportionately from groups with lower socioeconomic status. However, although sibship size is negatively related to social class, the effect of number of siblings remains strong even when socioeconomic status is controlled for (Downey, 1995). The effect of number of siblings may vary across contexts because different societies play different roles in supporting the family. A suggested functional form between sibship size and educational outcome is

Target child (Y) = 1/number of children in the family (X)

This relationship is believed to occur only between sibship size and strictly economic parental resources. Economic resources in comparison with interpersonal resources may be less readily explained. One explanation is that the parents can decide over their spare time and choose to quit exercising or reading when the second child is born (Downey, 2001).

Clearly, the core of the resource dilution theory is that the availability of resources of parents

decreases as sibship size increases. Finally, unlike the CM, the RDH mechanism pertains to a broad spectrum of parental resources, and thus not only family characteristics or parental resources that affect children's cognitive ability.

Theoretical differences between Confluence Model and Resource Dilution Hypothesis

The CM and RDH have different theoretical implications for educational attainment. The CM explains educational attainment through the impact of sibship size, birth order, and birth spacing on children's cognitive ability. In contrast, the RDH is a more general hypothesis of the relationship between sibship size and different types of parental resources which extends beyond cognitive ability (for example, educational attainment, occupational status, income, etc.). This theoretical difference is described by Downey (2001: 497):

> *'... whereas the confluence model offers no explanation for an effect of sibship size on educational attainment apart from intellectual skills, the resource dilution model explains that although some parental resources influence intellectual skills, other parental resources (e.g., money saved for college) affect attainment directly'.*

Consequently, in the CM the effect of sibship size on educational attainment runs exclusively through children's cognitive ability. However, it follows from the RDH that there should be an *additional* effect of sibship size on educational attainment originating in parental resources and inputs that are unrelated to children's cognitive ability.

Zajonc(1975) and colleagues do not consider the interactions between parents and their children, nor any deliberate or necessary resource- investment strategies. The intellectual family climate, which does not even take into account parental IQ, is considered to be so important that the model can dispose of these other factors. Until now, it has seemed impossible to replicate the initial results obtained with the confluence model (Brackbill and Nichols, 1982; Galbraith, 1982; Retherford and Sewell, 1991). Moreover, since the assumptions underlying the confluence model seem unrealistic, and since it claims to be applicable to intelligence only, which is something quite different from educational attainment? Fortunately, sibling resource-dilution theory does account for the types of resources and socio-psychological processes that are obviously associated with schooling levels.

This crucial theoretical difference between the CM and the RDH provides a source of identification because it allows for a direct test of the two channels through which sibship size affects educational attainment: An indirect effect through cognitive ability and a direct effect on educational attainment. In other words, while the negative effect of sibship size on cognitive ability may be explained theoretically by both the CM and RDH, any additional *direct* effect of sibship size on educational attainment can only be explained by the RDH.

In contrast to the confluence model, the resource dilution model does not include a sib-socialization component. In other words, only children and last-borns are not handicapped by lack of siblings; they do not suffer from a teaching deficit. The parental dilution model implies nothing about possible birth order effects (Blake, 1981). The dilution theory concludes that children still continue to compete for parental attention (e.g., gifts, loans and inheritances) even after they moved out of the home (Downey, 2001).

According to Steelman and Powell (1989), the resource dilution theory has been used as an ad hoc explanation for the educational outcomes due to sibship size. Therefore, the theory is seldom tested directly. However, several studies note a negative effect of sibship size on financial arrangements (e.g. Steelman & Powell, 1989), intellectual performance (e.g., Blake, 1981), parental

treatments and attention (e.g. Blake, 1981; Downey, 1995), and material resources (e.g. Downey, 1995).

Implication

The ambition of this paper was to bring forth diverse interpretations of how sibling configuration affects children's educational attainment as explained by the Confluence Model (CM) and the Resource Dilution Hypothesis (RDH). There is a major controversy in the literature on whether the CM or the RDH is the correct explanation of the observed correlation between sibling configuration, cognitive ability and educational attainment.

Unfortunately, most studies cannot distinguish empirically between the CM and the RDH. The reason why is because analysts generally only observe the end result of the CM and the RDH (for e.g. a negative relationship between sibship size and children's educational attainment) and not the psychological or sociological processes that generate this end result. However, the CM and the RDH differ with respect to how they perceive these processes.

Hence this paper possesses theoretical as well as educational implication to explicate the interrelationship between sibship size, birth order and birth spacing and the educational attainment of the children.

Conclusion

A theoretical contender to the Resource Dilution Hypothesis is the *Confluence Model.* The Confluence Model attributes the negative relationship between sibship size and children's intellectual outcomes to a poor intellectual climates and stimuli in large families. That is, more siblings “drain” the family's intellectual milieu, which in turn implies that children tend to face poor intellectually. As family size grows larger and larger, the intellectual environment becomes more and more “babyish”. Therefore, the confluence model predicts a negative effect of sibship size upon intellectual development. But this theory restricts itself to statements referring to the impact of siblings on the intellectual family climate, and not to family interaction.

While the confluence model emphasizes more on how the intellectual milieu affects individual development, resource dilution theory provides an alternative explanation by focusing more on the resource-allocation aspect within a family. Given the fact that parental resources are finite, large sibships generate strains on many types of parental resources which in turn lead to poorer child outcomes.

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ATTITUDE TOWARDS TRIBAL GIRLS' EDUCATION AMONG THE TEACHERS AND PARENTS OF ARUNANCHAL PRADESH

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ABSTRACT

This paper attempts to investigate the attitude of tribal parents and teachers towards tribal girl's education. A sample of 400 tribal parents and 400 tribal teachers were selected for this purpose. Attitude Scale for parents and teachers were used to collect the data. Comparison was made between urban & rural male and female tribal teachers and urban and rural male & female tribal parents. Findings disclosed that male and female teachers of urban area have more favourable attitude towards tribal girl's education than the rural areas. When comparison was made between the parents of urban and rural areas, no significant difference was found in their attitude towards girls' education.

Key-words: Attitude, tribal girls' education.

Introduction

Education enables girls to make their own decisions and to influence their families positively. Education saves and improves the lives of girls and women. It allows them to have greater control of their lives and provides them with skills to contribute to their societies.

The Indian Constitution assigns special status to the Scheduled Tribes (STs). STs constitute about 8% of the Indian population. There are 573 Scheduled Tribes living in different parts of the country, having their own languages, which are different from the one mostly spoken in the state where they live. Arunachal Pradesh, the easternmost state of India is a land of tribal communities. There are 25 major tribes in Arunachal Pradesh speaking different dialects. In Arunachal Pradesh women are deprived of education because of patriarchal gender relation, which directly restricts their access to education. Besides this, women education has suffered a lot because of many reasons behind such as (i) parent's apathy (ii) lack of neighbourhood educational institutions (iii) illiteracy of guardians (iv) poverty (v) lack of awareness (vi) social barriers for women (vii) engagement of girls in agriculture or household sector for supplementing family's income.

To encourage women education government has established separate unit to impart knowledge of 3 Rs to women learners in the state, games and sports, music, tailoring, knitting and weaving facilities are also added in this unit to motivate the women learners. To uplift girls education many programmes were initiated by government like, Kasturba Gandhi Balika Vidhalaya" which is running under SSA "NPEGEL" covered 20 schools and to bring out the best in girl student "Pratibha Khoj Scheme" was also introduced to encourage talented tribal girls. But still the pace of women literacy rate in Arunachal Pradesh is very slow, a little progress have been made through a long term efforts, plans and programmes over the last few decade. As per 2001 census the literacy rate of women in Arunachal Pradesh is 44.24 which show a dismal picture of women education in the state.

Aims and Objective of the present study

The attitude of the parents and teachers is very important for girls' education. The successful completion of girls' education upto many extend depends on the attitude of parents and teachers. The negative attitude of the parents and teachers regarding girl's education and schooling can prevent

their girl child from getting education. With less parental support in school work, there will be low level of motivation and poor self-esteem among the girls. Positive attitude of the parents and teachers can be beneficial to their girl child in many cases and can be reflected in improvement in class performance, creating interest among girls to learn, and higher achievement scores in reading and writing. In view of all these points the present study aims to investigate the following objectives:

1. To study the attitude of urban and rural male Teachers towards tribal girls education in Arunachal Pradesh
2. To study the attitude of urban and rural female Teachers towards tribal girls education in Arunachal Pradesh
3. To study the attitude of urban and rural male Parents towards tribal girls education in Arunachal Pradesh
4. To study the attitude of urban and rural female Parents towards tribal girls education in Arunachal Pradesh

Hypotheses of the Study

1. There will be a significant difference in the attitude of urban and rural male teachers towards tribal girl's education
2. There will be a significant difference in the attitude of urban and rural female teachers towards tribal girl's education
3. There will be a significant difference in the attitude of urban and rural male parents towards tribal girl's education
4. There will be a significant difference in the attitude of urban and rural female parents towards tribal girl's education

Sample and Tools

Sample for the present study consists of 400 tribal parents and 400 tribal teachers, drawn from four districts of Arunachal Pradesh namely: Tawang, East Siang, Papumpare and Tirap. Out of 400 Parents and 400 Teachers, 200 male teachers & 200 male parents and 200 female teachers and 200 female parents were selected. The samples were again distributed on the basis of settlement (urban and rural). Stratified Random Sampling technique was adopted for this purpose. The four sample districts for the present study were selected on the basis of the literacy rate. The literacy rate of Tawang district is 60.61%, East Siang and Papumpare has the highest literacy rate in the state with, 73.54% and 82.14% respectively and the district Tirap is in the lowest place with only 52.23% literate persons according to census 2011.

As data gathering tool the researcher has developed and used attitude scale for parents and teacher, to find out their attitude towards tribal girls education. The attitude scale consists of 22 statements. For constructing the attitude scale Likert's five point scale method was adopted. For computing the reliability of the attitude scale, test-retest method was used. The co-efficient of the reliability came out to be 0.95. The content validity of the scale was taken care by seeking opinion of the content expert.

Findings

The present study aims to investigate the attitude of teachers and parents towards tribal girl's education. To fulfil these objectives t-value was computed and analyzed.

Table 1: The mean score and t- value of urban and rural male teachers towards girls' education

Group	N	Mean	Df	t-value
Urban	100	54.13	188	3.90
Rural	100	49.13		

Table 1 shows the t – value of urban and rural male teachers towards girl's education. The computed t – value (3.90) is significant at .05 level of confidence for 188 df. The table t – value (1.97) is lesser than the computed t – value. Therefore, the hypothesis of the study that "there will be a significant difference in the attitude of urban and rural male teachers towards tribal girl's education gets accepted and looking into the mean scores, it can be interpreted that the male teachers of urban area have more favourable attitude towards girl's education than the rural area.

Table 2:The mean score and t- value of urban and rural female teachers towards girls' education

Group	N	Mean	Df	t-value
Urban	100	73.5	188	8.42
Rural	100	71.8		

The computed t – value (8.42) of urban and rural female teachers' attitude towards girls' education is greater than the table t-value (1.97) at .05 level of confidence for 188 df. So, the hypothesis of the study that "there will be a significant difference in the attitude of urban and rural female teachers towards girl's education" gets accepted and it is understood that, the female teachers of urban area have more favourable attitude towards girl's education than the rural area.

Table 3:The mean score and t- value of urban and rural male parents towards girls' education

Group	N	Mean	df	t-value
Urban	100	68.2	188	0.38
Rural	100	67.6		

Table 3 reflects that there is no difference in the attitude of urban and rural male parents towards girl's education, as the computed t – value (0.38) is lesser than the table t-value (1.97) at .05 level of confidence for 188 df. Therefore, the hypothesis of the study gets rejected.

Table 4: The mean score and t- value of urban and rural female parents towards girls' education

Group	N	Mean	df	t-value
Urban	100	69	188	0.46
Rural	100	68		

The t – value of urban and rural female parent's attitude towards girl's education is shown in table 4. The computed t – value (0.46) is not significant at .05 level of confidence for 188 df. The table t – value (1.97) is greater than the computed t – value. Therefore, the hypothesis of the study that "there will be a significant difference in the attitude of urban and rural female parents towards girl's education" gets rejected and it can be interpreted that the attitude of urban and rural female parents towards girl's education is almost same.

Conclusion and Discussion

It was observed that the parents of urban and rural area have moderately favourable attitude towards tribal girl's education. This finding is a positive sign, since girl child were not normally encouraged for formal education as compared to boys in tribal community. The major reason is the engagement of daughters in household and agricultural activities. Daughters in tribal community are treated as helping hands for their mothers. Even if they are sent to school, they have to take along their younger's to school with them. Findings also reveal that the teachers both male and female of urban area have more favourable attitude towards tribal girl's education. This may be because of their level of education and awareness. Therefore, to achieve 100% enrolment of girls as targeted under Sarva Shiksha Abhiyan awareness programme for parents through different means is of utmost importance. Teachers and NGOs should be assigned the task to motivate the parents to enrol their daughters in schools, especially the parents who are reluctant to do so. Adult education programme should be made functional to educate the illiterate parents. To motivate girls, more incentives and special efforts should be given to refine girls' school infrastructure on priority basis. Though state government has initiated various programmes and schemes but, very few of them have actually reached the tribal girls and benefited them. Many of the programmes did not benefit the tribal community because of geographical barriers and centralized planning which does not always fit into tribal culture and area. Thus, right policy and proper implementation of centrally sponsored schemes like, KGBVs, Pratibha Koja and Residential schools must be ensured. Finally, ensuring basic facilities like- separate toilets for boys and girls, transportation facilities, safety concerns and good quality teaching will definitely have positive impact on tribal girls' education in the state.

