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VETRI EDUCATION

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Editor's Note

Dear Readers,

Vetri Education wishes all the contributors, subscribers, readers and all other well wishers **A Very Happy, Prosperous and Productive New Year**. Let us look forward to a more favourable year ahead in the field of human resource development in general and value based education in particular. The significant change **Vetri Education** has made is the silent transformation of the print form of the Journal into electronic form starting with its 8th Volume (2013). As usual the issues will be available by the middle of the first month in the quarter at: www.vetrieducation.com Authors and subscribers can receive a PDF file of the Journal on request, providing email address. The Vetri group looks forward to the continued support and encouragement to the new format.

The first article in the Inaugural Number (No1, Vol VIII, Jan- March, 2013) of **Vetri Education** of this format is by **G. C. Bhattacharya** on: Importance of Education of Teacher Educators for Quality Assurance in Teacher Education. The urgency and indispensability of the need for proper education of teacher educators are aptly explained and forcefully put forward by this seasoned educationist.

Manoj Kumar Dash, Rasmi Ranjan Puhan and Lakshmi Priya Malla explain through the second article: Problems and Prospects of Education of Tribal Women, based on their research studies and analysis on the existing educational facilities/opportunities for tribal women in Keonjhar district of Odisha and opportunities provided for skill development programmes for tribal women living in rural and remote places there.

Study of Well-being among School Teachers by **Ripenjeet Kaur** forms the third article. After assessment of the well-being of a chosen sample, this study finds no significant difference of well-being among the school teachers, based on difference of sex and the nature of the subjects taught by them.

Asrat Dagnew presents in his article: Role of Mentors in Guiding and Supporting Novice Teachers of Elementary Schools , fourth in the issue, the short comings of mentoring of novice primary school teachers by the senior faculty and suggests methods for improvement, based on his study of the phenomenon in a small region in Ethiopia.

In the fifth article of the issue, An Introduction to Personality Structure, **Ripenjeet Kaur** analyses the personality structure defined by a trait and contributed by the big five traits inferred from the individual's behaviour and points out the possibility to define personality structure as a complex and multidimensional model by identifying the individual, in terms of these five traits.

The short article, forming the sixth and last article in the issue: Pheromones – Function and Importance by **A. G. Ramachandran Nair** is a short review on the topic on the lines of earlier articles in the Journal, on molecular explanation of biological phenomena and describes various aspects of pheromones including the possible role in modern human.

Vetri Education expresses sincere appreciation and thanks for the valuable contributions and encouragement from authors, subscribers and all our well wishers, along with the earnest services of Mr. P. R. Anebarassane Rada and Ms. N. Jeenath for their inputs for the successful and timely publication of the issues of the Journal.

Academic Editor,
Vetri Education

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Importance of Education of Teacher Educators for Quality Assurance in Teacher Education

G. C. Bhattacharya*
Faculty of Education, Kamachha Campus
Banaras Hindu University, Varanasi - 221 010 (U. P.)

Abstract

The National Council for Teacher Education admitted that the role of teacher educator is of prime importance for effective implementation of teacher education curriculum and quality assurance in the Curriculum Framework for Quality Teacher Education (1998) while specifying the objectives. Such points on objectives have been made associated with development of teaching competency and skill, ability for planning and organizing professional programmes, skills of management of teacher education programmes and institutions, curriculum development, and appropriate evaluation strategies, organization of in-service continuing education programmes and need based and commitment oriented job training, understanding in relationship of Indian ethos, modern technology, national needs and Indian realities, ability to undertake meaningful educational research, ability to sustain self directed life long learning, making appropriate use of information communication technology and innovative practices in terms of Indian heritage, culture and values etc., among teacher educators.

As a professional qualification for prospective teacher educators, M.Ed. (Teacher Education) programme has been suggested by NCTE with stage specification like that of Pre Primary, Elementary, Secondary and Senior Secondary, Special Education. Distance Education and Physical Education as it was observed that the existing M.Ed. courses in Indian Universities are, by and large, academic in nature and not adequately professional in content.

It has also been said that the quality and character of teachers would, thus, largely depends on the professional education of teacher educators and is eventually needed that their education should be given a new orientation and be improved qualitatively and adjusted with the demands of the new curriculum. Thus, in this paper an attempt has been made to justify the need perspective and suggest the framework of a secondary level curriculum for prospective teacher educators to educate them well for bringing quality assurance, in near future in teacher education programmes of the nation in a competent and accountable way.

Key words: Teacher education, teacher educators, quality assurance

Introduction

The National Council for Teacher Education admitted that the role of teacher educators is crucial in nature who are supposed to be accountable for undertaking responsibility to teach and train prospective teachers so that effective implementation of teacher education curriculum and quality assurance may be possible as indicated in the Curriculum Framework for Quality Teacher Education (1998) while specifying the concerned objectives.

Teacher Education is concerned with the plan and programme for teaching and training of prospective teachers at any level where as the term quality assurance means

*** E-mail: dbhattacharya9@gmail.com and gcb.edu2008@yahoo.co.in**

ensuring norms or a desired standard in terms of outcomes of teacher education programmes as explicit from attainment of competency and effectiveness in teaching done by the prospective teachers with expert communication and curriculum transactional attempts.

Discussion

Objectives of education for teacher educators

As far as the specification of objectives for education of teacher educators is concerned, NCTE delineated a few of such points in the Curriculum Framework for Quality Teacher Education (1998). The following are seventeen of them:

i. to develop competencies and skills needed for the preparation of teachers and teacher educators in a satisfactory manner,

ii. to evaluate them to organize competency based and commitment oriented professional programmes related with teaching and training of prospective teachers,

iii. to enable them to develop pedagogy, relevant to the education of teacher educators,

iv. to acquire an understanding of the needs and problems of teacher educators and teacher education institutions properly,

v. to develop skills related to management of teacher education programmes and institutions,

vi. to develop competencies of curriculum development and preparation of learning and evaluation materials,

vii. to enable teacher educators to acquire capabilities to organize in-service continuing education programme,

viii. to enable them to organize need based and commitment oriented on job training,

ix. to develop competencies for evaluating educational programmes and teaching learning materials,

x. to develop the capacity of evaluation, analysis, interpretation, elaboration and communication of educational ideas,

xi. to relate education with the national needs and develop critical awareness of Indian realities,

xii. to enable them to understand the relationship among Indian ethos, modern technology and education,

xiii. to promote the global perspective of educational development with special reference to the developing countries,

xiv. to enable them to undertake meaningful educational research including action research,

xv. to develop capacity to reinterpret Indian heritage, culture and values to meet the requirements of the modern Indian society,

xvi. to develop capability for self directed and life long learning, and

xvii. to enable them to appreciate and adopt emerging information communication technology and innovative practices in the Indian context of heritage, culture and values etc. among teacher educators.

NCTE considered that both pre- and in-service education of teacher educators are of high significance and pertinent in the present day context which may be imparted through appropriate organization and agencies especially for providing continuing and recurrent in- education.

It is also highlighted that education and training of teacher educators have to focus attention on expectations of teacher educators on such problems which used to reflect the emerging trends in education and overall needs and aspiration of the countrymen.

Sharma (2002) has rightly observed that teacher educators are now unable or in a weak position to perform their duties and responsibilities; and practice teaching being the weakest part of teacher education programmes.

It is true in the sense that basically in self financing teacher education institutions, and even in some other institutions too, it has been found that neither micro teaching is organized for practice of teaching skills by the prospective

teachers in simulated situation nor all minimum forty lessons are practiced in real class room teaching learning situation. On record, though lesson plans of minimum specified numbers are written, only a small portion actually practiced; majority of the lessons remaining unsupervised.

Gupta (1988) also observed various short comings of existing teacher education programmes including that of practice teaching and evaluation.

Bhattacharya (2003) noted practice teaching as the weakest link in the teacher education programmes at all levels and recommended internship as a remedy for it.

Teacher education is supposed to deal with specific problems confronting teacher education institutions and to make teacher educators more responsible and responsive.

It may encourage teacher educators for continuing professional growth and advancement of knowledge base. But in real situation, neither prospective teachers nor teacher educators are motivated enough to learn but to earn including degrees/diplomas, jobs and reputation.

The rationale existing behind the educational and professional training of teacher educators in terms of need perspective is for making proper provision of qualitative instruction through well designed programmes of professional education.

But there is no proper provision of training and education of prospective teacher educators and M. Ed. is considered as the proper qualification to become teacher educators in teacher education institutions.

At present, the only programme which is often considered as meant for preparation of teacher educators to cater the needs of prospective teachers and teacher education institutions is the M. Ed General and/or M. Ed. special programmes which are not specifically designed for the purpose.

In some institutions/universities, practice of supervision of prospective teachers during their practice of teaching and dissertation work is not mandatory for M. Ed. students and this, may hamper their acquisition of ability to evaluate teaching as well as conducting educational research, innovative practices and solve related problems in the field of teacher education.

Before establishment of NCTE, National Council of Educational Research and Training was responsible for professional development of teacher educators and used to conduct training programmes in the field of microteaching, simulated teaching, student teaching, teacher education curriculum, etc.

The U.G.C. used to assist to organize national and regional level training programmes, funded research projects, conducted workshops for improvement of teacher educators in the field of educational technology, non-formal education, population education, environmental education, research methodology etc., in particulars.

The National Institute of Educational Management and Planning used to organize various programmes for principals of teacher education institutions, departmental heads, and other administrators concerned with education in general and teacher education, in particular.

The SCERT's and State Boards of Teacher Education used to organize continuing education programmes for teacher educators on teaching methodologies for new subjects and in new and innovative areas. Some university departments used to organize seminars, workshops and orientation programmes for teacher educators on teaching, development of instructional skills, interaction analysis, teaching behaviour analysis, educational technology, guidance and counselling and research methodology.

For undertaking innovative practices in teacher education, some colleges and university departments were upgraded as Colleges of Teacher Education (CTEs) and Institution of Advance Studies in Education (IASE) by U.G.C.

NCTE after its establishment in 1995 as a statutory organization initiated many conferences and seminars and conducted field training of human rights and national values, indigenous thoughts in education, indigenous approaches to preparation of teacher educators, institutional networking, capacity enhancement and production of good quality enrichment materials for teacher educators.

But non-serious attitude of some teacher educators and teacher education institutions are creating trouble, and marks are given not on the basis of objective evaluation of performance of prospective teachers and teacher educators but on certain other considerations.

Thus, teacher education programmes are suffering from non-serious approach and wrong tendencies of some incompetent teacher educators appointed in the field due to non-professional reasons. Selection procedure and assessment system are faulty and performance based abilities of teachers or teacher educators never receive due consideration. No where, candidates are being asked to teach classes and/or supervise teaching and their performances are not compared with the outcomes of tape-recording devices. Therefore, incompetent teacher educators produce incompetent prospective teachers and subsequently poor learners and performers from schools from the very elementary stage. Real situation especially in the northern part of the country is that both the graduate and post graduates are not competent enough to write a single sentence in Hindi, leave alone

English, or able to teach skilfully after 'undergoing' through teacher education programme and securing high scores there, imposing a serious problem of un-employability rather than that of unemployment.

These unemployable teachers and teacher educators are successful to be employed in any educational institutions using some other avenues and means and are thus spoiling not only one but many generations during their tenure of service.

It is not the quality but quantity and not the values and virtues but managing skills which are rewarded causing an ever increasing gap between desired and real life situations.

Supervision and feedback mechanism of the practice of teaching aspect of teacher education programmes is getting progressively weaker and similar is the situation with the assessment and evaluation interventions.

Till date no objective evaluation is ensured for practice of teaching examination of prospective teachers and examiners are free to decide over the calibre of prospective teachers by their own desire and consciousness. No teacher education institution is making use of any teaching competency scale for this purpose lest any examiner has to sit in a class and spend full duration of period to observe and record objectively the performance of prospective teachers.

Then only two or three examiners may not be able to assess fifty to sixty lessons during three to four hour's duration of practical examinations. Majority of the examiners are also not having specific qualification and ability in making proper use of standardized tools/tests for assessment of skills and competency of prospective teachers, in teaching during practice of teaching. General M. Ed. may not be a proper qualifying degree for those who want to become teacher educators. Therefore, NCTE proposed for a change.

Proposed models of pre-service education for teacher educators

NCTE proposed Pre-service Education Programme for Teacher Educators as M. Ed. (Teacher education) to ensure quality in education and training of them at various levels and areas like that of Pre-primary level, Elementary Level, Secondary/ Senior Secondary levels and for Special Education, Distance Education and Physical Education etc., to resolve the issue.

M. Ed. Teacher Education course may help and orient prospective teacher educators to know about how to make proper and integrated use of various teaching skills and techniques as per needs of learners, in class room teaching learning situation, how to make use of methods and models of teaching, how to set question papers and evaluate the answer scripts objectively and how to manage learning and learners of varied nature and abilities with diversified needs and requirements and ensure mastery learning.

M. Ed. Teacher Education course needs be designed with practical utility base and modelled to prepare prospective teacher educators in a way that they may develop insight to design lesson plans as per varied needs of learners and bring flexibility in teaching. It may assist to train them in providing reinforcements, feedback and constructive ideas while criticizing lessons. It may ensure development of testing and evaluation capacity among prospective teacher educators. For mastery learning, provision of higher scores or grades is permissible, but not without attainment of mastery, at any cost.

Curriculum framework

The proposed Curriculum framework was designed for Elementary level only by NCTE on the basis of which Curriculum Framework for Secondary level may be proposed including core content/papers on:
Contemporary Indian society and emerging educational issues, Philosophical bases of education, Educational Sociology and social and cultural anthropology, Psychology of learning and learners, Curriculum development, transaction and evaluation, Comparative education, and Practical activities can comprise: Pedagogical analysis of two school teaching subjects, Research methodology, Field work/ internship practices, supervision and evaluation of practice lessons, Framing synopsis for educational research projects/ dissertation, and Optional can include: Teacher preparation, Educational management, finance and planning, Educational technology and computer assisted teaching,
Computer education and use of ICT in teaching, Secondary school education-characteristics, Alternative education, Education of children with special needs, Guidance and counselling etc.

Basic requirements

NCTE highlighted over few points for quality enhancement in education and training programmes for prospective teacher educators like:

Making use of need based programmes, Designing of specialization courses for teacher educators,

Evolving pedagogy for different stage or category specific teacher education programmes,

Internship programmes to acquaint with total functioning of teaching and teacher education institutions,

Competency and skill (teaching and management) development oriented programmes,

Making use of different teaching strategies (team teaching, panel discussion, demonstration, dialogue etc.) and oriented training programmes.

Thrust areas

Thrust areas identified in the in-service and continuing education of teacher educators can be:

Short term orientation programmes (for working teachers),

Short term induction programmes (for inexperienced teachers) and recurrent training (for continuing education and training) of teacher educators,

Preparation of special teacher educators of different categories,

Networking of various institutions and organizations - it is supposed to be required for collaborative programmes by pooling and sharing of resources.

Motivation for teacher educators

Lack of proper motivation mechanism for teacher educators to work hard and with

sincerity is observable. Neither financial nor any honourous/prestigious reward is initiated for those teacher educators who used to make some genuine attempts for the sake of qualitative improvement of teaching and training of prospective teachers. Somewhere, negative reinforces are in function. Prospective teachers are also striving for getting higher grades, but not aspiring to learn well.

Both the aspects of learning and making to learn are overlooked in teacher education programmes in our country; the wise saying that if any one has to destroy a nation, he can initiate and accomplish it by destroying its teacher education system and the nation, its education, culture and social set up will automatically collapse is ignored or not cared.

Unfortunately, the teacher educators are treated at par with other teachers in the field of higher education and no additional benefits are being given to them either in the form of allowance or in the form of higher designation/grade etc. though other categories are supposed to teach the students, teacher educators are to teach prospective teachers.

In such a situation, qualitative improvement in prospective teachers is not possible and teacher education institutions will produce trained but unskilled teachers who may not acquire skill and techniques of teaching but a training degree and licence to do injustice with the future learners, after seeking appointments as teachers in schools.

Conclusion

NCTE has admitted that in fact, our education system has inadequate facilities for preparation and orientation of teacher educators, remaining a major block for taking due care of the education and training of teacher educators in several respects.

Further, with the policy focus changing to quality and relevance of education, it is necessary that only those who are professionally competent, committed and willing are charged with the responsibility of preparing teachers for the nation.

The quality and character of teachers would thus, largely depend on the professional education of teacher educators and their education should be given a new orientation and be improved qualitatively and adjusted properly with the demands of the new curriculum, for changing social needs and requirements of future generation.

When NCTE accepted that the professional quality of teacher educators may determine the quality of the training of teachers both at pre–service as well as in-service levels and the professional level at which teachers are prepared may in turn, determine the quality of school education, it is also to be accepted well that without improving the quality and standard of education and training of our teacher educators, any improvement in the quality and standard of school education is hardly achievable.

When we are talking about quality assurance in teacher education, we have to think many a time about quality and standard of education and training of prospective teacher educators both at pre- and in-service levels.

The existing M. Ed. courses are more academic in nature than that of being professional in content and practice, instead.

If teaching is supposed to be a profession and teacher as a professional expert, obviously teacher educators are super professionals and education and training of them is needed to produce high quality professional experts and not merely academicians who may not posses all competencies and commitments to cater to the needs of teaching professional in terms of skill based abilities and knowledge based expertise.

Since overall quality in education mainly depends upon the quality of teachers and a sound programme of professional preparation of teachers on one hand, it is

the education and training of teacher educators on the other hand, which may play a controlling part on the other because teaching is an art as well as a science.

As an art, skills and techniques of teaching may be inculcated to assimilate through a series of well designed activities in the field unlike in science, teaching is required to be given systematic step by step practice to eradicate errors and ensure refinement in teaching behaviour.

For a professional, concerned ethics and values are essential to be learnt and thus for a teaching or teacher educator to act as a professional, one has to think seriously about the way to assimilate ethics and values related with teaching profession. Therefore, a well designed professional course is essential for prospective teacher educators to enable them to be well acquainted with ethics and values concerned with teaching profession.

Teacher educators are required to be fully aware and familiar with the school realities, social environment and community expectations for realistic performance of their own duties, through professional training.

Similarly, to be professionally sound, teacher educators are also supposed to be actively associated with policy formulation in the field of education in general and teacher education, in particular, along with implementation strategies concerned as well as with the monitoring techniques of such programmes.

Let us hope, to work out a plan and programme for professional preparation of prospective teacher educators formally, whose implementation would ensure quality assurance in our teacher education programmes soon.

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CURIOUS FACTS, MATERIALS, PROCESSES AND BIOACTIVITIES

Doctors remove 'Bubble' Tumour from the Foetus

In what has been termed as a 'world first' procedure, doctors in the US have successfully removed a tumour from the mouth of a 4 month old foetus. Doctors at the Jackson Memorial Hospital at Florida, who carried out the land mark operation, said that the tumour was very rare; it had been seen only once in twenty years in he hospital. Tammy Gonzalez , who was 17 weeks pregnant at that time, saw a tiny 'bubble' coming out of her baby's mouth during a scan. Tests confirmed the mass as teratoma - a large tumour made out of different type of tissues – ballooning from the soft palate of the foetus.