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OPINION OF TEACHER EDUCATORS REGARDING ENVIRONMENTAL EDUCATION AND ENVIRONMENTAL ETHICS EDUCATION

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ABSTRACT

This paper is related to the opinion of Teacher Educators teaching Environmental Education to the students of Bachelor of Education (B.Ed.) program. Their opinion regarding existing curriculum of Environmental Education (EE) at B.Ed. level and various aspects of Environmental Ethics Education (EEE) for pupil teachers was taken for the completion of this study. The respondents opined that the present EE curriculum is not suitable to change the environment related behaviour of pupil teachers (B.Ed. students).78.12 percent respondents agreed that there was a need of replacement of present EE curriculum by curriculum of EEE. They agreed to include Meaning of Sustainable Development, Ecological Friendship, Philosophical concept of Environmental Ethics Education, Indian Environmental Ethics, Western Environmental Ethics and methods of Teaching and Evaluation of EEE in the proposed module of EEE.

Key-words: Environmental Education, Environmental Ethics Education

Introduction

The history of Environmental Education (EE) and its implementation around the world in modern era since 1970 till now reveals that Environmental Ethics Education (EEE) may shape the environmentally desired world of tomorrow. It may be considered as the most effective means that society may develop for confronting the environmental challenges of the future. According to Anand (2002), systemized, organized and awakened social mind can be developed only through right type of education and it is through right type of education that appropriate awareness can be created to make life and its environment creative, constructive and progressive. For making students aware, curriculum should be so framed that students can understand and inculcate the concept of sustainable development at all the stages of their education. Curriculum should be, on the basis of recommendations given by UNDESD (UNESCO, 2005). But in practice, no programme of educational reform can be implemented without the willing and active co-operation of teachers. They are one of the main pillars of the society, responsible for educating young people for different walks of life. There is a old proverb which states that, 'no system of education can rise above the levels of its teachers'. Thus, we have to educate our teachers about Environmental Ethics Education (EEE). Accordingly, it is very necessary for the Pupil Teachers (students undergoing Teacher Training) to get educated about Environmental Ethics Education (EEE).

Therefore, prior to suggesting anything concrete about EE and EEE it was found apt to study the opinion of Teacher Educators (Teachers in Teacher Training Institutions) teaching Environmental Education to Bachelor of Education (B.Ed.) students about present curriculum of Environmental Education (EE) and different aspects of a proposed module of Environmental Ethics Education (EEE) for pupil teachers. The paper has been developed in the same direction. Accordingly for proceeding further in this direction the studies related to EE and EEE were reviewed for convenience. Some studies, books, reports and other literature reviewed are- Annual report (2000-2001), Buch (1997),Dey(1992),Dhawan (2005),Gupta (1982),Housebeck et.al (1991),Hsu Shih-

Jang92004),Kumar (2002), Kumar (2004),Mckinney (1996),Mishra (1998),Rajput (2004), Rajput et al (1980),Raju (2007), Ramsey et al (1976), Saxen (1996), Saxena (2004), Seema (1997),Shahnawaj (1990), Tomar (1998),Wilke (1985) and Husen and Postlethwaite (1980).

The sole objective of this paper was to find out the opinion of Teacher Educators (TE) regarding course of Environmental Education (EE) existing in B.Ed. institutions and also regarding Environmental Ethics Education (EEE) Module. The details related to the various aspects of the paper have been given in the forthcoming sections.

Method of the Study

The details of the population, sample and the tool have been given below:

Population: Population of this study consisted of Teacher Educators (TE) teaching Environmental Education in B.Ed. institutions of Eastern Uttar Pradesh (U.P.) of India. Their opinion was taken on the, "Opinionnaire for Assessing Existing Curriculum for Environmental Education and views about proposed module of Environmental Ethics Education".

Sample: The purposive sampling technique was adopted for the selection of the sample. Accordingly, Twelve (12) districts of Eastern U.P. were selected randomly. Seventy one (71) Teacher Educators from these twelve districts were taken purposively in the sample. The developed tool was administered on them. At the final stage only 32 Teacher Educators of B.Ed. out of selected 71 Teacher Educators responded. The names of districts and number of TE from those districts have been given below:

Table 1:District-wise distribution of Teacher Educators in the Sample

Sl.No.	Name of the Districts	No. of Teacher Educators in the Sample (N)	Actual Respondents (n)
1.	Varanasi	08	04
2.	Gorakhpur	09	05
3.	Faizabad	08	03
4.	Ballia	06	03
5.	Allahabad	07	05
6.	Mau	05	02
7.	Azamgarh	05	02
8.	Basti	06	02
9.	Deoria	06	01
10.	Siddharthnagar	03	02
11.	Kushinagar	04	02
12.	Balrampur	04	01
		N = 71	**n = 32**

Preparation of Opinionnaire:

An opinionnaire for assessing existing curriculum for Environmental Education (EE) and views about Environmental Ethics Education (EEE) named as, 'Paryavaran Achar Shiksha Sarvekshan Matawali' was prepared for administration on the Teacher Educators teaching EE in B.Ed. institutions. It has two distinct parts namely - Personal Information and Body of the Opinionnaire. Personal information includes name, age, gender, educational qualification, teaching experience of the respondents (in years) and University/College Name of the respondent. The main body of the opinionnaire consists of 31 items. Some items consist of sub-items. These items are distributed over four broad areas as given below:

a) Opinion on existing curriculum (7 items);

b) Opinion on Environmental Ethics curriculum (5 items in which item number 4 has 15 sub-items);

c) Opinion on Teaching Strategies & Evaluation Techniques (11 items in which number 6 has 9 sub-items); and

d) Opinion on Environmentally Ethical behaviour of the students (8 items).

Table – 2: Description of Opinionnaire (Item-wise)

Sl. No.	Area /Dimension	Total Items	Item Numbers
1.	Existing curriculum	7	1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7
2.	Environmental Ethics curriculum	5	2.1, 2.2, 2.3, 2.4 (2.4.1, 2.4.2, 2.4.3, 2.4.4, 2.4.5, 2.4.6, 2.4.7, 2.4.8, 2.4.9, 2.4.10, 2.4.11, 2.4.12, 2.4.13, 2.4.14, 2.4.15), 2.5,
3.	Teaching strategies and Evaluation Techniques	11	2.6, 2.6.1, 2.6.2, 2.6.3, 2.6.4, 2.6.5, 2.6.6, 2.6.7, 2.6.8, 2.6.9 and 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10
4.	Environmental Ethics behaviour	8	4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8

The structure of the opinionnaire is of mixed type, i.e. both closed and open ended questions have been included. There were 31 items in this opinionnaire titled as “Paryavaran Achar Shiksha Sarvekshan Matawali” in Hindi. The items are basically related to the four dimensions mentioned above. The opinionnaire has been expert validated for the contents included in it.

Data Analysis and Interpretation

Analysis of the data obtained on the Opinionnaire administered on the Teacher Educators teaching Environmental Education at B.Ed. level has been presented dimension-wise in the below given sections. The responses related to each dimension have been presented in a tabular form. The

related items with respect to each dimension have been presented below with the respective tables and accordingly the obtained responses in form of 'agree' and 'disagree' have been presented as frequency and percentage along with each item.

Dimension 1-Opinion on existing curriculum of Environmental Education (EE):

The details related to the opinion of respondents regarding EE curriculum prevalent in B.Ed. institutions have been presented below in table 3.

Table 3: Opinion of Teacher Educators on Existing Curriculum of EE.

Sl.No.	Item details related to Curriculum of EE	Frequency* of Responses	
		Agree	Disagree
1.	The ability of present EE curriculum to change student's behaviour	14(43.75)	18 (56.25)
2.	The ability of present EE curriculum to change student's reorganization	16 (50)	16(50)
3.	Unnecessary content in present EE curriculum	21(65.63)	11(34.37)
4.	Impracticability of present EE curriculum	22(68.75)	10(31.25)
5.	Ability to deeply understand facts through EE curriculum	15(46.87)	17(53.13)
6.	Need of reformation in present EE curriculum	17(53.13)	15(46.87)
7.	Need to replace present EE curriculum by Environmental Ethics Education (EEE) Curriculum	25(78.12)	07(21.88)

(*= Percentage has been given in parentheses with frequency)

Interpretation:

The above table clearly reveals that according to the 56.25 percent respondents the existing EE curriculum in B.Ed. institutions is not fit for changing student's behaviour 65.63 percent respondents admitted that the content is unnecessary whereas 68.75 percent felt it as impractical. Therefore, about 53 percent felt the need of reformation whereas about 78 percent of the TE felt the need to replace the present EE curriculum with EEE curriculum.

Dimension 2: Opinion on content of proposed Environmental Ethics Education Module (EEEM)

The details related to the opinion of Teacher Educators teaching EE in B.Ed. institutions, regarding content of EEEM have been presented below in the tables 4(a) and 4(b).

Table 4 (a): Opinion on content of proposed EEEM

Sl.No.	Item details related to proposed EEEM	Frequency* of Responses	
		Agree	Disagree
1.	Include "Meaning of Sustainable Development" in EEEM	25(78.12)	07(21.88)
2.	Include "Ecological Friendship" in EEEM	22(68.75)	10(31.25)
3.	Include "Philosophical concept of Environmental Ethics Education" in EEEM		
	Indian Environmental Ethics	30(93.75)	02(6.25)
	Western Environmental Ethics	26(81.25)	06(18.75)

(*= Percentage has been given in parentheses with frequency)

Interpretation:

The above table 4 (a) clearly reveals that TE were of the opinion that, meaning of sustainable development (78.12 percent), ecological friendship (68.75 percent), and philosophical concept of EEE-Indian(93.75 percent) and western (81.25 percent) should be given place as content in the proposed EEEM.

Table 4 (b): Inclusion of Problems of Environment and Ethics in proposed EEEM

Sl.No.	Proposed Topic	Frequency* of Responses	
		Agree	Disagree
1.	Green House Effect	08(25)	24(75)
2.	Ozone layer depletion	07(21.88)	25(78.12)
3.	Global warming	09(28.13)	23(71.87)
4.	Air pollution	25(78.12)	07(21.88)
5.	Water pollution	27(84.38)	05(15.62)
6.	Rising Sea level	05(15.62)	27(84.38)
7.	Noise pollution	22(68.75)	10(31.25)
8.	Radioactive Pollution	23(71.87)	09(28.13)
9.	Soil pollution	27(84.38)	05(15.62)
10.	More use of Polythene	07(21.88)	25(78.12)
11.	More use of Pesticides	09(28.13)	23(71.87)
12.	Problem of Food	06(18.75)	26(81.25)
13.	Drinking water problem	08(25)	24(75)
14.	Biodiversity conservation	29(90.62)	03(9.38)
15.	Waste management	25(78.12)	07(21.88)
16.	Energy conservation	22(68.75)	10(31.25)

(*= Percentage has been given in parentheses with frequency)

Interpretation:

The above table 4(b) reveals that majority of the Teacher Educators are of the opinion that the EEEM should include content related to the problem of environment and ethics related content related to Air Pollution (78.12) ,Water pollution (84.38), Noise Pollution (68.75), Radioactive Pollution (71,87) , Soil Pollution (84.38), Biodiversity Conservation (90.62), Waste Management (78.12) and Energy Conservation (68.75).

Further regarding opinion related to inclusion of the teaching strategies

Dimension 3: Opinion on useful Teaching Strategies and Evaluation Techniques for Environmental Ethics Education

On the question, How to teach Environmental Ethics? , the responses obtained from the Teacher Educators teaching EE at B.Ed. level have been presented below in table 5.

Table 5: Responses on useful Teaching Strategies for EEEM

Sl.No.	Proposed Teaching Strategies and techniques	Frequency* of Responses	
		Agree	Disagree
1.	Discussions on Environment related Case Studies	30(93.75)	02(6.25)
2.	Self evaluation of behavior with all components of environment	27(84.38)	05(15.62)
3.	Ethics development	29(90.62)	03(9.38)
4.	Community activities	24(75)	08(25)
5.	Story Telling	24(75)	08(25)
6.	Painting/ poster/ poetry/ essay competition	26(81.25)	06(18.75)
7.	Short play/Mime	25(78.12)	07(21.88)
8.	Folk game playing	30(93.75)	02(6.25)
9.	Discussions on Scrapbooks	30(93.75)	02(6.25)
10.	Diary writing	27(84.38)	05(15.62)

(*= Percentage has been given in parentheses with frequency)

Interpretation:

From the above table 5, it is evident that, for teaching EEE majority of the Teacher Educators in the sample agreed to include the Teaching Strategies and Techniques like Discussions on Environment related Case Studies, Self evaluation of behavior with all component of environment, Ethics development, Community activities, Story Telling, Painting/ poster/ poetry/ essay competition, Short play/Mime, Folk game playing, Discussions on Scrapbooks and Diary writing for teaching Environmental Ethics Education.

Regarding the question related to inclusion of "Evaluation methods for Environmental Ethics Education" in module the responses obtained from respondents have been given below in table 6.