Two weeks later Dr. Roben Quintero, Director of the Fetal Therapy Centre at the hospital, snaked a tiny camera and surgical tools through a quarter inch incision in Gonzalez's growing belly and into the amniotic sac. A laser was used then to cut the peach-sized tumor from Leyna's lips. The operation lasted just over an hr., and after 5 months the baby was born. (Details of the surgery reported in American Journal of Obstetrics and Gynecology)

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Problems and Prospects of Education of Tribal Women

Manoj Kumar Dash*, Rasmi Ranjan Puhan and Lakshmi Priya Malla
IGNOU Regional Centre, Dwaraka, New Delhi - 110 077

Abstract

Education is the panacea for every type of diseases in the world. It is education which makes an individual better suited to the needs in the ever changing world. The educational system should aim to reduce the social gaps and enable every individual acquire desired skills. The tribal community all over the country have been facing various forms of deprivation. The root causes of them are lack of education and educational opportunities for them. Though the tribal women of Odisha in general and Keonjhar district in particular are away from the main stream of national life, they are not kept away from the impact of socio-economic changes affecting the society and their personal life. A large number of tribal women in Keonjhar district are deprived of education and educational opportunities at different stages. Our system must be providing opportunities to enable them to assume leadership qualities for economic self-reliance and even social transformation. It is often alleged that the level of aspiration of these women as a group is low and they are quite satisfied with what they are and what they have. It is essential to provide adequate and appropriate educational opportunities so that they get motivated to participate, support and also ultimately learn to initiate their own programmes of development. Article 46 of the Indian constitution envisages "promotion of educational and economic interest of SCs, STs and weaker sections of the community".

This study attempts to analyse the existing educational facilities/opportunities for tribal women in Keonjhar district of Odisha and opportunities to provide skill development programmes for tribal women living in rural and remote places in Keonjhar district.

Key words: Tribal women, socio-economic status, educational facilities, educational opportunities

Introduction

Educational backwardness is the major hurdle in the way of growth and development of a state. It is the education system which provides a new work culture for people to shoulder the responsibilities of the state and develop a spirit of self accountability (Dwibedy, 2005). Keonjhar district in Odisha is a tribal and educationally backward area. In Odisha tribal population constitute 21.13% of total population. Out of the total population of Keonjhar district (15, 61, 990), 49.84% are women. The tribal women accounts for 22.18% in Keonjhar district. There are 40.30% STs in the whole Keonjhar district (Jena, 1999). The male literacy in thedistrict is 54.63% and the female literacy, 25.97%.

*** E-mail: drdash@ignou.ac.in**

In 2001 the ST women literacy was 23.37% in comparison to 40.33% of ST men. However, women literacy was 50.51% in Odisha (2001 census report). It is also recorded that above 49.84% tribal women in Keonjhar districts have missed education at different stages due to internal or external factors (Sharma and Mittal, 1998). Thus, there is a great need of providing awareness and educational opportunities to fulfil their aspiration and provide natural justice to them to gain a better socio-economic status.

Discussion

Tribal community in the context of India

As per Article 341 and 342 of the constitution of India there are 572 different

tribal communities recognised as Scheduled Tribe (ST) by the government. They are spread in all reasons (North-Eastern region, Himalayan region, Central India region, Western India region, South India region and Island region) across the country (Laya, 2003). These communities were recognised by some typical characteristics such as i) geographically isolated and there is discrimination in terms of political, economic and social dimensions; ii) mostly depend upon natural resources for livelihood; iii) the whole culture is community oriented and believe in power of nature; iv) the tribes are governed by consensus decisions taken by the community; and v) holistic approach with non- materialistic attitude to land and natural resources. However over a period of time since independence, they have undergone rapid change with the policy of central government from time to time. It is also equally true that the programmes of central and state governments, especially meant for tribal areas, do not reach the tribal population effectively. This may be due to difficulties in efficient implementation of systems in place.

Education in tribal context

Education is an important instrument of social change and reconstruction and also a powerful means of empowerment. Empowering tribal communities means capacity building of tribal communities to enable them to take their own decision, protect their own rights and enable them to contribute to the process of national development (Dash, 2008). There are many efforts taken up by the government from time to time to make the tribal communities enable to participate actively and effectively in local governance. The key areas in educating tribals include: i) development of their analytical abilities in the context of their own communities; ii) development of confidence and capacity to articulate their interest; iii) enable them to participate actively in decision making processes; iv) develop skill and attitude to improve livelihood; v) develop competencies to meet challenges; and vi) enable to respect individual and community and appreciate traditional knowledge system. There are many young adults dropped out from the school system in tribal areas. Making appropriate educational provision for them and providing them opportunities to make use of the facilities are important in rural and remote places (Dash, 2007).

Educational context in the tribal areas of Odisha

In order to provide education to all tribal children in general and tribal girls in particular, government of Odisha has taken up a number of measures like free and compulsory education to all children, award of scholarships, boarding facilities and free distribution of text books, etc. There are about 1585 tribal schools and 3598 hostels under the administrative control of the Department of Tribal Welfare, Govt. of Odisha for promotion of educational opportunities in tribal and remote places in the state. Tribal women in Keonjhar district of Odisha are considered most backward. In Keonjhar district out of 40.30% of ST population, 74.03% male and 25.97% female are literate. The percentage of literacy among SC women is 40.33% in Keonjhar district (2001 Census report). The status of women literacy was 50.51% in 2001 in Odisha. This clearly reflects the very low status of ST women literacy (25.97%) in Keonjhar district in particular. It is thus evident that tribal women in Keonjhar district are deprived of educational facilities and this is the right time to look into their educational needs and aspirations to ensure their contribution in social and national development. Under the provisions of Kastuba Gandhi Balika Vidyalya (KGBV) and National Programmes for Education of Girls at Elementary Level (NPEGEL), the Odisha Primary Education Programme Authority (OPEPA) is implementing many pilot projects as special measure for facilitating education of girl children and uplifting educational facilities for them in rural and remote places of the state, under the national flagship

programme Sarva Shiksha Abhiyan (Dash, 2008; 2008a).

Research questions seeking answers

Answers are to be found for the following questions:

- Are the socio-economic conditions of tribals are causing problems to their educational development?
- Are the available educational opportunities suitable to tribal girls/women in Keonjhar district of Odisha?
- Are the tribal women aware of the availability of various educational facilities, provisions and opportunities in Keonjhar district?
- Is there specific difficulty/hindrance to the promotion of educational opportunities in tribal areas of Keonjhar district?
- Are the tribal women receiving appropriate educational facilities and opportunities as per their expectation in tribal Keonjhar district?

These questions need answers from reflective thinking of administrators, policy makers, implementers as well as researchers to provide effective solution to tribal's education in Keonjhar district. Hence, the study intends to describe status of tribal women in Keonjhar district and also aims at suggesting strategies and plan of action for improving the education of tribal women in different parts of the state in general and in Keonjhar district in particular.

Rationale of the study

Education of women in rural, remote and tribal areas should be given priority in every state. It is essential to eliminate the gender disparity. Though there is steady increase in the overall rate of literacy in India from 52% in 1991 to 65% in 2001 and 74% in 2011, the tribal women's literacy is still a matter of great concern with the literacy% at 23.37 in Odisha (2001 census report). There are many studies conducted on education of tribals and tribal women in Odisha and outside. However, no studies have been conducted to focus on the educational development of tribal women in the Keonjhar district of Odisha which is one of the tribal dominated districts in the state. Thus, the present study is aimed at throwing light on the educational development of tribal women in Keonjhar district in relation to:

i) Socio-economic conditions
ii) Choice of suitable educational system for tribal women
iii) Difficulties in promotion of tribal literacy and
iv) Educational awareness of tribals

This will enable us to understand the current status and also provide a base for designing and developing perspective educational plan for improving quality and educational opportunities for tribal women in Keonjhar district and even the entire state.

Details of the study

Objectives of the study

The following form the objectives:

1. To study the socio economic conditions of tribal women and availability of educational opportunities in Keonjhar district of Odisha

2. To study the extent of awareness of tribal women on various educational facilities and opportunities available in Keonjhar district

3. To study the difficulties in promotion of educational opportunities in tribal areas of Keonjhar district

4. To compare the level of expectations of tribal women with educational opportunities available in tribal areas of Keonjhar district

5. To suggest strategies for further improvement of educational facilities and opportunities for rural, remote and tribal areas

Methodology of the study

The population of the study comprises all the tribal women belonging to 5 of the 8 different blocks of Keonjhar district of Odisha.

Sample

Keeping in view the nature of the population and variety of cliental group, the study was conducted in five rural blocks of Keonjhar district. From each block, two clusters were selected. In each cluster, three schools and from every school, ten parents (mother) were selected randomly. Thus, three hundred parents were contacted personally for the collection of data.

Sampling strategy

Multistage stratified random sampling technique was employed for selection of various subjects of the study namely; blocks, clusters, schools and parents. Holton & Burnett (1997) states that: "ultimate function of stratification is to organise the population into homogeneous subsets and then select appropriate number of elements from each. It permits the use of different sample designs for different portions of the population"

Method

Descriptive survey method was used in the study as the investigators tried to get information about more than one variable and assigned numerical value to those variables also with better understanding of perceptions of stakeholders (Hittleman and Simon, 1997). Through this method information about conditions, situations and events that occur in the present can be obtained (UNESCO, 2005). Therefore, in the present study the investigator used this method to explore all possibilities to meet the special educational needs of tribal children in general and tribal girls in particular in this study.

Tools

The following tools were used for collection of relevant data:

1. Questionnaire for collection of data on various dimensions in relation to educational plans, programmes and development of tribal women. This is a newly developed questionnaire prepared by the investigators for this study. The questionnaire covers five different dimensions of tribal women such as socio-economic conditions, availability of meaningful educational opportunities in tribal area, educational awareness of tribal women, level of expectations of tribal women and difficulties in expansion of educational opportunities for tribal women. Under each dimension five items are developed and all the items under each dimension were thoroughly examined and finalised with the help of a group of experts in a workshop.