Table 6: Inclusion of Evaluation Techniques for Environmental Ethics Education in proposed EEEM

Sl. No.	Proposed Evaluation Methods	Frequency* of Responses	
		Agree	Disagree
1.	Questionnaire	26(81.25)	06(18.75)
2.	Observation	25(78.12)	07(21.88)
3.	Schedule	23(71.87)	09(28.13)
4.	Interview	24(75)	08(25)
5.	Paper-pencil test	21(65.63)	11(34.37)
6.	Rating scale	27(84.38)	05(15.62)
7.	Situation-reaction Test	30(93.75)	02(6.25)
8.	Observation in Artificial situation	31(96.87)	01(3.13)
9.	Self reporting	29(90.62)	03(9.38)

(*= Percentage has been given in parentheses with frequency)

Interpretation:

The above table 6 clearly reveals that majority of the TE were of the opinion that, the EEEM should include the content related to evaluation through Questionnaire, Observation, Schedule, Interview, Paper-pencil test, Rating scale, Situation-Reaction Test, Observation in Artificial Situation and Self reporting.

Dimension 4: Opinion on expected daily life behaviour of pupil Teachers taught through Environmental Ethics Education Module

On the question, what type of behaviour will be expected from a student who will be taught Environmental Education by proposed Environmental Ethics Education Module?, the respondents gave different views related to various components of environment. In the open ended section of the opinionnaire the respondents gave their views in the form of some sentences for different components of the environment. Some important opinions of respondents obtained on different components of environment have been presented below in table 7:

Table 7: Opinion regarding expected daily life behaviour of pupil Teachers taught through Environmental Ethics Education Module

Component of Environment	Sl.No.	Expected Environmentally Ethical Behaviours
Air pollution	1.	Use public vehicle.
	2.	Use Mosquito Net. Don't use coil or liquid.
	3.	Must plant tree on all special days.
	4.	Reduce the use of Freeze and Air Conditioners.
	5.	Walk to school if the distance is not too long.
	6.	Save Electricity and not misuse it.
Water pollution	1.	Don't dirty ponds/river banks by latrine or other things.

	2.	Use ordinary toilet instead of western one, to save water.
	3.	Not to throw flowers and other harmful materiel's in river. Do not open sewer in the river
	4.	Reduce the use of soap/shampoo while taking bath in river.
	5.	Attempt to recycle and reuse water.
Noise Pollution	1.	Avoid using loudspeaker or other instruments in any function.
	2.	Habit of hearing music in low volume.
	3.	Reduce use of horn in bike/car.
	4.	Avoid to use loud band and explosives in any celebration
Soil Pollution	1.	Use all environmental components to fulfill only the need not the greed.
	2.	Believes that the ownership of a land does not give you the right to do anything what you want.
	3.	Try to prepare compost fertilizer with waste materials
Radioactive Pollution	1.	Consume less energy thus don't feel need of atomic energy.
	2.	Don't support more atomic explosions.
Bio-diversity Conservation	1.	Believes that all the living and nonliving things are not for use of only humans.
	2.	Lives simply so that coming generation can get clean and healthy environment.
	3.	Avoid plucking flowers and leaf in lawn or garden.
	4.	Plant more trees and take care of them.
	5.	Don't use toxic materials /more fertilizer in garden.
	6.	Help all animals, birds & plants without any rewards.
	7.	Avoid materials made by animals' horn, hair and leather.
	8.	Habituate to give water & some food to any animal
Waste Management	1.	Buy producst packed in recycled papers.
	2.	Buy refillable pens, lighters, flashlights and cameras.
	3.	Buy paper products made from unbleached paper.

	4.	Reuse plastic containers and glass to store pencils, crayons and other items.
	5.	Share magazines and books with friends.
	6.	Reuse envelops, files and folders.
	7.	Use both sides of paper to write, print and photocopy.
	8.	Reuse plastic bags, don't throw them here and there.
	9.	Try to repair rather than replace any home appliances.

Findings

On the basis of the analysis and interpretations given above along with tables 3,4a, 4b and 5 it is clearly reflected that Teacher Educators teaching EE in B.Ed. institutions are of the opinion that the existing curriculum of EE being taught by them is not able to change the behaviour of pupil teachers. It does not induce environmental ethics in them. They also don't find it fit for pupil teachers and are of the opinion that it should be replaced by a curriculum of EEE.A module of EEE according to them and also based on the review of literature in EE and EEE, should contain the following contents as summarized in table 8 given below:

Table 8: Summary of the contents in the proposed Environmental Ethics Education Module based on the opinion of Teacher Educators teaching EE at B.Ed. level

Unit	Name of The Unit	Sub- themes within the Unit
1	Sustainable Development	Sustainable Development, Environmental Friendship Environmental Ethics
2	Philosophical bases of Environmental Ethics	(A) Environmental Ethics in Indian Tradition (B) Environmental Ethics in Western Tradition Anthropocentrism-Judeo-Christian, Consequentialism-Teleological Tradition , Utilitarianism, Deontology, Non-anthropocentric ethical Tradition - Biocentrism, Eco-centrism, Deep Ecological Ethics, Eco-feminism
3	Areas of Pollution	Air Pollution, Water Pollution, Soil Pollution, Noise Pollution, Radio-active Pollution, Energy Conservation, Bio-diversity Conservation, Solid –waste Management

4	Teaching Strategies and techniques for Environmental Ethics	Discussions on Environment related Case Studies, Self evaluation of behavior with all component of environment, Ethics development, Community activities, Story Telling, Painting/ poster/ poetry/ essay competition, Short play/Mime, Folk game playing, Discussions on Scrapbooks and Diary writing.
5	Evaluation techniques for Environmental Ethics	Questionnaire, Observation, Schedule, Interview, Paper-pen Test, Rating scale test, Situation Reaction Test, Observation in artificial situation and Self Reporting .

Further, as expressed by the Teacher Educators after being taught through the above content of EEE module the pupil teachers are expected to reflect the environmentally ethical behaviour as mentioned in summarized form in table 7 already given in the above sections under analysis and interpretation of the dimension four of the opinionnaire.

Conclusions and Educational Implications

On the basis of the above mentioned analysis and the findings of the study some important conclusions have been drawn as mentioned below.

1. Existing Environmental Education curriculum is not able to change the Students behaviour.
2. Existing Environmental Education curriculum is not able to change in student's reorganization ability of ethical/unethical environmental situations.
3. Many unnecessary and impractical contents are present in existing EE curriculum.
4. Present EE curriculum is not able to help pupil teachers to deeply understand facts of environmental ethics.
5. There is a need of reformation in present EE curriculum.
6. There is need of replacement of present EE curriculum by Environmental Ethics Education curriculum.
7. On the basis of opinions of Teacher Educators teaching Environmental Education in B.Ed. institutions and the review of the related literature in EE and EEE the contents of 'Environmental Ethics Education Module' have been identified as given above in table 8.
8. On the basis of opinions of Teacher Educators teaching Environmental Education in B.Ed. institutions the environmentally ethical behaviours related to various components of environment, expected from pupil teachers being taught on the basis of contents of 'Environmental Ethics Education Module' have been summarized in table 7 given above.

The major educational implication for theory and practice in the field of Education, based on the above conclusions is that, it is the responsibility of all the Teacher Training/Education Institutions globally as well as at the national level in India to develop environmental ethics in trainees. Particularly in India to achieve this purpose Environmental Ethics Education (EEE) should be made compulsory in pre-service teacher education programmes like B.Ed. NCTE discussion document (2004) also emphasized on the importance of environmental ethics education for pre-service teachers and in–service teachers and its inclusion in the teacher training program. Therefore the curriculum of EE for Pupil Teachers should be amended to develop it as EEE. It is also the responsibility of the national level institutions such as NCERT, SCERT, NUEPA, Academic Staff Colleges and Departments of Education in the Universities to promote environmental ethics through implementation of EEE in pre-service & in-service teacher and Teacher Educator programs. The findings and conclusions of this study may help a lot in the fulfillment of goals of environmental education in this direction.

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APPRAISAL OF INCLUSIVE EDUCATION WITH REFERENCE TO PHYSICAL ACCESS IN GANJAM DISTRICT OF ODISHA

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ABSTRACT

This study was undertaken with the objectives to find out (1) total number of children with special needs identified during 2010-11, (2) total number of children with special needs enrolled & covered through school readiness programme and Home Based Education, (3) total number of children with special needs assessed during 2010-11, (4) total number of children with special needs distributed aids & appliances through single window camp, (5) total number of ramps and hand rails constructed in year 2011-12 and, (6) the amount of money allotted to schools for the purpose of children with special needs. Data were also collected through interview and from the sources like records and other documents available at SSA Office of Ganjam district. In order to verify those official documents regarding physical access for CWSNs researcher randomly selected 10 primary schools of Ganjam district of Odisha and all CWSNs of those respective schools for evaluation of physical access provided to them. The study revealed that as per Child Tracking System and District Information on School Education and report of field of functionaries a total of 9894 differently able children were identified. Out of them 9182(92.8%) children were enrolled and 712 were out of schools. This paper reveals other details related to inclusion too.

Key-words: Inclusive Education, Physical Access.

Introduction

"Inclusion without resources, without support, without teacher preparation time, without commitment, without a vision statement, without restructuring, without staff development, won't work" (Mara Sapon-Shevin,2005).This statement clearly reflects that a lot of grass root effort has to be made to ensure inclusion. Initially we know that, segregating children based on disability was discriminatory and violation of the human rights. Subsequently, the philosophy of 'integration' emerged which advocated education of children with mild and moderate disabilities in general schools along with others with adequate resource support. But children under integrated settings were still treated separately in schools and integration or mainstreaming was only partial. This led to the emergence of the new concept called Inclusive Education (IE) which argues that all children irrespective of the nature and degree of the disability should be educated in general schools with normal children. Inclusive education wishes that education system should value all children irrespective of the nature and degree of disability. Children herald a new tomorrow and education plays an influencing role in shaping the worldview of children by creating an inclusive and barrier free society. It is in this context that schools are acknowledged as a crucial sphere for developing a tolerant and plural community by means of imparting education and developing equal opportunities for all.

In spite of these efforts, UNESCO (1999) report indicated that the implementation of inclusive education in India remained at a very preliminary stage. This evidence is consistent with other

experiences of developing countries where inclusive education has been legislatively adopted but educational and other benefits of inclusion have not been achieved (Eleweke & Rodda, 2002).

As "disabling educational environments affect all children, not only those who are identified as having impairments," (Miles, 2000) it is essential that school quality issues are identified and addressed. The re-conceptualisation of inclusive education as a school quality issue could have significant impact on educational change in India for all children. Singal's (2005). Singal (2005a) argued that government policies focused on resources and physical access (distribution of aids and appliances) or infrastructure such as ramps in schools and notion of social justice through the equal distribution of benefit, seems to be more about inputs, not processes like pedagogy, curriculum or attitudes.

But we should not forget that without better input process can never be possible. Even without proper input process will become paralyzed. Thus Quality Education revolves around the availability and quality of infrastructures along with required support services.Identification is done to know the extent of the problem or the number of children with special needs in a particular district. It also gives a rough idea of the kind of disability prevalent in that area so that planning could be done accordingly. Under SSA, this exercise would be done under micro planning. Moreover, in SSA since the budget to be provided for education of children with special needs depends on the number of children identified, it is important that it is undertaken by those who are oriented to different types of disabilities like visual impairment, hearing impairment, loco-motor impairment, mental retardation, learning disabilities, cerebral palsy and multiple disabilities, so that they can also identify children with mild to moderate disabilities. The initial screening of children with special needs enrolled in schools could be done by general teachers, after being trained on how to identify such children in classrooms. Formal assessment is undertaken to determine the nature, type and extent of disability. Functional assessment means to get an idea of the child's current level of functioning. Both formal and functional assessment should be done by a competent team comprising doctors, eye specialist, ENT specialist, resource teachers and general teachers. Appropriate referrals should also be provided through this assessment. This means that if the team doing the assessment feels that a particular child cannot come to school at this point in time on account of his/her disability, then alternative educational placement should be suggested. The team should also specify that what aids and appliances the child requires. Assessment could be done with the help of PHCs, National Institutes, Composite Resource Centres and District Disability Rehabilitation Centres. (Dash, 2007)

In the assessment camp, the decision regarding appropriate educational placement for every child with a special need should be made. As far as possible, effort should be made to place children with special needs in regular schools with all the support they would require. However, if a child has a severe disability, it might not be possible for him or her to attend a regular school nor would it be feasible for a regular school to provide all those special services, such as physiotherapy, occupational therapy and speech therapy that might be required by this child. Hence, in these circumstances the team doing the assessment should suggest some other alternative educational options such as EGS&AIE centres, distance learning and home-based education.

After the assessment and educational placement, the SSA State Mission Societies should chalk out an appropriate strategy to provide assistive devices to children with special needs. The aids and appliances needed by children with special needs are those that enhance their functional capacity. A few examples might be a hearing aid for a child having hearing impairment, glasses and lenses for a

low vision child and callipers, crutches for a child having orthopaedic impairment.

Development of innovative designs for schools to provide an enabling environment for children with special needs should also be a part of the programme. This activity could be undertaken jointly with the Civil Works component under SSA. All new school buildings being constructed under SSA should have ramps, handrails and other such modifications to provide easy access. Some provisions should also be made so that the existing school buildings are also made barrier free.

Need and significance:

Segregation or isolation is good neither for learners with disabilities nor for general learners without disabilities. Societal requirement is that learners with special needs should be educated along with other learners in inclusive schools, which are cost effective and have sound pedagogical practices (NCERT, 2000). Segregating children based on disability was discriminatory and violation of the human rights. Subsequently, the philosophy of 'integration' emerged which advocated education of children with mild and moderate disabilities in general schools along with others with adequate resource support.

Identification or mapping children with special needs is an integral part of inclusive education. A concerted drive to detect children with special needs at an early age should be undertaken through PHCs (Primary health centres), ICDS (Integrated Child Development Scheme), ECCE (Early Childhood Care and Education) centres and other school readiness programme.

Assessment of identified child should be carried out to ascertain the extent and type of disability, the nature of support services required and assistive device required by the child. Architectural barriers in schools would have to be removed for easy access and to promote inclusion of children with special needs. Schools must be designed using an inclusive lens to create barrier free environments and accessible buildings must incorporate not only through ramps, but also through accessible classrooms, toilets playgrounds etc.

Every child with special needs should be placed in the neighborhood school, with needed support services. For instance, they may need mobility training, training in Braille, sign language, postural training, etc. Thus, school readiness of children with special needs must be ensured by providing 'special training' as envisaged in the Right to Education Act. This means that a) all children with special needs, who are not enrolled in schools or have dropped out, will first be enrolled in a neighborhood school, b) they will be entitled to special training through regular teachers or teachers specifically appointed for this purpose c) and then mainstreamed in general schools along with their peer in age appropriate class. Accordingly the present study was taken with the formal title, '**Appraisal of Inclusive Education with reference to Physical Access for Children with Special Needs in Ganjam district of Odisha'.**

Objectives:

The objectives of the study were to find out:

1. Total number of children with special needs identified during 2010-11.
2. Total number of children with special needs enrolled & covered through school readiness programme and Home Based Education (HBE).
3. Total number of children with special needs assessed during 2010-11.

4. Total number of children with special needs distributed aids & appliances through single window camp.
5. Total number of ramps and hand rails constructed in year 2010-11.
6. The amount of money allotted to schools for the purpose of toilet modification for children with special needs(CWSNs).
7. Evaluation of various aspects of physical access for CWSNs in Ganjam District of Odisha.

Method and Procedure:

Descriptive method of research has been adopted for this study. An interview schedule was prepared by the researcher for district coordinator (DC) to collect the data. The researcher interviewed the District Coordinator at the SSA Office of Ganjam at Chattarpur. Prior to this researcher met and approached the State Coordinator for permission to collect data from the SSA Office. Immediately consent letter was issued to the researcher and the copy was sent to District Coordinator by e-mail. With that permission letter the researcher proceeded for data collection. The State SSA Office provided the researcher with address and contact numbers of all District Coordinators of Orissa. Through telephonic conversation researcher get the date and time to meet Sh. Tapan Kumar Sahoo, District Coordinator of Ganjam district. Data were also collected from the secondary sources like records and other documents available at SSA Office of Ganjam district. SSA, Ganjam Report on Progress over view on Inclusive Education for Children with Special Needs 2010-11 was also a source from which data were reviewed. In order to verify those official documents regarding physical access for CWSNs, primary data also collected by the researcher. Purposive sampling was used to select 10 primary schools of Ganjam district of Odisha with at least one OI/CP studying in those schools. A self made interview schedules and school observation schedule was prepared by the researcher consultation with the guide Dr.Sudarshan Baral for Head Masters of sample schools. Simple percentile is used for calculation of the data.

Findings:

A. From Official Documents:

1. As per Child Tracking System and District Information on School Education and report of field of functionaries a total of 9894 differently able children were identified. Out of 9894 identified children with special needs, 9182(92.8%) children were enrolled and 712(7.1%) were out of schools. As out of school children were still 7.1% of total number of children with special needs identified, it was planned to mainstream all 712 out of schools children with special needs taking different strategy like motivating them to enroll in normal schools. All 712 nos. out of school 169 (1.7%) children with special needs are covered under HBE and 543(5.4%) are covered under school readiness programme during 2010-11 by Inclusive Education (I.E.) volunteers.
2. Out of 9894 identified children with special needs students it is found that more number of boys are orthopedically impaired i.e.13.9%, where as girls are more of low vision and constitutes 11.7% of total children with special needs identified.
3. All total in 14 venues named Purusottampur, Hinjli, Sheragada, Soroda, Kukudakhandi, Berhampur, Rangeilunda, Digapahandi, Buguda, J.N. Prasad, Polosara Dharakote,

Bhanjanagar, K.S.Nagar of Ganjam district Single Window camps for assessment of children with special needs organized and only 1183 Students were provided with aids and appliances out of 4397 participants of single window camp.) .Out of Total 9894 identified children with special needs only 4397(44.4%) v participated in single window camp which shows very poor participation. Only 11.9% children with special needs were provided with aids and appliances .Parents should be motivated and BRTs /I.E. volunteers/BRCC/CRCC should take initiative for total participation and assessment.

4. In Purusottampur out of 359 participants of single window camp 89 CWSN were provided with aids and appliances. Similarly, in Hinjli 63 out of 196 participants, in Sheragada 101 out of 225, in Soroda107 out of 248, in Kukudakhandi 93 out of 243 ,in Berhampur 57 out of 143, in Rangeilunda 66 out of 198 ,in Digapahandi 160 out of 508, in Buguda 97 out of 387 ,in J.N.Prasad 61 out of 499 , in Polosara 95 out of 394 , in Dharakote 49 out of 321 , in Bhanjanagar 67 out of 393 , in K.S.Nagar 78 out of 285 were assessed and provided with aids and appliances as mentioned above.(Appendix-5)

5. Two day screening camp for surgical correction of cleft lip and palate children had been conducted on 25th & 26th June 2010 at the premises of DPO (District Project Officer), SSA, Ganjam. Dr. Subrat Jena, Director Ashwini Hospital , Cuttack with his team completed screening camp in 2 days. Total 94 children were detected and surgery of 82 nos. children was completed in phase wise during the financial year 2010-11. Further surgery of 12 nos. cataract cases have been completed in ECOS Hospital of Berhampur during the month of July 2011.

6. As per progress overview of SSA, Ganjam, Odisha, 1014 ramps and handrails in different schools has been planned and constructed. Bhanja Nagar block is having 93 ramps and hand rails which is highest among all blocks, where as K.S.Nagar block is having 12 no of ramps and hand rails which is lowest among all blocks.(Appendix-4)

7. An amount of Rs. 7000/- to each school has been deposited in favour of Village Education Committee & Head Master of concerned schools in the month of July 2010. The construction work had been completed by direct supervision of Block Resource Teacher, Block Resource Centre Coordinators of concerned blocks. But still there is need of construction of modified toilet which is very negligible in nature and no data was available in documented form.

B. Analysis of Interview Schedule of Head Master/Head Mistress

1. Out of 10 schools, 40% schools were having 2 numbers of CWSNs where as other 20% schools were 3, 30% schools were having 5and rest 10% schools were having single number of CWSNs. All together there were 30 CWSNs in those sample schools and each school had at least one CWSN with orthopedic handicapped (O.H) or Cerebral Palsy (C.P).(Appendix-6)

2. When H.Ms are asked who are the different functionaries related to Identification and Assessment 40 % replied may be doctors and resource teachers .They said that this is not our job .This should be done by the government and when CWSNs will admitted to our school we will take care of them. Whereas rest 60% H.Ms had thorough knowledge of

Identification and Assessment procedure and they said that they themselves visit the home to get that child admitted to in their school and resource teacher helps the parents as well as motivate them to attend single window camp for proper identification and assessment. The Head Masters were very positive in their attitude towards the education of CWSNs.

3. 100% H.Ms replied that their schools have Learning corners, for special children, TLM for disabled children, Ramps, Handrails. But 10% H.Ms replied that they have modified toilet and resource room facilities. That means in rest 90% schools had no resource room or modified toilet. Though 60% H.M. agreed that they have received grant for toilet and soon it will be started. In emergency, parents of CWSNs are called and students are sent to their home if not then out side school campus is used for that purpose. Though 10% schools had resource room but that was never used by the resource teacher as reported by the H.M.

   But as far as researcher's observation is concerned 90% schools had no Learning corner for CWSNs and classes were over crowded. Even it was difficult for the class teacher to manage the class. CWSNs with speech and hearing impairment or orthopedic impairment were very well accommodated in those class rooms. The excellent part was CWSNs and peer group interaction. But CWSNs with Severe MR category or CP category were isolated and were seated towards last row and they were silent and as per teacher's view due to severe disability neither they themselves participate nor their peer group take any initiation to interact with them .There was no interaction at all with peer group. Though they were physically present in the class still they were isolated. It should be taken care for their better participation.

4. Out of 10 schools, all schools (100%) were having ramps with handrails. As far as researcher's observation is concerned except 20% of schools in rest of the schools ramps were not properly constructed for independent movement of CWSNs. It was difficult for O.H children to move without escort's support. When H.M asked about this he said these ramps were made before we get any guidelines regarding construction, so now we will modify it for better and easy access.

5. It was found that 100% schools had no access for wheel chair and tricycle into class rooms as doors of classrooms were not wide enough for entry of any tri cycle or wheel chair. It was found that in 100% schools, classes were over crowded. Due to this reason it was difficult to accommodate CWSNs with assistive devices like wheel chair or tri-cycle. In every school either tricycle/wheel chairs were found out side the class room or below the veranda where ramps were steep.

6. 30% schools having two wings had a single ramp in one wing and there was no ramp at all in other wing and which was in accessible for O.I/C.P children having class in that wing. When H.Ms asked they replied that it is due to new admission and we are supposed to change the classes to this accessible wing. It shows least concern of Head of the institute towards CWSNs and about their education.

7. When H.Ms asked about attendance and regularity of CWSNs 60% responded that O.H students are better in their class room performance and are regularly coming to the school where as 40% H.Ms replied that though O.H students are good at study but they don't

come to school regularly because parents belong to BPL group and they leave the home early in the morning to earn their bread and butter. Due to heaviness of wheel chair CWSNs are unable to come to the school independently. They need an escort. Even CWSNs with severe category were not regular to the school.

So, without escort severe category of MR, O.H and CP CWSNs were unable to come to the school.

8. 70% H.Ms responded that assessment of 100% CWSNs done by I.E professionals but 70% children have disability certificate and 30% students possess bus/rail concession. Where as 30% H.Ms replied that 30% students neither have disability certificate nor other services. Though they have already assessed but yet they have not received any disability certificate or hearing aids.

When the reason is asked it was found that either due to negligence of parents or concerned authority and aids and appliances is not provided to CWSNs in time.

District coordinator said that mainly due to short of professionals in ALIMCO they are unable to provide it in time. Sometimes late assessment of children and demand by the district is send late to ALIMCO unable to supply the required aids and appliances in time. 60 % H.Ms replied that 60% parents of severe category of CWSNs are provided with escort allowance.

So, if we want to provide better education for CWSNs first of all we have to take care of preliminary needs like physical access which include school preparedness and assistive technologies in order to provide them access to other support services.

Conclusion

A child with a special need can make use of educational support services only if schools are made barrier free i.e. physically accessible. Therefore, removal of architectural barriers in schools should be undertaken for easy access of children with special needs, especially those with loco-motor problems. Effort should be taken to provide disabled-friendly facilities in schools. Undoubtedly quality is a matter of concern. However; lack of proper input like physical access, imparting quality inclusive education to children with special needs would never be possible because, better process needs a better input.

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WOMEN EMPOWERMENT IN INDIA: LEGISLATIVE GOALS AND REALITIES

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ABSTRACT

The principle of gender equality is enshrined in the Indian constitution-in its Preamble, Fundamental rights and the Directive Principles. The Constitution not only grants equality to women but also empowers states to adopt measures of positive discrimination in favour of women. Government laws, developmental policies, plans and programs have aimed at women's advancement in every sphere. The 73rd and 74th constitutional amendment, 1993 have provided for reservation of seats in the local bodies of panchayats and municipalities for women, which are considered historical in women's participation in decision making at the local level. Despite all these, various reports confirm that women conditions have not improved much in India. Crimes against women continue to increase and they are conferred inferior status in the society. The present paper explores the various legislative measures for attaining women empowerment on one hand and the current status of women as per UN reports on the other hand. The underlying causes for the dilapidated conditions of the women are analyzed. How education can only bring transformation in society perceptions and accomplish women empowerment is highlighted.

Key- words: Empowerment, Education, Legislation.

Introduction

The most common explanation of word 'empowerment' is the ability to exercise full control over one's actions. Women Empowerment refers to increasing the spiritual, political, social and economic strength of women. It involves the empowered developing confidence in their own capacities. It can be perceived as a process where women's awareness, consciousness, choices with life alternatives, resources at their disposal, voice, agency and participation increases. These ultimately enhance women's capabilities and decisions they take individually or collectively for themselves. Thus, we can say women empowerment means the process through which women who are currently discriminated in society achieve gender equity. Empowerment occurs when women achieve increased control and participation in decision making that leads to their better access to resources and improved socio-economic status. Experts opine that there are five levels of women empowerment i.e. welfare, access, conscientisation, mobilization and control. Welfare means an improvement in socio-economic status e.g. nutrition, shelter etc. It is the zero level of women empowerment where women are passive recipients of benefits. Access is considered as the first level of empowerment as women are able to have access to resources and services by their own works .Conscientisation is the second stage where women collectively urge or act to remove discriminatory practices. Women at this level adopt strategies for action to get gender equity. Mobilisation is the action stage of women empowerment and women get connected with wider women's movement and struggle for their own empowerment. Control is the last level of women empowerment where women have taken action so that there is gender equity in decision making, access to resources and women achieve direct control of their life. The concept of Women empowerment was introduced at the International women conference in 1985 at Nairobi. The 4th world conference on women, Beijing in 1995 identified certain qualitative and quantitative indicators of women empowerment (Chandra, R., 2010).which are as follows:

Qualitative indicators of women empowerment:

1. Increase in self-esteem, individual and collective confidence
2. Increase in articulation, knowledge and awareness on health, nutrition reproductive rights, law and literacy
3. Increase in personal leisure time and time for child care
4. Increase on decrease of workloads in new programmes
5. Change in roles and responsibility in family and community
6. Visible increase on decrease in violence on women and girls
7. Responses to changes in social customs like child marriage, dowry, discrimination against widows
8. Visible changes in women's participation level attending meeting, participating and demanding participation
9. Increase in bargaining and negotiating power at home and in community
10. Increased access to and ability to gather information
11. Formation of women collectives
12. Positive changes in social attitudes
13. Awareness and recognition of women's economic contribution within and outside the household
14. Women's decision over her work and income

Quantitative indicators of women empowerment:

1. Demographic trends such as maternal mortality rate, fertility rate, sex ratio, life expectancy at birth and average age of marriage
2. Number of women participating in different development programmers
3. Greater access and control over community resources/government schemes -crèche, credit cooperative, non formal education
4. Visible change in physical health status and nutritional level
5. Change in literacy and enrollment levels
6. Participation levels of women in political process.