2. Schedule for discussion and interaction with school authorities, parents and community members. Efforts are taken to collect some qualitative information from various stakeholders responsible for providing quality education to all and promoting the same in tribal and remote areas of Keonjhar district. The information obtained on discussion and interaction with various stakeholders rightly supplements the quantitative information obtained through the newly developed questionnaire. The items incorporated in the schedule help the investigators to carry out the discussion systematically and sequentially. It also helps the investigator to draw logical conclusion.

Analysis and interpretation

The analysis and interpretation of the study has been made in five different sections such as: i) socio economic conditions of tribal women; ii) availability of educational facilities and their suitability; iii) educational indicators in tribal areas of Keonjhar district; iv) difficulties in expansion of educational opportunities in tribal areas; and v) Educational opportunities versus level of expectations of tribal women.

Socio-economic conditions of tribal women

About 70 per cent of the respondents realised that they are backward and disadvantaged due to lack of education and lack of educational opportunities in the locality. They strongly believe that education can improve their economic condition which is an obstacle in the way of their improvement and also think that education of women is essential in giving appropriate care to their children and other members in the family. About 50 per cent of the respondents have a clear understanding that education certainly acts as an instrument in improving their standard of living in the society and can shape future of their children. However, it is surprising to note that 46 per cent of the respondents, while accepting this to some extent view that there are many uneducated families who maintain their life successfully and hence doubting education's role in their economic status. It reveals the lack of awareness and understanding of people, in tribal areas, on the strength of education in today's world. This is certainly not a positive indication for development of society and improving socio-economic conditions of people in rural and remote places like Keonjhar district of Odisha. Similarly, only 2 per cent of respondents gave full credit for education in their current employment, 40 per cent to some extent and 58 percent did not indicate their opinion. This shows that education, as a lifelong learning process, is yet to be understood and appreciated by the tribal parents of Keonjhar district. This is a serious concern which needs to be addressed through various meaningful educational plans and programmes.

Availability of educational facilities and their suitability

90 per cent of the respondents are of the opinion that knowledge gained from schools and other educational institutions are very important for their day-to-day life but hardly there is a link between education provided in such educational institutions and earning livelihood in today's context. This shows that they are clear about the role of education on development of their future and overall development of their life. 47 per cent of the respondents viewed that the curriculum of school education is not appropriate for educating tribal women in today's context. It should be need-based, especially in reference to the women education. It is also reflected that tribals are keen in educating themselves and knowing about the world around them. However, they find it quite difficult to obtain quality education at all levels as well as meaningful education for the girls and women. The current practices need to be contextualised appropriately to meet the need of tribal people.

Educational awareness in tribal areas of Keonjhar districts

It is gathered that 45 per cent of the respondents feel that govt. provision for education is not equally available to all sections of the community in the district. This shows that in tribal areas people are deprived of the benefits of the government's efforts for their educational development. Only 62% are knowledgeable about free education for women; but not clear about the various opportunities available for them. The tribal people in general and tribal women in particular need a conceptual clarity on various dimensions of the provisions of education for women at different levels. Due to ignorance of tribal women they are unable to take advantages of various educational programmes, implemented by the state from time to time. A small chunk of tribal women (28%) are aware of the educational opportunities intended for them and their community. Knowledge, understanding and clarity on the different opportunities available for the rural and marginalised section of the communality are essential to ensure fruitful result. 78% view that they know about different schemes and scholarships for tribal women. There is lack of motivation however, in them for education and contributing to activities related to education

and development in the society. 20% of the respondents believe that programmes implemented by state for development of educational facilities need qualitative improvement. Design, development and implementation of need based programmes specific to tribal communities must be given due importance. Systemic approach to contextualise the programmes in the light of local needs and aspirations should be given due importance, followed by more effective implementation of programmes.

Difficulties in expansion of educational opportunities in tribal areas

Only 30% respondents feel that they can pursue education with the support of their parents. Most of the children are deprived of getting parental support and cooperation for their education. It may be due to poverty, low socio-economic conditions and lack of opportunities in rural and remote places. Ignorance of the parents about the policies, programmes and other beneficial activities, undertaken in their district may also be a reason. Effective implementation of programmes can motivate the tribal people to some extent.70% of respondents believe that inadequate number of schools, colleges and other vocational training institutions are main hurdles in pursuing further education, though they are interested for further education and improvement. 66% of the respondents blame illiteracy of parents as a serious problem for education for tribal women.

84% believe that lack of quality teachers and service of untrained teachers in schools are drawbacks for quality education of their wards. It is a serious problem not only in Keonjhar district of Odisha but also in many other parts of our country, particularly in all eastern, north-eastern and northern states. 56% are of the opinion that curriculum and curriculum transaction pose serious problems, keeping in view of the need and relevance of education in the context of tribal areas. It shows that appropriate contextualisation is essential and should be a part of in-service teacher education programme at all levels, particularly for facilitating and promoting education in rural and remote areas. 82% of the respondents pointed out that lack of proper publicity deny them the awareness and knowledge about things. This shows that mass publicity about the policies, programmes, activities and other measures should be on top gear in all rural and remote places, similar to that in urban areas. More than 52% of the respondents are of the opinion that women education is not emphasized duly in our society even today creating great hindrance for education of women. This is a serious situation, demanding attention of all stake holders.

Educational opportunities versus level of expectations of tribal women

74% of the respondents are keen to have education for contributing to the welfare of their society. This is certainly very encouraging for strengthening educational opportunities in tribal belt of Odisha in general and Keonjhar district in particular. 56 % view that education is a creative investment of government for the future. They realise that tribal women want to be a part of the development process like women in other areas. It is also noted that there are doubts in the mind of tribal women about the investment being made by government for their education. On closer examination, it is observed that about 44% of the respondents desire qualitative improvement in effective implementation of all programmes at grass root level. A very good suggestion comes out of the discussion that education and educational provisions in tribal areas must support their earning capability. The tribals entertain expectations in education to develop their life and improve quality of living. A large number of people living in rural and remote places are not aware of the importance and utility of education in development of their earning capability and doubt on the role of current system of education for making them economically sound. This needs to be corrected. It is also essential to decide the

right types of education required for tribal communities in general and tribal women in particular. We must motivate them to make best use of the opportunities available to them by highlighting right direction and noble purposes.

Issues and challenges in education of tribal women

There are certain typical areas that require immediate interventions of government in terms of policy, implementation of developmental plans and programmes by state and central governments and international agencies. They are: i) survival of most of the tribal communities is through natural resources. It is essential to minimise access of tribal people's natural resources to others, imposing restrictions; ii) improving access to basic services such as health, sanitation, transport facility, electricity, irrigation and education; iii) facilitate and promote their cultural ethos, protect their rights, dignity and freedom; iv) restrict or prevent external interference to their self governance; and v)integration of education with empowerment process.

Direction of development of tribal women depends on education of tribal youth and quality of investment in education for men and women in tribal areas. There are many stake holders in the tribal community. Creation of general awareness for them in various aspects of growth and development is the need to realise the tribal realities. Implementation of proper training/ orientation for various stake holders and efforts to internalise the learning in tribal style are quite challenging. Focussing on skills that address livelihood issues is very essential for sustainable development. Creating opportunities conforming to the special educational needs of girl children and women is another thrust area. Inadequate access is the main reason preventing the tribal women entering into productive activities and involving in society and community participation. Development of sound mechanism to educate representatives of village Panchayat to ensure participation of women is another area, yet to receive due focus. Tribal women are hardly aware of the customary laws and legal provisions to safeguard their rights and privileges under their jurisdiction.

Content of education at secondary and senior secondary level does not consider traditional knowledge system and their understanding of their special environment and reconciliation of their identity. We are still struggling to provide primary education to children in their mother tongue - a major block in creating opportunities for tribal women to enhance their learning capabilities. Mainstream educational institutions are not able to cater to the learning needs of tribal women adequately.

Finding and implications

Improving the socio-economic conditions of tribal backward communities in Keonjhar district is one of the major concerns in Odisha. In most tribal areas of Keonjhar the struggle for existence is very hard and people lead a hand to mouth living. Even the tribes engaged in agriculture struggles to have two square meals a day. The entire family is busy with different activities with their traditional approach throughout the day. Even then, they are poor, marginalised, underdeveloped and underprivileged. There are many programmes of the state and central governments and various international agencies in areas of education, health, sanitation, economic development etc. intended for them. They are still educationally deprived, economically marginalised and socially backward even now, due to their being deprived of the legitimate share in the development of society and district as a whole. Educational facilities, opportunities and difficulties of tribal women should be viewed from the perspectives of their economy and society.

Women's status is often described in terms of their level of income, employment, education, health and fertility as well as

their roles within the family, the community and society. In tribal communities of Keonjhar district, the role of women is substantial and crucial. They constitute about half the total population. In tribal society, women are more important than in other social groups, because they work harder and the family economy and management depends on them. However, they face many problems and challenges for a decent life due to inadequate education and knowledge about utility and benefit of education. It is also equally true that tribal women are curious to avail the facilities of education and educational opportunities. But hardly there are service providers, who extend their support to open various educational avenues in rural and remote places. The major constraint for participation of tribal women in agriculture and allied activities and in other sectors is wage discrimination, gender-based technology, lack of training and inadequate exposure. The strategies for tribal development in Keonjhar, and specially for women, need education and proper training which can motivate them and also empower them to live independently, contributing towards development like other members of the society. Awareness of the parents, motivation of youth and provision of career counseling for students at different levels are some of the strategies needed to implement through various means (print and electronic media) exclusively for tribal areas. There should be continuous efforts to make the curriculum and curriculum transaction purely contextualized to suit their needs and expectations. The intensive plan of action for mobilization of the community and strategies for education of dropout girls and education of girls at secondary and senior secondary level must be designed and developed with novel approach. Provision of vocational education and life skill education is rewarding approach for uplifting the standard of education of tribal women.

Conclusion

Providing educational opportunities to all women in the society and having need based specific educational plans for tribal women are some of the important ways of women empowerment and improving basic foundation of education in rural and remote places. Creating competencies of women is indispensable to find the right way for their contribution in the process of growth and development of the society and the country. Even today, tribal women remain steeped in ignorance, superstitions and marginalization, with men presiding over their destiny not only in Odisha but also in most other parts of India. Improvement in education of tribal women in rural areas of Keonjhar district is not an option, rather a compulsion for social development and reconstruction in the state. It needs a strong will from various angles - political willingness for transformation of society and intensive plans and efforts of intellectuals, policymakers, administrators and field implementers. All stakeholders must jointly contribute for strengthening mutual cooperation and collaboration for the common cause of educational improvement of tribal women as a part of social responsibility of the government and the people.

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MRI flatlander (SBU Researchers Develop Groundbreaking New Graphene-Based MRI Contrast Agent)

Researchers at Stony Brook University New York have developed a highly effective and potentially safer nanoparticle-based MRI (magnetic resonance imaging) contrast agent using the carbon allotrope graphene. There have been health concerns aired recently about the conventional gadolinium-based contrast agents used in medical imaging. Now, Balaji Sitharaman and colleagues have demonstrated how a graphene-based contrast agent could work at much lower dosages than standard contrast agents. The team also points out that their putative replacement is also a lot less expensive.

Accidental energy storage ('Nanocable' could be big boon for energy storage)

The serendipitous discovery by researchers at Rice University of a nanoscopic coaxial cable could lead to a new energy storage system. The same cable might also be used in lab-on-chip devices, microelectromechanical systems (MEMS). "At the outset, we were just curious to see what would happen electrically and mechanically if we took small copper wires known as interconnects and covered them with a thin layer of carbon," explains study co-author Jun Lou. When Liu ran some electronic tests on his first few samples, the results were far from what he expected. The capacitance of the new nanocable is up to 143 microfarads per centimeter squared, better than the best previous results from microcapacitors.

Green plastics, tough as steel (Steel-Strength Plastics - and Green, Too!)

Moshe Kol of Tel Aviv University, Israel, and colleagues are developing durable plastics to replace steel in many engineering applications. The team has developed a new catalyst for polypropylene production, which allows them to create the most regular form of the material yet possible with the highest melting point. "Everyone is using the same building blocks, so the key is to use different machinery," Kol explains. He suggests that the new tough plastics could be used to replace heavy steel components in cars and pipe work in industrial facilities.

Scientists Grow Lab Eyes

Scientists in Japan claim to have developed a rudimentary human liver and a precursor of a human eye ball in the lab using stem cells. At Yakohama City University in Japan, a team led by stem cell biologist Takanori Takebe made a small, rudimentary liver using recipe of just three types of cells. The trick was figuring out when to introduce each element into the mix of cells. "It took over a year and several trials" Live Science quoted Takabe as saying.

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Study of Well-being among School Teachers

Ripenjeet Kaur*
Surjeet Memorial College of Education,
Malwal District, Ferozepur, Punjab – 142 052

Abstract

The aim of this study was to assess the well-being of the school teachers. Teachers being the nation builders, their wellness is valuable and important for the students as well as society. In this study no significant difference of well-being among the school teachers, based on difference of sex and the nature of the subjects taught was observed.

Key words: Well-being, wellness, school teachers, science and humanities

Introduction

Teacher plays an important and pivotal role in the educational system. The teacher is the person on whom all the activities of the school are dependent and the school without teacher is a soulless body. Teachers' personality, character qualities, well–being, attitudes, teaching efficiencies and life style help the pupils to become good human beings, thereby contributing in creating a knowledgeable society. "Goodness" of any educational programme is determined, to a large extent, by the teachers. The quality of education and the standard of achievement are inseparably inter-related with the quality of teachers. The National Policy on Education (1986) has rightly observed that no pupil can rise above the level of its teachers. So, teachers must be encouraged to develop their uniqueness. The best teacher is one who possesses good physical and mental health and balanced personality. Due to advancement in every field, profession of teachers has become more challenging, complicated and tough. All these influence their well being.

The documented account of well-being dates back to 1961 when the term 'wellness' was coined and defined as an integrated method of functioning, which is oriented toward maximizing the potential, that the individual is capable of acquisition (Dunn, 1961).

*** E-mail: noorbrar29@yahoo.com**

Healthy person can get adjusted in the society is the fact. Health simply does not mean a good state of health or free from diseases, but also a psychological well-being of an individual. Archer, Probert and Gage (1987) define well-being as the process and state of quest for maximum human functioning that involves the body, mind and spirit.

Hatfield and Hatfield (1992) view well-being as the conscious and deliberate process by which people are actively involved in enhancing their overall well-being - intellectual, physical, social, emotional, occupational and spiritual.

Well being is also seen in terms of dimensions of attitudes, behaviour, thoughts and feelings which can enhance a subjective sense of well-being and influence the individual's attention to self-care and compliance with medical regimens (Melamed, 2000).

It can be said that well being is not only physical fitness, it includes wellness of all the aspects of human life also like: physical well-being meaning a state of good health, mental or intellectual well-being meaning accepting new ideas and thoughts (changing according to change in life), spiritual well-being meaning joy, peace, happiness and adherence to higher values of life, emotional well-being meaning a state of emotional stability and control which

includes self-confidence, efficiency, trust in self and optimistic views about life and social well-being meaning good inter-personal as well as societal and public relationship.

Review of related literature revealed that there is lack of studies on well-being of teachers, whatever studies are there, the views of different investigators with regard to well-being are multidimensional and diversified. So, consistent efforts are needed to substantiate the research studies in this particular domain. We can infer that Diener (1984), Mookherjee (1994), Wood, et al. (1994), Edward and Kern (1995), Michael (1998), Singh (1999), Holly, (2000), Macfarlane (2000), Khalique and Khalid (2009) found significant relationship of well being with living conditions, social relations, health, working conditions, age, sex, financial status, marital status and stress but Kaiser (1993), Preedosak (1997), and Chopra, et al.(1997) found no significant relationship with sex, educational level, school environment and self esteem.

Discussion

Emergence of the problem

The teaching profession at different stages of education - elementary, secondary and tertiary - gives a set of challenges in which teachers demonstrate or display emotions while they may not actually feel. Teachers are expected to demonstrate love and kindness to students. They are also expected to serve as mentors and motivate students who are unwilling to learn. Such kind of expectations leads to a kind of discrepancy between the expected and actual emotion of teachers leading to some kind of stress and lowered levels of self-esteem. This may be detrimental to well-being of teachers. These psychological attributes are crucial for exploration to know their dynamics in the personality make up of teachers. The school teachers are facing new challenges and need to be supported by the educational administrators and the state. In order to strengthen the role of teachers, it is necessary to take into account well-being of teachers. Hence it was thought worthwhile to undertake the present research problem: Study of well-being among the school teachers.

Significance of the study

Well-being is a new area of research in psychology. Progress of any nation depends largely on well-being of its citizens. All the intellectual, creative, educational and socio-cultural advancements are possible if the individuals of the nation possess physical, mental, social, emotional and spiritual well-being. Similarly, teachers' efficiency and effectiveness largely depend on their all-round well-being. Review of literature reveals that there is lack of studies on various dimensions related to well-being and related domains. To the best knowledge of the investigator very few studies related to well-being have been reported on teachers. In view of this and the importance of well-being of teachers in the progress of the Nation, the present study has been undertaken.

Objectives of the study

1. To study the well-being of school teachers
2. To find out differences between male and female school teachers in relation to well-being
3. To find out differences in well being of teachers, teaching science and humanities subjects

Hypotheses of the study

1. There is no significant difference in well-being of male and female school teachers
2. There is no significant difference in well-being of teachers of science and humanities

Delimitations of the study

Only 200 school teachers from the different schools of Ferozepur district were selected to study well-being with regard to five dimensions of well-being.

Design of the study

It is necessary to adopt a systematic procedure to collect the necessary data, to help to achieve the objectives and to test the hypotheses of the study. The present study was designed to investigate the well-being of school teachers based on sex and

subjects, taught. The methods of investigation employed in the present study were descriptive and exploratory survey (Aggrawal, 1996).

Sampling

The sample comprised 200 school teachers, teaching 25 schools in Ferozepur district in Punjab. The sample subjects were selected on the basis of cluster random sampling method (Aggrawal, loc. cit). There were 133 females and 67 males; 168 from humanities and 32 from science. The age range of teachers was between 24 and 40 years.

Science school teacher is one, who teaches physics, chemistry and biology subjects in the schools and humanities teacher teaches mathematics, social studies and languages only.

Tools

For the collection of data, adoption of a systematic procedure is necessary. For every type of research certain instruments are needed to explore new fields. Tools used for studying the well-being of school teachers were:

A. Personal data sheet (prepared by the investigator) - This data sheet was used to seek information about teachers' details, qualification, area of residence and teaching group etc.

B. Well-being scale (Singh and Gupta, 2001) - The scale can be used to measure the well-being of a group or an individual. It is widely used by researchers. It consists of five subscales - physical well-being, mental well-being, social well-being, emotional well-being and spiritual well-being. Each sub-scale has ten items and there are 50 items in total. Scores on all the sub-scale are added up to get a composite score as total well-being. Minimum and maximum score can be 50 and 250 respectively. Only 10-15 minutes are required to administer the well-being scale. It consists of 29 positive items and 21 negative items.

After necessary instructions and explanation on the tools given to the respondents, they were asked to answer them and return within the specified time for evaluation and analysis.