Women empowerment through legislative measures

The Constitution of India is committed not only towards equality to women but also empowers states to adopt measures of positive discrimination in favour of women. Government laws, developmental policies, plans and programmes have aimed at women's advancement in every sphere. The constitution of India guarantees: to all Indian women equality (Article 14), no discrimination by the State (Article 15(1), equality of opportunity (Article 16), equal pay for equal work (Article 39(d). In addition, it allows special provisions to be made by the State in favour of women and children (Article 15(3)), renounces practices derogatory to the dignity of women (Article 51(A) (e)), and also allows for provisions to be made by the State for securing just and humane conditions of work and for maternity relief (Article 42).

Apart from these, there are number of Acts related to women issues: The immoral traffic (Prevention) Act, 1956, The indecent representation of women (Prevention) Act, 1986.,The Dowry prohibition Act, 1987, The prohibition of child marriage Act, 2006, Protection of women from Domestic violence Act, 2005.and National Commission for women, Act, 1990.

India ushered into the new millennium by declaring the year 2001 as the women's empowerment year, 'Swashakti'. The national policy for empowerment of women, 2001 has outlined three policy approaches for achieving the target (Bhardwaj, S.K. , Rani, S. ,2011):

1. Judicial /Legal empowerment-by making the legal system more responsive and gender sensitive for women's needs.
2. Economic empowerment- by mainstreaming gender perspectives in the development process, enhancing women's capacities and access to economic opportunities.
3. Social empowerment by adopting programmes for education, health and nutrition of women.

In accordance with these policy approaches, a number of women empowerment programmes and schemes are run by the Government such as STEP, 1987- to support training and employment programs for women; Swayamsudha- Integrated scheme, 2001 for empowerment of women; Swadhan ,2001- to provide holistic and integrated services to women in difficult circumstances; Ujjawala 2007- for prevention of trafficking of women; .National Mission for Empowerment of women,2010- to empower women socially, economically and educationally; Dhalaxmi- 2008 for development of girl child; Nutrition Programmes for adolescent girls (NPAG-2005) for improving the health of adolescent girls.

Gender budgeting has been adopted as a powerful tool for gender mainstreaming and ensuring that benefits of development reach to women as much as men. 73rd and 74th Constitutional amendments 1993 were historical in women empowerment perspective as it provided for 33% reservation for women in the local governance. However, this has been further increased to50%.

The current status of Indian women as per various reports

The various beneficiary measures have helped women to attain their due respect and place in the society or not is the grave question that looms over us. The incessant incidences of violence and crime against women reveal a sad picture. As per reports of the United Nations Resident Co-ordinator in India(Menon-Sen and Shivakumar, 2001) titled' Women in India: How Free? How Equal?', several disturbing issues concerning the current status of women in India is raised .Data from the Human development report,2001 and the Census of India 2001 ,too reveals that Indian women continue to be excluded in the society and remain as second grade citizens in almost every sphere. It will not be exaggeration to say that there exists a wide gap between the goals and the real status. Some of the threatening disclosures regarding the status of women are as follows:

- The continuously declining female ratio (from 946 in 1951 to 933 in 2001 census) is the strongest evidence of gender discrimination. It indicates female infanticides and sex selective abortions are rampant.
- Reports reveal that in most Indian families, women do not own any property in their own names and do not get share in parental property.
- Crimes against women have increased as per police records. Police records for the country as a whole show that a woman is molested every 26 minutes. A rape occurs every 34 minutes. Every

42 minutes, an incident of sexual harassment takes place. A woman is kidnapped every 43 minutes. And every 93 minutes, a woman is killed.

- Dowry deaths continue unabated; as per reports at least 5,000 women die each year because of dowry deaths, and at least half a dozen die each day in kitchen fires- thought to be intentional.
- According to UNICEF-State of world's children -2009 reports, 47% of Indian girls are married below age of 18. The report also show 40% of world's child marriages occur in India
- Trafficking of young girls and women continue flourishing and they are forced into prostitution.
- The girls and women continue to face nutritional discrimination within the families. In 1998 – 1999, only 48 percent of married women in the reproductive age group used any form of contraception (World P o p u l a t i o n Monitoring, 2000). This figure is much lower(30%) in poorer states like Uttar Pradesh and

  Bihar._ For many women, abortion is the only method of contraception available.
- More than 570 women die per 100,000births (World Population Monitoring,

  2000), 70 percent of these deaths are due to totally avoidable reasons.
- Women are under-represented in governance and decision-making positions.
- Most women do not have any autonomy in decision making in their personal lives.
- Less than 50 percent of women have access to money in the household.
- Women face violence inside and outside their family, as well as at the workplace.
- The maternal mortality in India is second highest in the world and 88% of pregnant women suffer from anemia (UNDP, Human Development Report).

The underlying causes for the poor achievement of the goals

There is no doubt that despite all the good intentions, women's plight have not improved whereas it has further deteriorated in some spheres. Leaving a meager number of urban and semi-urban women, vast number of Indian women is still crying for social justice. The discrepancy in the ideology and practice of the empowerment policy of women in India is very well revealed. The 73rd and 74th Amendments of the Constitution guaranteeing women's political participation are being boasted by the government as the landmark in women's empowerment but the universal occurrence of proxy and dummy women candidates in local panchayat elections is the common phenomena today and it reflects the real scenario of women empowerment. The money and muscle associated with the electoral process inhibits women from joining politics on their own. Restriction on mobility, lack of control over resources and low literacy rates are the major obstacles. A women needs to be healthy to meet the challenges of empowerment, but Indian women lack even in basic health resources and are at the risk of unwanted, early pregnancies and severe malnutrition. The majority of women are engaged in agricultural sector, which has been worst affected in recent years thereby making them more vulnerable. There is severe lack of basic infrastructure facilities in villages and cities. Access of safe drinking water, sanitation and cooking fuel has direct impact on the lives of women which are in worst conditions in rural areas. A woman has to walk miles for getting one bucket of water. Dilapidated transport facilities further aggravate their living conditions. Economic policies lack gender perspectives and fail to enhance their social and economic position.

Empowerment would become only relevant when women are self reliant, confidant, educated and can take rational decisions. Women's empowerment has to be seen in holistic perspective i.e. in all areas such as political, socio-cultural, religious, political, legal and economic spheres. The underlying causes of women discrimination are deeply rooted in the patriarchal and gender stereotyped social, economic structure of our country. Prevalence of cultural attitudes and practices that promote the low value and disrespect of girls are the major hurdles. Economic disparities are also acute because much of the unpaid work within families and communities are done by women. Women's disproportionately higher share of domestic responsibilities further restrains their opportunities for development. It is thus important to bring changes in societal attitudes and perceptions with regard to the role of women in different spheres of life. Vast adjustments have to be made in traditional gender specific work allotment in the society. The current education fabricated on western materialistic ideals has failed to address the fundamental issues of equity, justice, dignity and the practices of sustainability. It has moreover created situations of exploitations, unrest, absence of sensitivity and empathy. The modern consumerist society portrays women as commodity and has done irrepressible damage to their image.

Education as a means for women empowerment

It is rightly been pointed by social reformers that education is the strongest positive interventionist for women upliftment. It is a significant instrument for changing women's subjugated position in the society. There are numerous studies demonstrating a positive link between education and a variety of demographic indicators such as fertility, infant and child mortality and morbidity (Veikoff, V. A. ,1998) Education has to play a decisive role in making women self reliant and increasing their autonomy so that they can take part in the decision making both at home and in public places. They have to be educated, in true sense which shall enable them to respond to the challenges of the society and they are able to confront with their traditional roles. Education benefits a woman in life-altering ways. An educated woman gains higher status and an enhanced sense of efficacy. She also has greater bargaining power in the household, tends to desire a smaller family size and seeks the necessary health care for themselves and their children. She has high educational and career expectations of her children, both boys and girls. Education profoundly changes the way they interact with society, and positively affects their economic status. Thus we can say educating women creates more equitable lives for women and their families and increases their ability to participate in community decision making. It enhances their self-respect and dignity. It even gives platform for the women to raise their voices.

Vast reforms are needed in our current education system at the primary, secondary and at the higher education levels. Education programme needs to address gender sensitization. Positive self-image of the girl child has to be build and large scale efforts to conscientise and mobilize women on gender issues is required. In other words, our education needs to incorporate gender perspectives through measures such as:

- Inclusion of topics in the curriculum related to understanding gender and the unequal discriminative conditions and position of women.
- Sensitization and equipping teachers to address gender issues in the classroom.

Gender mainstreaming has been proposed at the Fourth World Conference on women. C**apacity building for gender mainstreaming has to be done through education. This can be accomplished** through three successive stages:

a. Capacity building for women –by developing in them confidence of their capacities in

non-traditional areas like leadership, governance and in empowerment.

b. Capacity building for men, mainly aims to change men's gender attitudes, eliminate gender-based violence, enhance men's capacities in sustainable roles and relationships with women.

c. Social capacity building is about gender stereotypes, discriminatory behaviour, attitudes and practices in the society. The third area deals with developing gender analyses in all realms of society where differences between women's and men's access to resources, benefits and control over participation and decision-making, exist.

Thus, the process of women empowerment can only be gradually accomplished through educational reconstruction of the social, economic and political fabric of the country. The current education has to integrate the issues of sustainability, morality and equality perspectives in order to change the prevalent biases and perceptions regarding women.

Conclusion

Women empowerment can not be achieved only through a few legislative measures and legal provisions. Political empowerment holds little meaning unless social and economic restructuring in favour of women is done. A long term vision is required to remove the obstacles in the path of women's empowerment. The deep rooted gender discrimination in the society can only be removed through right education, awareness, gender sensitization and gender mainstreaming. It is being rightly quoted that women's education is the key of keys to bring about revolution in women empowerment (Basu, A., 2010). Efforts should be directed towards all round development of each and every section of women through proper economic, social and educational endeavours.

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A COMPARATIVE STUDY OF ADJUSTMENT OF VISUALLY IMPAIRED AND SIGHTED ADOLESCENTS

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ABSTRACT

This paper is related to the comparative study of adjustment of visually impaired (VI) and sighted adolescents. The sample has been taken from schools in Varanasi. The study reveals that Sighted adolescents were found to be better adjusted than that of visually impaired adolescents. VI adolescents in integrated settings are found to be better adjusted in compare to those in special setting. Sighted adolescents were found to be more adjusted than those of the VI adolescents in special setting. Sighted and VI adolescents in integrated settings were found to be similar in respect of their adjustment. The paper includes the details related to this study.

Key-words: Adjustment, Visually Impaired Students

Introduction

Visual impairment is a medical phenomenon. It relates to impaired sense of vision loss. Usually vision is the most actively used by man and hence, his knowledge grows mainly form his visual experiences. Blindness limits perception and cognition in three ways, ie (i) in the range and variety of experiences, (ii) in the ability to get about, (iii) in the control of environment and the self relation to it. These limitation delays developmental stage characteristics compared to that of sighted counterparts.

Adolescence is the period of transition from childhood to adulthood. It extends from 12 years to the 19 or 20 years of age. The term 'adolescence' is derived from Latin word which means "to grow to maturity'. Thus, it is a process rather than a period, a process of achieving the attitude and believes needed for effective participation in society (Roger 1981). It has been regarded as a period of rapid change, both biologically and psychologically. Although adolescents may face period of uncertainty, loneliness, self-doubt, anxiety, joy and feeling of competence as they overcome the developmental challenges. A sensory deprivation limits the world of experiences. It deprives the organism of some material resources from which the mind develops. When one type of sensation is lacking, it alters the integration and functions of all others. It is therefore, essential to understand the special needs of visually handicapped adolescents. Success in working with such persons depends upon understanding their special needs.

When a man deviates from the normalcy he tries to adjust himself to the extent of deviation. If the deviation from physical and social norm is extensive and vital a total reorganization of life-pattern is indicated. Visual disability creates a situation in which both physical and social demands necessitate such total reorganization on the part of the handicapped person. Reorganization is a form of response to demand to adjust which, in turn, is response to a reality situation. Its purpose is to secure optional conditions for living. But this task is particularly hard to achieve because of severe reactions due to the loss of vision which is regarded as the most important and vital organ for living.

Blindness always produce shock it affects the parents and the family members, and the individual who is afflicted with it. The absorption of shock, both physical and emotional is prerequisite to adjustment to disability. Blindness may produce denial or depression in the individual

or the parents. It has been seen, those who show mainly denial tend to be "excessively disabled", in contrast to those who manifest depression and more adequate later adjustment.