Results

An analysis of the data and its interpretation was done to draw logical inferences with a view to gauging what contribution the present study could make in the scientific area of well-being of school teachers. Analysis of the data includes the investigation of the level of well-being of school teachers and also comparison of the levels of well-being of school teachers with regard to difference in sex and teaching subjects.

Data generated have been further analysed and presented as:

- Scoring, recording, tabulation using proper tables
- Calculating mean, mode, median, standard deviation, skewness, kurtosis, rank order and t-ratios (Aggrawal, 2000; Garret, 2005).
- Descriptive statistics namely mean scores showing the average performance of the group. To find out the hierarchy of well-be ing of school teachers, the measure of cen tral tendency 'Mean' was calculated.
- The Standard Deviation (S. D.) of any dist ribution shows the dispersion or the scatter of the scores in that distribution along with mean. Hence, in this study the standard devi ation was calculated to find out the homo geneity of the groups of school teachers un der study.
- To compare the well-being between different sub groups of school teachers, the 't' test was used. To test the significance of t- ratios the following levels of confidence were es tablished:
  - o Not significant
  - o Significant at 0.05(*) and 0.01(**) levels of confidence

Descriptive and differential analysis

Before presenting the actual analysis of data and discussion of results pertaining to hypotheses, advanced in the study, it was desirable to

describe the nature of distribution of scores for various measures of values. The analysis has been divided into two sections.

Section – I (Descriptive analysis)

The scores of Mean, Median, Standard Deviation, Skewness, Kurtosis and ranking of scores of different dimensions of well-being (physical, mental, social, emotional and spiritual) obtained from the data of 200 school teachers are presented in Table-1 to provide analytical and comparative picture of descriptive statistics economically and conveniently. The various statistics are organised in a tabular form.

Table 1: Descriptive data analytic picture of total sample (N=200) on the variable of values

Dimensions of well-being	Mean	Median	S. D.	Sk (Skewness)	Ku. (Kurtosis)	Ranks
physical	26.08	26.00	4.31	.406	-0.636	3
mental	27.36	27.00	3.94	.298	-0.791	1
social	27.02	27.00	4.41	.466	-0.770	2
emotional	25.34	24.00	5.02	.298	-0.765	4
spiritual	24.26	23.00	5.36	.406	-0.737	5

Discussion based on Means

Table 1 projects that the values of Mean, Median, and S. D. in the area of physical, mental, social, emotional and spiritual well-being. It is evident from high mean score that these dimensions of well-being are highly present in school teachers.

Dimensions of well-being have also been ranked on the basis of their mean scores as shown in Table 1 in descending preference order i.e. highest dimension of well-being and so on till the least dimension of well-being.

The data tabulated in Table1 shows that school teachers scored first rank in respect of mental well-being (M=27.36). It means that teachers are mentally healthy and strong. School teachers scored second rank in respect of social well-being (M= 27.02). It means that teachers have good relations in the society. Third rank is scored by physical well-being (M=26.08). It shows that school teachers are also physically fit to teach their students and perform their duties. Fourth place got emotional well-being (M= 25.34). It may be attributed that school teachers are emotionally less strong as compared to other dimensions of well-being. Fifth rank is scored by spiritual well-being (M= 24.26). It means that school teachers are less concerned with their spiritual well-being due to their duties and responsibilities.

Discussion based on Skewness (Sk) and Kurtosis (Ku)

Table1 shows that value of skewness for the dimensions of well-being are: physical=0.406, mental=0.298, social=0.466, emotional=0.420 and spiritual=0.380. The range of values varies from 0.298 to 0.466. Values of skewness for different dimensions of well-being are within the acceptable limits of normality+.

Values of Kurtosis entered in Table 1 for different dimensions of well-being are: 0.636, 0.791, 0.770, 0.765 and 0.737 respectively. The range of Kurtosis is between

0.791 and 0.636. For all the values trend is somewhat towards leptokurtic.

Observing the above results, it may be inferred that score distribution of measures of well-being show slight approximation to leptokurtic tendency. Overall, the distribution has been assumed to be near normal.

Section – II (Differential analysis)

This section deals with rank order, in order to know different dimensions of well-being of school teachers. Differential analysis has been done in order to compare the differences with respect to sex and subjects taught by teachers.

Well-being of school teachers on the basis of sex

Comparison based on means, ranks and t-ratios of male as well as female school teachers in respect of dimensions of well-being are given in Table 2.

Table 2: Means, ranks and t-ratios of male and female teachers

	Male school teachers (N=67)			Female school teachers (N=133)			
Dimensions of well-being	**Mean**	**S. D.**	**Ranks**	**Mean**	**S. D.**	**Ranks**	**t-ratios**
physical	26.40	3.89	2	25.90	4.52	2	-1.77
mental	26.86	3.97	1	27.66	3.97	1	3.07
social	26.37	4.35	3	24.40	4.39	3	3.57
emotional	24.85	4.89	4	25.62	5.07	4	2.35
spiritual	24.63	4.91	5	24.04	5.60	5	-1.68

*Significant at 0.05 level of confidence; **Significant at 0.01 level

Table-2 shows that on the basis of mean scores male school teachers assigned first rank to mental well-being, second to physical well-being, third to social well-being, fourth to emotional well-being and fifth to spiritual well-being; similarly, female teachers also assigned ranks to the different dimensions of well-being. Table 2 further projects that non significant mean differences exist between male and female school teachers in respect of all the five dimensions of well-being. The t-ratio obtained between male and female school teachers in respect of physical, mental, social, emotional and spiritual well-being are not significant at any level of confidence. This indicates that male and female school teachers do not show much of difference in respect to well-being.

Thus, hypothesis: "There is no significant difference in well-being of male and female school teachers", is accepted.

Well-being of school teachers on the basis of teaching subjects

Teachers were classified into two groups on the basis of subjects, taught by them in schools - school teachers teaching science subjects (1) and teaching humanities subjects (2)

Table 3: Means, ranks and t-ratios of science and human.teachers

	Science School Teachers (N = 61)			Humanities School Teachers (N =139)			
Dimensions of well-being	**Mean**	**S. D.**	**Ranks**	**Mean**	**S. D.**	**Ranks**	**t-ratios**
physical	25.95	4.32	3	26.34	4.26	3	-1.34
mental	27.50	3.99	1	27.08	3.98	1	1.57
social	27.26	4.37	2	26.54	4.44	2	2.46
emotional	25.50	4.99	4	25.01	5.06	4	1.46
spiritual	24.11	5.47	5	24.55	5.12	5	1.22

Table 3 represents teachers teaching science subjects in schools, assigned first rank to mental well-being, second to social well-being, third to physical well-being, fourth to emotional well-being and fifth to spiritual well-being; similarly teachers teaching humanities subjects in schools also assigned ranks to the different dimensions of well-being in the same way.

Non-significant mean differences are observed between school teachers teaching science and humanities subjects in respect of all the five dimensions of well-being. The t-ratios obtained in respect of physical, mental, social, emotional and spiritual well-being indicates that science and humanities school teachers do not differ with regard to well-being.

Hence, hypothesis: "There is no significant difference in well-being of school teachers of science and humanities subjects", is accepted.

Conclusion

The well being of the sample teachers was found to be satisfactory. Teachers, being continuous learners and self evaluators, have the opportunity to improve their well-being and need sincere efforts in that direction. There is no significant difference in the level of well being of the limited sample studied now in respect of difference of sex of the teachers or the subjects taught by them.

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Seed Spitter (PTOOEY! Plant Poison Turns Seed-Eating Mouse into Seed Spitter)

A desert plant has a neat way to coerce spiny mice in its native Negev Desert to spread its seed. The plant sweet mignonette, or taily weed, releases a toxic "mustard oil bomb" containing isothiocyanates when the mouse eats the plant's fruit making the critters spit out the seeds. The chemical weapon not only protects the plants' seeds from being ingested but any delay in the mouse reaction means that it allows the nocturnal rodents to spread the seed farther than they would otherwise reach if the fruit were simply to root at the foot of the parent plant. "It's fascinating that these little mice are doing analytical chemistry, assaying the fruit for toxic compounds" and learning not to bite into the seed, explains team member Denise Dearing of the University of Utah. "It's not that these mice have poor table manners," Dearing says. "They deliberately wiggle the seed out of the pulp of the fruit like a person does when eating watermelon. This removal of the seed keeps the toxins in the pulp from being activated."

Playing at NMR (Coin Flip Game to Teach NMR Coupling and J-Value Concepts)

Ever the chemical information innovator, Adam Azman who teaches organic chemistry at Butler University has devised a "coin flip" game to help chemistry students get to grips with the concepts of nuclear magnetic resonance spectroscopy and more specifically the idea of coupling. By assigning a value to the head or tail when flipping two pennies, thousands of coin tosses will add or subtract from a tossed "quarter" - the "set of equivalent protons" giving a statistical 1:2:1 ratio of total values $0.23, $0.25, or $0.27. He points out that using a nickel will allow you to augment that game with J-values. You can play the game here - http://blue.butler.edu/~aazman/coupling/

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Role of Mentors in Guiding and Supporting Novice Teachers of Elementary Schools

Asrat Dagnew*
Department of Education, Bahir Dar University, Ethiopia

Abstract

This article is to report how the roles and responsibilities of mentors in guiding and supporting novice teachers in primary schools of Dangila woreda were assessed. It has been done by attempting to answer the basic questions: Do mentors guide and support novice teachers effectively? What are the conditions that affect the mentoring relationship between mentors and novice teachers? Is there a healthy relationship between mentors and novice teachers? And what are the major problems faced by novice teachers? The study was made employing the descriptive survey method. 14 primary schools in Dangila woreda were selected using simple random technique. Before dispatching the questionnaire, pilot test was conducted and efficacy determined using alpha coefficient, with internal consistency of 0.85. Mentors, novice teachers, and principal respondents were selected randomly to fill up the questionnaire. Data gathered from 33 mentors, 63 novice teachers and 14 principals were analyzed and interpreted. Further, portfolio of novice teachers and information obtained through observation were incorporated. The findings of the study indicated that mentors did not guide and support novice teachers effectively, although they seemed good in knowing their roles and responsibilities. Absence of training, shortage of time and logistic, lack of interest, limited number of experienced teachers in remote schools and absence of planned regular meeting were identified as crucial factors, affecting mentoring relationship. The relationship between mentors and novice teachers was found good. Accommodating students' difference, in- effective evaluation and absence of well developed content knowledge were identified as problem faced by novice teachers. Providing mentoring training, encouraging experienced teachers to continue in remote schools for longer years, appropriate support by woreda expert and sharing experience from experienced teachers are some of the possible remedies.