There have been some studies regarding the adjustment of visually impaired and sighted adolescents Sharma (1998) reported that visually impaired students of secondary schools were found to be more frustrated than sighted ones. Sujata Bhan (2005) found significant difference in self-concept of sighted peers and visually young adult. Rai (1992) reported that generally blind adolescents are emotionally unstable, frequently unhappy react emotionally to trivial situations. They may lose their temper easily and. frequently, be moody or irritable: they often appear tense or anxious and weep under stress. In new situations, they may be either fearful and timid or overtly aggressive. The studies based on socio-economic status and adjustment reflected that there is significant positive correlation between emotional adjustment and socio economic status. Higher the socio-economic (SES) better the adjustment. Similarly, significant and positive correlation were also found between emotional adjustment and interaction of the blind subjects with the sighted and also between emotional adjustment and acceptance of blindness. It can, therefore, be concluded that emotional instability may occur as a consequence of blindness, but it may also need not necessarily occur as a result of blindness. Bhargava (1981) reported that VI individuals experience the problem in social adaption but they are not uniformly deficient.

Visually impaired having similar needs as sighted adolescents. They continuously interact to their surrounding to satisfy their needs, it may be home, school, peer group and their own emotion. Visually impaired having limited experience and opportunity posed serious problem to adjust. Thus, for proper adjustment of visually impaired adolescence, it is essential for parents, teachers, peer groups have positive attitude which in turn develop positive self concept and positive attitude .This can be achieved only though proper attitude and awareness regarding visually impaired young adult towards society and vice versa. Adjustment is essential for rehabilitation. The present study is an humble endeavor in this respect.

Objectives of the study—

The objectives of the study comprises flowingly—

1- To compare the adjustment of sighted and VI adolescents.

2- To compare the adjustment of VI adolescents in special and integrated settings.

3- To compare the adjustment of sighted and VI adolescents in special settings.

4- To compare the adjustment of sighted and VI adolescents in integrated settings.

Hypotheses—

H_{01}— There is no significant difference in adjustment of sighted and VI adolescents.

H_{02}—There is no significant difference in adjustment of VI adolescents in special and integrated settings.

H_{03}—There is no significant difference in adjustment of sighted and VI adolescents in special setting.

H_{04}—There is no significant difference in adjustment of sighted and VI adolescents in integrated setting.

Methodology—

Sample—It is survey type of research comprising 100 randomly selected adolescents in all including 30 VI adolescents in special setting, 30 VI adolescents in integrated setting, and 40 sighted adolescents form three schools of Varanasi district. A self made adolescents adjustment scale has been used in the present study. It consists of 30 items having 10 items each related to home, school

and personal areas respectively. Data was analyzed by using statistical techniques as mean standard deviation (SD) and t- test.

Results and Discussion—

The results and their respective discussions are given below in a tabular for—

Table-1
Mean, SD and value for the Adjustment of Sighted and VI Adolescents

S. N.	Adolescents	N	Mean	SD	t- value
1	Sighted	411	65.55	5.15	5.60*
2	VI	60	58.86	6.76	

*** Significant at .05 level**

Table 1 shows that t- value of 5.60 is Significant at .05 level. Thus, the null hypothesis that there is no significant difference in adjustment of VI and sighted adolescents is rejected. It means there is significant difference between adjustment of VI and sighted adolescents. Such result may be due to the reason that the sighted adolescents have greater exposure than that of the VI ones. This Result is in consonance with the finding of Sharma (1998) and Rai (1992)

Table-2
Mean, SD and value for the adjustment of VI Adolescents in Special and Integrated Settings

S. N.	Settings	N	Mean	SD	t-value
1	Integrated	30	64.55	4.20	11.77*
2	Special	30	53.10	3.25	

*** Significant at .05 level**

Table 2 shows that t- value of 11.77 is Significant at .05 level. Thus, the null hypothesis that there is no significant difference in adjustment of VI adolescents in special and integrated settings is rejected. It means there exists a significant difference between adjustment of VI adolescents in special and integrated settings. Probable reason for this result may be due to the integrated set-up having varieties of exposure compared to that of special setup which, in turn, provide better social and personal interaction. These healthy inter-personal and intra-personal experiences boost up their morale fetching good result in terms of proper adjustment either at home, school or a personal area.

Table-3
Mean, SD and value for the Adjustment of Sighted and VI Adolescents in Special Setting.

S. N.	Adolescents	N	Mean	SD	t- value
1	Sighted	40	65.55	5.15	13.45*
2	Special	30	53.10	3.25	

*** Significant at .05 level**

Table 3 shows that t- value of 13.45 which is significant at .05 level. Thus, the null hypothesis that there is no significant difference in adjustment of sighted and VI adolescents in special settings is rejected. It means there exists a significant difference between adjustment of sighted and VI in special settings.

This may be due to reason that VI adolescents in special setup, having restricted exposure hamper the self-confidence, reduce problem solving ability and affect the adjustment process.

Table -4

Mean, SD and value for the Adjustment of Sighted and VI Adolescents in Integrated Setting.

S. N.	Adolescents	N	Mean	SD	t- value
1	Sighted	40	65.55	5.15	0.892*
2	VI	30	64.55	4.20	

*** Not Significant at .05 level**

Table 4 shows that t- value of 0.892 is not Significant at .05 level. Thus, the null hypothesis that there is no significant difference in adjustment of sighted and VI adolescents in integrated settings is accepted. It means that sighted and VI adolescents are same so far as their adjustment is concerned in integrated setting.

This may be attributed to the reason that sighted adolescents having greater exposure strengthen self-confidence in adjustment in the same way as VI adolescents in integrated setup.

Conclusion :

The following are the conclusions regarding the study :

1- Sighted adolescents were found to be better adjusted than that of visually impaired adolescents.

2- VI adolescents in integrated settings are found to be better adjusted as compared to those in special setting.

3- Sighted adolescents were found to be more adjusted than those of the VI adolescents in special setting.

4- Sighted and VI adolescents in integrated settings were found to be similar in respect of their adjustment.

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विद्यार्थियों की अभिरूचि पर बहुआयामी शैक्षिक उपागमों का प्रभाव : एक अध्ययन

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ABSTRACT

In this study the researcher has studied about the effect of Multimedia on the interest of Higher Secondary students. The researcher selected 100 students by random sampling method from the Schools of Urban and Rural areas of Ambikapur District. Researcher used Adolescent Interest Test and Self-made Questionnaire for this study. The findings of this study revealed that the multimedia effects the imagination as well as creativity of the students. The effect of multimedia is very positive. The study also reveals that it also increases the talent in the creativity of the students which is very important for their overall development.

Key-words: Impact, Multimedia Educational Approaches, Interest.

शिक्षा का मुख्य उद्देश्य व्यवहार में परिवर्तन लाना है, जिसका परिणाम अधिगम उपलब्धि है। शिक्षा से अभिप्राय उन सभी साधनों तथा प्रक्रियाओं के कुल योग से है, जो व्यक्ति योग्यता, क्षमता, अभिवृत्ति तथा सकारात्मक मूल्यों और उनके व्यवहारों से उसे उस समाज के अनुकूल बनाती है, जिसमें वह रहता है। शिक्षा को ऐसा प्रभाव कहा गया है जो व्यक्ति के विचार, व्यवहार, स्वभाव आदि में स्थाई परिवर्तन लाता है। हम जो आज अपने दैनिक जीवन और व्यवसाय कि दुनियाँ को बड़े ही सुविधाजनक और प्रगतिपूर्ण ढंग से जी रहे हैं उसके पीछे तकनीकी क्षेत्र में हो रहे बहुआयामी प्रगति और विकास का बहुत बड़ा हाथ है। आज हमारे जीवन का कोई भी क्षेत्र और कोना ऐसा नहीं है जहाँ तकनीकी ज्ञान और कौशल के उपयोग का आनंद हमारे द्वारा नहीं उठाया जा रहा फिर शिक्षा इससे अछूती कैसे रह सकती है। शिक्षा प्रक्रिया और उसके परिणामों के सभी तरह के नियोजन क्रियान्वयन और प्रबंधन में आज तकनीकी अपना बहुमूल्य योगदान दे रही है। ऐसा सब कुछ करने में हार्डवेयर तथा सॉफ्टवेयर, प्रिंट मिडिया तथा नॉन प्रिंट मिडिया के रूप में उपलब्ध वैज्ञानिक तथा तकनीकी ज्ञान और सिद्धांतों ने ही अपना चमत्कार दिखाया है। इसी के सहारे आज हम शिक्षा अधिगम प्रक्रिया को इस तरह नियोजित, क्रियान्वित एवं प्रतिबंधित करने में सक्षम सिद्ध हो सकते हैं कि कम से कम समय में कम से कम शक्ति और साधनों का उपयोग करते हुये अच्छे से अच्छे और बेहतर से बेहतर शिक्षण अधिगम परिणामों की प्राप्ति संभव हो सके।

शिक्षा को ऐसा प्रभाव कहा गया है, जो व्यक्ति के विचार, व्यवहार, स्वभाव आदि में स्थाई परिवर्तन लाता है। शिक्षण के लिये वैज्ञानिक विधि का प्रयोग निष्कर्षों तक पहुंचने के लिये अति प्राचीनकाल से किया जा रहा है, जिसका परिणाम यह हुआ है कि वर्तमान युग विज्ञान का युग बन गया है। शिक्षा प्रक्रिया का उद्देश्य बालक के व्यवहार में वांछनीय परिवर्तन करके उसका सर्वांगीण अर्थात् शारीरिक, मानसिक और आध्यात्मिक विकास करना है ताकि वह अपने परिवार और समाज का कल्याणकारी सदस्य बन सके और जीवन के उत्तरदायित्वों को योग्यता एवं कुशलता से निभा सके।

हेब्टेमरिअन (2010) के अनुसार अनेक मल्टीमिडिया प्रोग्राम इस प्रकार के हैं कि बच्चे स्वयं अपनी समझ से मल्टीमिडिया का उपयोग कर प्राप्त सूचनाओं की विवेचना कर सकते थे। अधिगम प्रक्रिया अधिक प्रभावशाली हुई। श्रीमिवसन एण्ड मुठुमनीकम (2010) ने निष्कर्ष प्राप्त किया कि कम्प्यूटर असिस्टेड इन्सट्रक्शनल कार्यक्रम (CAIP) के द्वारा पढ़ने से बच्चों की उपलब्धि में वृद्धि हुई है। CAIP के माध्यम से अध्ययन करने से बच्चों में

रूचि पाई गई। बच्चों ने इस कार्यक्रम का आनंद लिया। कपाड़िया (1992) के अनुसार 77 प्रतिशत छात्रों ने कहा कि टेलीविजन का माध्यम स्व शिक्षण को प्रोत्साहित करता है। हार्ले एण्ड हेगना (1955) ने पाया कि रूचियों का निर्धारण अभिक्षमता से होकर व्यक्तित्व विकास से होता है। स्ट्रांग (1943) के अनुसार रूचियों के निर्धारण में अभिक्षमता, योग्यता, पुरस्कार तथा सन्तुष्टि आदि की महत्वपूर्ण भूमिका होती है। राजिक एण्ड जकारिया (1995) के अनुसार किशोरों की अभिरूचि उनकी आयु, लिंग एवं एस.ई.एस. के आधार पर बदलती है। अधिक एस.ई.एस. वाले विद्यार्थी सामाजिक गतिविधियों एवं संगीत में अधिक अभिरूचि रखते थे, जबकि मध्य एस.ई.एस. विद्यार्थी निष्क्रिय रहते थे। तोडस (2008) ने कला एवं विज्ञान समूह के विद्यार्थी में कम्प्यूटर एवं इन्टरनेट के ज्ञान में सार्थक अंतर पाया। अनुराधा (1991) के अनुसार बच्चे टी.वी. कार्यक्रम में खेल कार्यक्रम देखने में रूचि रखते हैं। रवीन्द्रनाथ (1992) ने निष्कर्ष प्राप्त किया बहुमाध्यम का अध्ययन में प्रयोग करने से वैज्ञानिक अभिवृत्ति, विज्ञान विषय के प्रति रूचि उच्च हुई।

उक्त अध्ययनों के निष्कर्षों में मल्टीमिडिया की प्रभावशीलता के परिणामों में भिन्नता पाई गई। अतः कुछ शोध प्रश्नों को हल करने हेतु यह अध्ययन सार्थक होगा।

किसी भी कार्य को सम्पन्न करने में और उसके प्रारंभ करने में समस्या उत्पन्न होना स्वाभाविक है। यह एक स्वभाविक सी प्रक्रिया है। किन्तु कार्य करने से पहले समस्या का चयन करना कठिन कार्य है। समस्या ऐसी होनी चाहिये जिसकी बालक के व्यक्तित्व के विकास में कुछ उपयोगिता एवं आवश्यकता हो।

अभिरूचि का वास्तविक उद्देश्य केवल विषय के प्रति आकर्षण न होकर वांछित दिशा में व्यवहार में सुधार लाना है। यही व्यवहार आगे चलकर अभिरूचि का रूप ग्रहण करता है और बहुआयामी शैक्षिक उपागम के द्वारा शिक्षण समान होने पर भी बालकों के रूचि का परिणाम भिन्न–भिन्न होता है। यही कारण है कि बहुआयामी शैक्षिक उपागमों के द्वारा शिक्षण प्रक्रिया में विद्यार्थियों की रूचियों में भिन्नता होगी। विद्यार्थी जिन कार्यों और खेलों में अधिक रूचि रखते हैं वे उनको करने और सीखने के लिये अधिक प्रयास करते हैं। वास्तविक रूचियाँ बालक के जीवन में अधिक स्थायी होती हैं। अतः बहुआयामी शैक्षिक उपागम के द्वारा शिक्षण में विद्यार्थियों की कैसी रूचियाँ हैं और कितनी मात्रा में हैं तथा उच्चतर माध्यमिक स्तर के छात्र–छात्रायें किस हद तक प्रभावित हैं। इसी की जानकारी के लिये इस शीर्षक का अध्ययन किया।