Keywords: Mentoring, guidance and support, novice teacher, Elementary school

Introduction

At all stages of teacher education and in many countries of the world, mentoring is an acknowledged part of learning and developing new skills. Given the current pressure for educational reforms, mentoring can be an effective way to train teachers to adopt new practices (Weaver, 2004). Professional development practices such as mentoring that provide one-to-one guidance and ongoing on-site support can become successful as learning depends on the collegiality among teachers. A scene of collegiality also makes less experienced teachers feel bold to make mistakes, study themselves and share learning with each other to create excellence in their delivery (Dantonio, 2001). The support for mentoring in teacher training is relied upon to help novice teachers in putting up with the constant demands of new educational reforms, requiring them to adopt new practices (Weaver, 2004).

According to the Ministry of Education (2010), a mentor is an experienced practitioner who provides professional guidance and support. Donaldson (2008) defined a mentor as normally a more experienced colleague with knowledge of the needs and professional contexts of other

*** E-mail: asratboza@yahoo.com**

persons. Mentoring is therefore, the process by which experienced teachers give support, motivation and any other help when necessary to someone less experienced. It is also a method that helps newly employed teachers (novices) to set goals and strive for their success by acquiring the necessary knowledge, skills and attitude (MOE, 2010). It is a means of support offered by a staff member or colleague with more experience in the profession to a less experienced teacher.

Discussion

Teachers who are new to the profession often experience stress in their teaching duties. In addition to the traditional burdens of school rules, deadlines, procedures and expectations, today's schools face many new challenges: schedules are tight, assessing students are more stringent and teachers are busier than ever trying to keep up with new content, new technology and new methodology (Gagen, et al., 2005). Novice teachers are more vulnerable as they are likely to be in charge of students with lower performance. Despite the added challenges associated with teaching children and adolescents with higher needs, most novice teachers are given little or no mentoring; they are thus deprived of professional support and feedback, and a demonstration on how to help their students to succeed (Anthony and Kristsonis, 2006). This suggests that mentors are important in providing support for new teachers as they enter the real world of the classroom.

Studies demonstrated that new teacher turnover rate can be cut in half through comprehensive induction that includes a combination of high quality mentoring professional developmental support, scheduled interaction with other teachers in the school and in the community at large and formal assessment of new teachers, at least during their first two years of teaching (Smith and Ingersoll, 2004). Regarding the process and careful planning, it has been reported in different meetings, panel discussions, workshops and seminars that the mentoring process in particular and the CPD program in general, have many problems or constraints in implementation. Additionally, there appears to have no recognized study that explains whether mentors are appropriately guiding novice teachers or they fail in their responsibilities in the Ethiopian context. Besides, there is scanty knowledge on the status of relationship of mentors and novice teachers during the mentoring process in Dangila woreda primary schools.

Mentors regarded mentoring as an important responsibility, believed they were effective in their roles and found the experience of mentoring as a rewarding one. Donaldson (2008) reported that mentors thought: "They had created an appropriate balance between pastoral care and support and level of challenge for new teachers." Mentors gave clear accounts of ways in which novice teachers acted upon their advice and were making progress in developing skills as teachers. In addition to this, mentors found it beneficial when another promoted member or staff under took an occasional lesson observation and confirmed that beginning teachers were making appropriate progress. The duties undertaken by mentors were in most cases, outlined clearly in the form of guidelines. The guidelines provided in continuous professional development manuals, helped mentors and novice teachers to develop understanding and expectations of support strategies.

Mentors are expected to possess ideals and expertise of the teaching profession, to be shared with the new teacher. The function of the mentor varies depending on the needs of the new employee, the goal of the mentoring program and the structure of the local and broader education (MOE, 2007; Rhodes, 2004).

It has to be realized that the mentor teacher is a helper, not a supervisor, or evaluator and "a very special person, a model of professionalism". Most of the time, various literature sources, books and studies related to mentoring typically describe the benefits for novice teachers. However, facilitators of mentoring programs

and researchers are recognizing that mentors also derive substantial benefits from the mentoring experience. Teacher quality is improved by the implementation of best teaching practice. Mentoring plays a significant role in the implementation of best practices by asking reflective questions and providing curriculum resources. Thus, for the purpose of effective mentoring, the mentor and novice teacher must develop full faith in interaction and share common interests, values and goals among each other. It is not only the duty of mentors for effective interaction but novice teachers also have a significant role in the mentoring process.

Being new, beginners are seldom aware of the school culture, norms and expectations (Wildman, et al., 1992). They must familiarize with the social expectations and conventions that guide daily school operations and interactions among administrators, colleagues, parents and students. Novices often do not understand their roles in the social setting; mentors may have to smooth their rough edges, at times affecting their own reputations. Even after initial training and consciousness-raising, the mentors often forgot or appeared to be not aware of the differences between experts and novices. Problems also arose when the beginner would not reciprocate in the sharing process. Occasionally, mentors commented that their beginners would take everything - time, materials, and ideas - and give nothing in return (Matters, 2002). Conditions that created problems for novices often related to their academic or extra-curricular assignments.

Today, mentoring has become an important topic in Ethiopian education and a preferable strategy in continuous professional development program focused on new teachers' induction (MOE, 2003). Besides creating new career opportunities for experienced teachers, assigning mentors to work along and help new teachers represents an improvement over the abrupt and unassisted entry into teaching that characterizes the experience of many novices. Appropriate training given to mentors expands the teaching role and thus improves the quality of mentoring. Holloway (2001) stated that the mere presence of a mentor is not enough; the mentor's knowledge of how to support new teachers and providing guidance in new skills are crucial factors. Mentoring is likely to be of no value if mentors do not improve in their knowledge and expertise and change teaching practices to reflect current research. Davis and Higdon (2008) are of the view that mentoring could only be effective if both parties are willing to grow and learn and base their relationship on mutual trust and openness.

In general, there is a growing concern among educators, whether at the national or woreda level, that the single most important factor in determining students' performance is the quality of their teachers. Therefore, if the national goal of achieving 'quality education' for all across the country is to become realty, it is critical that efforts are required for developing and training high-quality teachers in every community and at every grade level. Also, qualified and efficient mentors are essential to help, guide and create experts from new teachers. With this background it was felt necessary to study the roles of mentors in helping novice teachers. Thus, this study attempts to identify and describe the role of mentors in supporting novice teachers and major factors affecting mentoring process of the novice and the mentors. Investigation on the effectiveness of mentoring and the nature of the relationship between mentor and new teachers during mentoring aimed at answering the following research questions:

1. Do mentors guide and support novice teachers effectively?
2. Do mentors know their roles and responsi bilities to guide and support novice teachers?
3. What are the conditions that affect the mentoring relationship between the mentors and novice teachers?

4. What are the major problems faced by novice teachers?

The survey method and the results are presented under different subheadings:

Method

Subjects

The choice of sample schools was based on Dangila Woreda 2003 E. C. annual educational report. According to this report, there were 48 elementary schools. Of these, 26 elementary schools were without novice teachers and the remaining 22 elementary schools were with novice teachers; these 22 elementary schools were selected as target population for this study. From these 22 schools, 14 (63.6%) schools were selected by simple random sampling (Kothari, 2000).

All the teachers who had three years and above experience and who were assigned as mentors and all the mentees were the respondents of this study. Therefore, 42 mentors (30 men and 12 women) and 68 novice teachers (27 men and 41women) were selected by comprehensive sampling technique. In addition 14 school principals (13 men and 1 woman) were selected from the sample schools.

Instruments

The data sources were individual mentors, novice teachers and school principals. The main data gathering instruments of the study were close ended and open ended questionnaires. Interview and observation were used to supplement the information obtained through the questionnaire. The questionnaire was prepared in a liker scale form (ref.?) that ranges from strongly agree to strongly disagree. The mentors gave responses regarding the novice teachers while the novice teachers were responding to questions about the mentors. Two sets of questionnaire were developed by the researcher:

1. The questionnaire for the mentors contained 45 items, designed to obtain data about conditions that affect mentoring relationship, major problems facing novice teachers and to check the existence of healthy relationships between mentors and novice teachers.
2. The second questionnaire was prepared for novice teachers, having 35 items designed to obtain information about effectiveness of mentors, role and responsibility of mentors, conditions that affect the mentoring relation ships and the degree of healthy relationship.

Reliability of the questionnaire was determined by alpha coefficient (The items were prepared based on five point rating like scales such as: Strongly agree; agree; undecided; disagree and strongly disagree. Through the application of Chronbach alpha coefficient, it has been calculated and checked.)

It accounted for 0.95 for effectiveness of mentors, 0.99 for the role and responsibility of mentors, 0.58 for the conditions that affect mentoring relationship, 0.83 for healthy relationship, and 0.88 for the major problems faced by novice teachers.

Method of data analysis

In the presentation and analysis of data, descriptive statistical analysis (Garrett, 2005) was employed. Some of the items of the questionnaire were grouped into their categories. Data collected through structured questionnaire were analyzed using percentage and mean. Narrative description was used for the information obtained through observation and interview to triangulate results of the data collected through questionnaire.