वर्तमान में शिक्षा केवल सैद्धांतिक ज्ञान तक ही सीमित नहीं है, वरन् शिक्षा में कई मल्टीमिडिया उपागमों का प्रयोग बढ़ता जा रहा है या यूं कहें कि शिक्षा का प्रत्येक क्षेत्र दिन प्रतिदिन व्यवहारिक होता जा रहा है तथा शिक्षा के क्षेत्र में विभिन्न बहुमाध्यमों के प्रयोगों पर जोर दिया जा रहा है, ऐसी स्थिति में अति आवश्यक है कि वर्तमान में विद्यार्थी केवल पुस्तकीय ज्ञान तक सीमित न रहे वरन् शिक्षा के क्षेत्र में बहुमाध्यमों के प्रयोग एवं महत्व को जाने एवं समझे यह अति आवश्यक है तथा इसके प्रति एक स्वरूप एवं सकारात्मक सोच का विकास करें तथा अपने आने वाली पीढ़ी को भी एक सकारात्मक सोच प्रदान करें। अतः परिवर्तित परिवेश में शिक्षा के क्षेत्र में जो परिवर्तन हो रहे हैं उनके प्रति छात्रों की बहुआयामी शैक्षिक उपागमों की प्रभावशीलता का अध्ययन करना आवश्यक होगा। क्या छात्रों की अभिरूचि, समायोजन स्तर एवं वैज्ञानिक अभिवृत्ति को बहुआयामी शैक्षिक उपागम प्रभावित करता है? क्या उनकी उपलब्धि व्यक्तिगत होगी? आदि प्रश्नों का उत्तर प्राप्त करने में अध्ययन सार्थक होगा।

शिक्षा के गिरते स्तर के कई कारणों में से मुख्य कारण यह है कि छात्रों की बहुआयामी शैक्षिक उपागम के प्रति प्रभावशीलता में आने वाला परिवर्तन जो प्रत्यक्ष, अप्रत्यक्ष दोनो ही रूप में शिक्षा को प्रभावित करते हैं। विषय के इसी गंभीर मुद्दे को दृष्टिगत रखते हुये चयनित समस्या की अपनी आवश्यकता व उपयोगिता है।

अध्ययन का उद्देश्य :

1. विद्यार्थियों की अभिरूचि एवं बहुआयामी शैक्षिक उपागमों के मध्य सह–सम्बन्ध ज्ञात करना।
2. छात्र एवं छात्राओं की अभिरूचि पर बहुआयामी शैक्षिक उपागमों के मध्य सह–सम्बन्ध ज्ञात करना।

परिकल्पनाएँ :

प्रस्तुत अध्ययन में निम्नलिखित शून्य परिकल्पनाएँ निर्मित की गई थीं –

H_{o1} विद्यार्थियों की अभिरूचि एवं बहुआयामी शैक्षिक उपागमों के अध्ययन में प्रयोग के मध्य सार्थक सहसम्बन्ध नहीं होगा।

H_{o2} छात्र एवं छात्राओं की अभिरूचि एवं बहुआयामी शैक्षिक उपागमों के अध्ययन में प्रयोग के मध्य सार्थक सहसम्बन्ध नहीं होगा।

शोध विधि :

प्रस्तुत शोध में उसके प्रकृति के अनुसार सर्वेक्षण विधि (Survey Method) का प्रयोग किया गया।

न्यादर्श :

प्रस्तुत शोध कार्य हेतु अम्बिकापुर जिले के ग्रामीण क्षेत्र के 5 हायर सेकण्डरी विद्यालय के 25 छात्र तथा 25 छात्राओं का एवं शहरी क्षेत्र के 5 हायर सेकण्डरी विद्यालय के 25 छात्र तथा 25 छात्राओं पर अध्ययन किया गया, इस प्रकार कुल 10 हायर सेकण्डरी विद्यालय के 100 छात्र–छात्राओं को यादृच्छिक न्यादर्श के आधार पर लिया गया है।

सारणी क्रमांक – 01

विद्यालय	छात्र	छात्राएं	योग
ग्रामीण क्षेत्र के 5 विद्यालय	25	25	50
शहरी क्षेत्र के 5 विद्यालय	25	25	50
योग	**50**	**50**	**100**

प्रयुक्त उपकरण :

1. किशोर अभिरूचि परीक्षण (Adolescent Interest Test) (1986) – प्रस्तुत शोध अध्ययन में हायर सेकण्ड्री स्तर के विद्यार्थियों की अभिरूचि ज्ञात करने के लिये श्रीमती अल्का डेविड द्वारा निर्मित किशोर अभिरूचि परीक्षण मापनी का प्रयोग किया गया। मापनी में अभिरूचि के पाँच क्षेत्रों को सम्मिलित किया गया एवं इन क्षेत्रों के संदर्भ में विद्यार्थियों की अभिरूचि ज्ञात की गई। सूची में अभिरूचि के क्षेत्र – 1. खेल 2. कला एवं विज्ञान 3. साहित्यिक कार्य 4. सामाजिक एवं घरेलू मामले 5. विज्ञान एवं तकनीकी। प्रत्येक कॉलम में 5 विकल्प हैं, जिनमें से अपनी अभिरूचि वाले विकल्प का चुनाव करना है और उसमें सही ($\surd$) का निशान लगाना है।

2. बहुआयामी शैक्षिक उपागम प्रभावशीलता प्रश्नावली (Multimedia Educational Approaches Effectiveness Questionnaire) अध्ययनकर्ता द्वारा निर्मित (2009)– यह उपकरण हायर सेकण्डरी स्तर के विद्यार्थियों के लिये विकसित किया गया है ताकि छात्र–छात्रायें विद्यालय एवं विद्यालय से बाहर शिक्षा में बहुमाध्यम का प्रयोग का पता लगाकर उन्हें शिक्षा में बहुमाध्यम का उपयोग संबंधित उचित अवसर उपलब्ध कराया जा सके। उपकरण में बहुमाध्यम के निम्नलिखित क्षेत्रों को सम्मिलित किया गया है –

1. कम्प्यूटर 2. इन्टरनेट 3. रेडियो 4. एल.सी.डी., ओ.एच.पी. एवं सी.डी. रोम 5. टेलीविजन 6. फिल्म 7. न्यूज पेपर 8. टेपरिकार्डर 9. एजुसेट। उपकरण में वैधता आमुक वैधता (Face validity) तथा पद वैधता द्वारा मापी गयी।इसकी वैधता .63 एवं विश्वसनीयता गुणांक .74 प्राप्त हुई। वैधता एवं विश्वसनीयता ज्ञात करने के लिये आमुक एवं आंतरिक संगति विधि का प्रयोग किया गया है। प्रश्नावली में कुल 90 पद हैं जिसमें प्रत्येक के लिये 5 विकल्प पूर्ण सहमत, सहमत, अनिश्चित, असहमत, पूर्ण असहमत दिये गये हैं जिनके अंक क्रमशः 5, 4, 3, 2, 1 है तथा नकारात्मक प्रश्नों के अंक क्रमशः 1, 2, 3, 4, 5 है।

प्रदत्त विश्लेषण एवं निष्कर्ष निरूपण :

H_{o1} विद्यार्थियों की अभिरूचि एवं बहुआयामी शैक्षिक उपागमों के अध्ययन में प्रयोग के मध्य सार्थक सहसम्बन्ध नहीं होगा।

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विद्यार्थियों की अभिरूचि पर बहुआयामी शैक्षिक उपागमों के अध्ययन का सांख्यिकीय विश्लेषण

चर	सहसंबंधित चर	N	Mean	df	सहसंबंध r	सार्थकता	परिणाम
अभिरूचि	मल्टीमिडिया	100	154.78	198	-0.05	सार्थक नहीं है	अल्प कोटि का सम्बन्ध (ऋणात्मक)
	खेल	100	8.46				
	मल्टीमिडिया	100	154.78	198	0.01	सार्थक नहीं है	अल्प कोटि का सम्बन्ध
	कला	100	7.77				
	मल्टीमिडिया	100	154.78	198	-0.10	सार्थक नहीं है	अल्प कोटि का सम्बन्ध (ऋणात्मक)
	साहित्य	100	8.89				
	मल्टीमिडिया	100	154.78	198	0.01	सार्थक नहीं है	अल्प कोटि का सम्बन्ध
	सामाजिक कार्य	100	6.86				
	मल्टीमिडिया	100	154.78	198	0.78	सार्थक है **	उच्च कोटि का सम्बन्ध
	विज्ञान	100	8.00				

निष्कर्ष –

उक्त परिकल्पना के सार्थकता की जांच हेतु सहसम्बन्ध (r) परीक्षण किया गया।

- खेल के प्रति अभिरूचि एवं मल्टीमिडिया का अध्ययन में प्रयोग करने में ऋणात्मक अल्पकोटि का सह सम्बन्ध पाया गया। .01 सार्थकता स्तर पर सार्थक सह–सम्बन्ध नहीं है। अतः शून्य परिकल्पना स्वीकृत हुई। निष्कर्षतः कहा जा सकता है कि खेलों के प्रति अभिरुचि एवं मल्टीमिडिया के प्रयोग का कोई सम्बन्ध नहीं है।

- कला के प्रति अभिरूचि एवं मल्टीमिडिया का अध्ययन में प्रयोग करने में अल्पकोटि का सह सम्बन्ध पाया गया। अतः .01 सार्थकता स्तर पर सार्थक सह–सम्बन्ध नहीं है। निष्कर्षतः कहा जा सकता है कि कला के प्रति अभिरुचि एवं मल्टीमिडिया के प्रयोग का कोई सम्बन्ध नहीं है।

- साहित्य के प्रति अभिरूचि एवं मल्टीमिडिया का अध्ययन में प्रयोग करने में ऋणात्मक अल्पकोटि का सह–सम्बन्ध पाया गया। जो कि .01 सार्थकता स्तर पर सार्थक सह–सम्बन्ध नहीं है। जो विद्यार्थी साहित्य में रूचि लेते हैं वे विद्यार्थी मल्टीमिडिया का प्रयोग कम करते हैं। निष्कर्षतः कहा जा सकता है कि साहित्य के प्रति अभिरुचि एवं मल्टीमिडिया के प्रयोग का कोई सम्बन्ध नहीं है।

- सामाजिक कार्य के प्रति अभिरूचि एवं मल्टीमिडिया का अध्ययन में प्रयोग करने में अल्पकोटि का सहसम्बन्ध पाया गया। जो .01 सार्थकता स्तर पर सार्थक सह सम्बन्ध नहीं है। अतः शून्य परिकल्पना स्वीकृत हुई। निष्कर्षतः कहा जा सकता है कि सामाजिक कार्य के प्रति अभिरुचि एवं मल्टीमिडिया के प्रयोग का कोई सम्बन्ध नहीं है।

- विद्यार्थियों की विज्ञान के प्रति अभिरूचि एवं मल्टीमिडिया का अध्ययन में प्रयोग करने में सहसम्बन्ध उच्च कोटि का एवं .01 सार्थकता स्तर पर सार्थक सहसम्बन्ध पाया गया। अतः शून्य परिकल्पना अस्वीकृत हुई। जो विद्यार्थी विज्ञान के प्रति रूचि रखते हैं वे मल्टीमिडिया का प्रयोग अधिक करते हैं। निष्कर्षतः कहा जा सकता है कि विज्ञान के प्रति अभिरुचि एवं मल्टीमिडिया के प्रयोग का सार्थक सहसंबंध है।

विवेचना –

विज्ञान विषय के अध्ययन हेतु बच्चे मल्टीमिडिया का प्रयोग अधिक करते हैं, विषय के अध्ययन हेतु सन्दर्भ के रूप में इन्टरनेट के माध्यम से विषय सामग्री संकलित करते हैं। विभिन्न प्रायोगिक कार्य, प्रोजेक्ट कार्य हेतु कम्प्यूटर, इन्टरनेट का प्रयोग किया जाता है। विज्ञान विषय से संबंधित अनेक विभिन्न पाठों की सी. डी. आसानी से उपलब्ध हो जाती है। इस सन्दर्भ में तोडस (2008) ने कला एवं विज्ञान समूह के विद्यार्थी में कम्प्यूटर एवं इन्टरनेट के ज्ञान में सार्थक अंतर पाया। मल्टीमिडिया का अध्यापन में प्रयोग एवं उनके खेल, कला, साहित्य एवं सामाजिक कार्यों के प्रति रूचि में अल्प कोटि का सह–संबंध है, क्योंकि विभिन्न प्रकार के खेल खेलने जिसमें शारीरिक रूप से कार्य करने की आवश्यकता है। अनुराधा (1991) ने अध्ययन में प्राप्त किया कि बच्चे टी.वी. कार्यक्रम में खेल कार्यक्रम देखने में रूचि रखते हैं। कला विषयों के अन्तर्गत चित्र, पेन्टिंग, संगीत, नृत्य, नाटक आदि में सहभागिता लेने वाले बच्चे को मल्टीमिडिया का प्रयोग करने की आवश्यकता बहुत अधिक नहीं पड़ती। साहित्य के क्षेत्र में मल्टीमिडिया का कम प्रयोग करते हैं, इनमें पुस्तकों, पत्रिकाओं तथा समाचार पत्रों का उपयोग अधिक होता है बाकी माध्यम की तुलना में। सामाजिक कार्यों को करने के लिये मल्टीमिडिया का प्रयोग अधिक नहीं होता। स्वयं सम्पर्क करने, सहयोग, आपसी मेल–जोल से विभिन्न सामाजिक कार्य में सहभागिता रहती है। अतः मल्टीमिडिया का अधिक एवं कम प्रयोग करने वालों में सामाजिक कार्य के प्रति रूचि समान ही रहती है। श्रीमिवसन एण्ड मुठुमनीकम (2010) ने निष्कर्ष प्राप्त किया कि कम्प्यूटर असिस्टेड इन्सट्रक्शनल कार्यक्रम (CAIP) के द्वारा पढ़ने से बच्चों की उपलब्धि में वृद्धि हुई है। CAIP के माध्यम से अध्ययन करने से बच्चों में रूचि पाई गई। बच्चों ने कार्यक्रम का आनंद लिया।

विज्ञान विषय के अध्ययन हेतु बच्चे मल्टीमिडिया का प्रयोग अधिक करते हैं, विषय के अध्ययन हेतु सन्दर्भ के रूप में इन्टरनेट के माध्यम से विषय सामग्री संकलित करते हैं। विभिन्न प्रायोगिक कार्य, प्रोजेक्ट कार्य हेतु कम्प्यूटर, इन्टरनेट का प्रयोग किया जाता है। विज्ञान विषय से सम्बन्धित अनेक विभिन्न पाठों की सी.डी. आसानी से उपलब्ध हो जाती है। इस सन्दर्भ में तोडस (2008) ने कला एवं विज्ञान समूह के विद्यार्थी में कम्प्यूटर एवं इन्टरनेट के ज्ञान में सार्थक अंतर पाया। मल्टीमिडिया का अध्यापन में प्रयोग एवं उनके खेल, कला, साहित्य एवं सामाजिक कार्यों के प्रति रूचि में अल्प कोटि का सह–सम्बन्ध है, क्योंकि विभिन्न प्रकार के खेल खेलने जिसमें शारीरिक रूप से कार्य करने की आवश्यकता है। अनुराधा (1991) ने अध्ययन में प्राप्त किया कि बच्चे टी.वी. कार्यक्रम में खेल कार्यक्रम देखने में रूचि रखते हैं। कला विषयों के अन्तर्गत चित्र, पेन्टिंग, संगीत, नृत्य, नाटक आदि में सहभागिता लेने वाले बच्चे को मल्टीमिडिया का प्रयोग करने की आवश्यकता बहुत अधिक नहीं पड़ती। साहित्य के क्षेत्र में मल्टीमिडिया का कम प्रयोग करते हैं, इनमें पुस्तकों, पत्रिकाओं तथा समाचार पत्रों का उपयोग अधिक होता है बाकी माध्यम की तुलना में। सामाजिक कार्यों को करने के लिये मल्टीमिडिया का प्रयोग अधिक नहीं होता। स्वयं सम्पर्क करने, सहयोग, आपसी मेल–जोल से विभिन्न सामाजिक कार्य में सहभागिता रहती है। अतः मल्टीमिडिया का अधिक एवं कम प्रयोग करने वालों में सामाजिक कार्य के प्रति रूचि समान ही रहती है। श्रीमिवसन एण्ड मुठुमनीकम (2010) ने निष्कर्ष प्राप्त किया कि कम्प्यूटर असिस्टेड इन्सट्रक्शनल कार्यक्रम (CAIP) के द्वारा पढ़ने से बच्चों की उपलब्धि में वृद्धि हुई है। CAIP के माध्यम से अध्ययन करने से बच्चों में रूचि पाई गई। बच्चों ने कार्यक्रम का आनंद लिया।

H_{o2} छात्र एवं छात्राओं की अभिरूचि एवं बहुआयामी शैक्षिक उपागमों के अध्ययन में प्रयोग के मध्य सार्थक सहसम्बन्ध नहीं होगा।

सारणी क्रमांक – 03

छात्र एवं छात्राओं की अभिरूचि पर बहुआयामी शैक्षिक उपागमों का सांख्यिकीय विश्लेषण

चर	सहसंबंधित चर	N	छात्र M	r	सार्थकता	छात्रा M	r	सार्थकता
अभिरूचि	मल्टीमिडिया	100	154.37	-0.05	सार्थक नहीं है अल्पकोटि (ऋणात्मक)	155.23	-0.04	सार्थक नहीं है अल्पकोटि (ऋणात्मक)
	खेल	100	9-41			7.50		
	मल्टीमिडिया	100	154.37	0.009	सार्थक नहीं है अल्पकोटि	155.23	0.007	सार्थक नहीं है अल्पकोटि
	कला	100	7.3			8.24		
	मल्टीमिडिया	100	154.37	0.082	सार्थक नहीं है अल्पकोटि (ऋणात्मक)	155.23	-0.13	सार्थक नहीं है अल्पकोटि (ऋणात्मक)
	साहित्य	100	8.74			9.04		
	मल्टीमिडिया	100	154.37	0.01	सार्थक नहीं है अल्पकोटि	155.23	0.009	सार्थक नहीं है अल्पकोटि
	सामाजिक कार्य	100	6.7			7.02		
	मल्टीमिडिया	100	154.37	0.76	सार्थक है ** उच्चकोटि	155.23	0.63	सार्थक है ** सामान्य कोटि
	विज्ञान	100	7.85			8.16		

निष्कर्ष –

उक्त परिकल्पना के सार्थकता की जांच हेतु सहसम्बन्ध (r) परीक्षण किया गया।

- छात्र एवं छात्राओं के खेल के प्रति अभिरूचि एवं अध्ययन में मल्टीमिडिया का प्रयोग करने में कोई सार्थक सह–सम्बन्ध नहीं पाया गया। खेल के प्रति रूचि रखने वाले छात्र एवं छात्राओं दोनों ही मल्टीमिडिया का प्रयोग कम करते हैं। निष्कर्षतः कहा जा सकता है कि खेल के प्रति अभिरुचि एवं मल्टीमिडिया के प्रयोग का कोई सम्बन्ध नहीं है।

- कला के प्रति अभिरूचि एवं अध्ययन में मल्टीमिडिया का प्रयोग करने में अल्पकोटि का सह सम्बन्ध पाया गया। जो .01 सार्थकता स्तर पर सार्थक सहसम्बन्ध नहीं है। निष्कर्षतः कहा जा सकता है कि कला के प्रति अभिरुचि एवं मल्टीमिडिया के प्रयोग का कोई सम्बन्ध नही है।

- छात्र एवं छात्राओं का साहित्य के प्रति अभिरूचि एवं मल्टीमिडिया का प्रयोग करने में ऋणात्मक अल्पकोटि का सहसम्बन्ध पाया गया। निष्कर्षतः कहा जा सकता है कि साहित्य के प्रति अभिरुचि एवं मल्टीमिडिया के प्रयोग का कोई सम्बन्ध नही है।

- सामाजिक कार्य के प्रति अभिरूचि एवं मल्टीमिडिया का प्रयोग करने में अल्पकोटि का सहसम्बन्ध पाया गया। अतः शून्य परिकल्पना स्वीकृत हुई। .01 सार्थकता स्तर पर सार्थक सहसम्बन्ध नहीं है। निष्कर्षतः कहा जा सकता है कि सामाजिक कार्य के प्रति अभिरुचि एवं मल्टीमिडिया के प्रयोग का कोई सम्बन्ध नहीं है।

- छात्र एवं छात्राओं के विज्ञान के प्रति अभिरूचि, अध्ययन में मल्टीमिडिया .01 का प्रयोग करने में उच्चकोटि का सह–सम्बन्ध पाया गया है, जो सार्थकता स्तर पर सार्थक सहसम्बन्ध है। अतः शून्य परिकल्पना अस्वीकृत हुई। निष्कर्षतः कहा जा सकता है कि विज्ञान के प्रति अभिरुचि एवं मल्टीमिडिया के प्रयोग का सार्थक सहसम्बन्ध है।

विवेचना –

विज्ञान विषय में अभिरूचि अधिक रखने वाले छात्र/छात्राएँ विज्ञान विषय से संबंधित नवाचार खोजे, कठिन अवधारणाओं को समझने हेतु मल्टीमिडिया का उपयोग करते हैं, क्योंकि आसानी से सरलतापूर्वक बच्चे खुद प्रयोग कर समझते हैं। रवीन्द्रनाथ (1992) ने निष्कर्ष प्राप्त किया बहुमाध्यम का अध्ययन में प्रयोग करने से वैज्ञानिक अभिवृत्ति, विज्ञान विषय के प्रति अभिरूचि उच्च पाई गई। सभी छात्र/छात्राओं को विद्यालय में बहुमाध्यम का प्रयोग के लिये समान अवसर मिलते हैं अतः दोनों में ही बहुमाध्यम का प्रयोग करने के सन्दर्भ में अधिक अंतर दिखाई नहीं देता है।

वर्तमान में विद्यार्थी विषय के ज्ञान हेतु पाठ्य पुस्तक के अतिरिक्त सन्दर्भ के रूप में साहित्य, पत्रिकायें, इन्टरनेट, कम्प्यूटर, टी.वी. का प्रयोग पर्याप्त रूप से अपने प्रोजेक्ट पूरा करने हेतु करते हैं। राजकि एण्ड जकारिया के अनुसार– छात्र एवं छात्राओं द्वारा विभिन्न साहित्य के अध्ययन में विभिन्न प्रकार के खेलों में सहभागिता में, सामाजिक कार्यों की सहभागिता में तथा कला के अंतर्गत विभिन्न गतिविधियों को करने में मल्टीमिडिया साधनों का अधिक उपयोग नहीं किया जाता है। ऐसा उपरोक्त निष्कर्ष में परिलक्षित होता है। स्ट्रांग (1943) के अनुसार रूचियों के निर्धारण में अभिक्षमता, योग्यता, पुरस्कार तथा सन्तुष्टि आदि महत्वपूर्ण भूमिका होती है।

अध्ययन निष्कर्षों की शैक्षिक सार्थकता –

विद्यार्थियों द्वारा अध्ययन के दौरान बहुमाध्यम का प्रयोग करने से विज्ञान विषय के प्रति रूचि में वृद्धि हो सकेगी। अतः विज्ञान विषय की अवधारणाओं को स्पष्ट करने हेतु शिक्षक कक्षा अध्यापन में बहुमाध्यम का प्रयोग करें, जिससे बच्चे पढ़ने हेतु तत्पर रहें। मल्टीमिडिया का अध्ययन में अधिक उपयोग करने से बच्चों की वैज्ञानिक अभिवृत्ति सकारात्मक पाई गई है। चूंकि बच्चे स्वयं इन माध्यमों का प्रयोग करेंगे तो क्रमबद्ध, व्यक्तिगत एवं तर्क संगत आधार पर विषय की अवधारणा स्पष्ट होने से सुविधा होती है बच्चे स्वयं करके सीखते हैं। बच्चों को टेलीविजन के माध्यम से विभिन्न शैक्षिक जानकारी प्राप्त होती है जैसे – डिस्कवरी चैनल, ज्ञानदर्शन है जिसमें वैज्ञानिक सिद्धांतों को सरलता पूर्वक प्रस्तुत किया जाता है। वैज्ञानिक शोध, नवाचार, पर्यावरण शिक्षा से बच्चे अवगत होते हैं जिसका उपयोग संदर्भ के रूप में करते हैं। अध्ययन में बहुमाध्यम का उपयोग करने से विद्यार्थी प्राप्त ज्ञान स्व अध्ययन से सीख सकते हैं। मल्टीमिडिया तकनीकी के नवाचार के रूप में सामने आई जिसके माध्यम से कम समय में अधिक से अधिक विद्यार्थियों को प्रभाव पूर्ण शिक्षण दिया जा सकता है। इन्टरनेट आज के विद्यार्थियों के लिये महती आवश्यकता बन गया है। शासकीय शालाओं में भी आई. सी.टी. लिटरेसी प्रोग्राम संचालित होना चाहिये।

सुझाव –

- शिक्षक किसी भी विषय को प्रभावशाली एवं रूचिकर शिक्षण हेतु, शिक्षण सामग्री, छोटे–छोटे प्रायोगिक उपकरण, दृश्य–श्रव्य, सामाग्रियों का उपयोग करें।
- बहुआयामी शैक्षिक उपागमों के प्रति बच्चों एवं शिक्षकों में सकारात्मक अभिवृत्ति व वातावरण बनाना आवश्यक है, यह धारणा है कि बहुआयामी शैक्षिक उपागमों से किया गया शिक्षण अधिगम परंपरागत शिक्षण अधिगम की तुलना में प्रभावशाली है।
- शिक्षक एवं विद्यार्थियों को मल्टीमिडिया सुविधाओं से पूरा पूरा लाभ उठाने हेतु आवश्यक तकनीकी परामर्श सेवायें ऑन लाइन भी आसानी से उपलब्ध हो ताकि मल्टीमिडिया से होने वाले शैक्षिक लाभों का फायदा उठाने में उन्हें अनावश्यक परेशानी उठाने तथा निराशावश मल्टीमिडिया के प्रति अरूचि पर सकारात्मक दृष्टिकोण विकसित होने से बचाया जा सके।

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