Results and discussions

This part of the paper deals with the analysis of the data gathered from sample school mentors and novice teachers in Dangila woreda. A total of 110 copies of questionnaire were distributed to the respondents; 68 questionnaires to novice teachers and 42 to mentors in the sample elementary schools. However, for various reasons all the questionnaires were neither correctly filled nor returned. The response rate was 96 (87.3%) consisting of 63 novices and 33 mentors. The remaining 14 (12.7%) was ignored.

Mentors effectiveness in guiding and supporting novices

Table 1: Mentors abilities to guide and support novice teachers

No	Items	Respondent	Total number of respondents										Mean (M)	S. D.
			Novice teachers: 63											
			Rating scale											
			1		2		3		4		5			
			No	%	No	%	No	%	No	%	No	%		
1	Mentors possess qualities and abilities, you respect & admire	N.T.	6	9.5	19	30.2	9	14.4	24	38.1	5	7.9	3.04	1. 18
2	Mentors have understanding of instruction in the area taught		6	9.5	21	33.3	14	22.2	18	28.6	5	7.9	2.87	1. 09
3	Mentors are exemplary teachers for you		6	9.5	20	31.7	11	17.5	21	33.3	4	6.3	2.98	1. 17
4	Mentors show an awareness of current teaching trends		6	9.5	23	36.5	13	20.6	15	23.8	5	7.9	2.85	1. 14
5	Mentors demonstrate a wide range of interpersonal skills		5	7.9	26	36.5	11	17.4	18	4.76	3	4.7	2.80	1. 09

Key: N.T. Novice teachers, strongly agree=5, Agree=4, Undecided=3, Disagree=2, strongly disagree=1,

Table 1, presents mentor effectiveness in guiding and supporting novice teachers. As rated by respondents, against the mean scores were interpreted in such a way that mean scores below 3 indicated ineffectiveness of the mentor, inversely a mean score value of 3 or greater than 3 indicated effectiveness of the mentor. 39.6% of the novices disagreed that mentors possessed qualities and abilities, they respect and admire while the majority (46%) agreed the idea. Hence, novice teachers believed that mentors possessed 39.6% of novices believed that mentors were

exemplary teachers but; 41.2% disagreed. Thus, Dangila woreda primary school teachers believed mentors as not exemplary teachers.

Majority (46%) of novices disagreed with item 4, while 31.7% of them agreed. Therefore, novice teachers in that woreda were not satisfied with mentors' awareness of current teaching trends.

44.4% of novice teachers disagreed on mentors' interpersonal skill (Item 5), 9.52% agreed. It seems to be suggestive that mentors lack interpersonal skill to sustain positive professional relationships.

Mean score was used to show the effectiveness of mentoring program. In line with this, the mean score of novice teachers in item 1 was (3.04) which were above 3. This indicated that novice teachers in the sample schools believed on mentors qualities and abilities. For the remaining for items, the mean score of novice teachers were below 3 (i.e.2.87, 2.98, 2.85, and 2.87) respectively. This shows that mentors have less ability to support novice teachers. According to Rhode (2004) and MOE (2005), mentors should be exemplary, have good interpersonal skills, and awareness of current teaching trends.

Roles and responsibilities of mentors

Table 2: Qualities of mentors

No	Items	Respondent	Total Number of respondent Mentors: 33 Rating Scale 1		2		3		4		5		Mean (M)	S. D.
			No	%	No	%	No	%	No	%	No	%		
1	Mentors serve as a professional role model	M	3	9.1	11	33.3	4	12.12	9	27.3	6	18.18	3.12	1. 31
2	Mentors serve as critical friends	M	2	6.06	6	18.18	4	12.12	13	39.4	8	24.24	3.67	1. 22
3	Mentors are models of effective instructional techniques for novices	M	3	9.1	8	24.2	4	12.12	12	36.4	5	15.15	3.30	1. 28
4	Mentors are sensitive to needs of others	M	3	9.1	6	18.18	4	12.12	12	36.4	8	24.24	3.48	1. 30
5	Mentors are enthusiastic about the profession	M	4	12.1	7	21.2	6	12.12	12	36.4	4	12.12	3.15	1. 25

Key **M:** Mentors; others same as in Table 1

Table2 shows 45.48% mentors agreed that they serve as professional role models, while the remaining (42.4%) of the mentors disagreed. For item 2, 63.64% mentors agreed that they serve as critical friends to the novices; but 24.24% disagreed. Therefore, majority of the mentors believed that mentors serve as critical friends for mentees. For item 3, 54.58% agreed and 33.3% disagreed. Hence, majority of the mentors believed that mentors were models of effective instructional techniques for the novices.

On item 4 and 5, Table 2 reveals 48.5 % agreeing and 33.32% and disagreeing. Thus, most mentors were sensitive to the needs of others and enthusiastic about the profession. The mean score was used to indicate whether mentors know their roles and responsibilities .The mean score of mentors were greater than 3 (3.12, 3.57, 3.30, 3.48, and 3.15 for item 1-5 respectively). This showed that mentors knew their roles and responsibilities.

Table 3: School related factors affecting mentoring

No	Items	Respondent	Total Number of respondent Mentors=33 Rating Scale										Mean (M)	S. D.
			1		2		3		4		5			
			No	%	No	%	No	%	No	%	No	%		
1	Mentors get mentoring training	M	5	15.2	14	42.4	4	12.12	7	21.2	3	9.1	2.66	1. 24
2	Experienced teachers are small in number at schools	M	4	12.1	5	15.2	7	21.2	16	48.5	2	6.06	3.21	1. 16
3	Mentors carefully identify specific novice teachers' need	M	4	12.1	7	21.2	6	18.18	12	36.4	3	9.1	3.12	1. 21
4	Mentors' selection is based on their personal and professional qualities	M	3	9.1	13	39.4	5	15.15	9	27.3	3	9.1	2.87	1. 19
5	Mentors have planned meeting program	M	2	6.06	12	36.4	5	15.15	9	27.3	5	15.15	3.09	1. 23

Key: M: mentors, others same as in tables 1 &2

As seen in Table 3, majority (57.55 %) of mentors disagreed about the mentoring training; only 30.31% agreed. on the idea. Regarding teachers' experience however, majority (54.54%) of the mentors agreed that experienced teachers were few in number in the schools; only a small number (27.22%) disagreed. Similarly, 54.54% of the respondents agreed that mentors carefully identified specific novices' learning need; nevertheless, 33.33% mentors disagreed.

For item 4, 48.45% of mentors disagreed that selection of the mentors was based on personal and professional qualities

of the highest order; only 36.37% agreed. Item 5, indicates that 42.42% of the mentors disagreed that they had planned meeting program; the rest agreed. Therefore, mentors had no planned meeting programs.

Mean score was used to indicate the overall condition that affect mentoring relationships. Accordingly, for item 1, the mean score was below 3 (2.66). Hence, mentors had not gained mentoring training. For item 4, the mean score of mentors was below 3 (2.87) and hence, selection of the mentors was not on personal and professional qualities.

Challenges faced by novice teachers

Table 4: Novice teachers' activities in the classroom

No	Items	Respondent	Total Number of respondent Mentors: 33 Rating Scale 1		2		3		4		5		Mean (M)	S. D.
			No	%	No	%	No	%	No	%	No	%		
1	Novice teachers motivate students in the classroom	M	1	3.03	11	33.3	4	12.12	15	45.45	2	6.06	3.18	1. 07
2	Novice teachers accommodate differences among students	M	3	9.09	17	51.5	3	9.09	8	24.24	1	3.03	2.67	1. 14
3	Novice teachers evaluate students' work properly	M	2	6.06	15	45.5	5	15.15	8	24.24	3	9.09	2.85	1. 15
4	Novice teachers deal with parents of students	M	4	12.1	12	36.4	5	15.15	11	33.33	1	3.03	2.79	1. 14
5	Novice teachers have well developed content knowledge	M	4	12.1	11		5	15.15	9	27.27	4	12.12		

Key: same as for Tables 2&3

As indicated from table 4, majority of the mentors (51.51%) agreed that novice teachers motivated students in the classroom, while less number (33.3%) of them disagreed. For item 2, the larger proportion (60.6%) of the mentors disagreed that novice teachers accommodated difference among adults, but a smaller proportion (27.27%) agreed. Therefore, novice teachers had a problem in accommodating student difference. For item3, 51.51% of them disagreed that novice teachers had problems in evaluating students' work properly but, the rest of the respondents agreed. The result indicates that novice teachers had problems in evaluating students' work properly. 48.48% of mentors were disagreed that novice teachers dealt with parents of the students (Item 4), while 36.36% agreed. For item 5, majority (45.45%) of the mentors disagreed that novice teachers had well developed content knowledge but, some (39.39%) agreed.

The mean score of item1 was above 3 (3.18). This indicated that novice teachers motivated students in the classroom. For the remaining four items, the mean score of mentors was below 3 (as in Table 4). The result indicated that in accommodating students' difference, effective evaluation of students, meeting with parents of students, content knowledge, and effective technique of questioning and effective organization of the classroom were the major challenges faced by novice teachers. According to Veenman (1984), novice teachers faced major challenges in maintaining classroom discipline, motivating students, accommodating differences among students, evaluating students' work and dealing with parents. A similar inference is possible from the present study through observation and document analysis.

Conclusion

From the analysis of the results and inferences made out of it, the following conclusions could be made on the role of mentors in guiding and supporting novice teachers of elementary schools of Dangila woreda, Ethiopia.

1. Mentors do not have appropriate awareness of current teaching trend, understanding of instruction and also interpersonal skill to establish and sustain positive professional relationships
2. Mentors do not provide well targeted support, have no well planned developmental program to the novice teachers and do not provide progressive feedback properly
3. Mentors and novice teachers of the selected schools suffer from lack of sufficient time and logistic to run mentoring program effectively
4. The major factors that affect mentoring program are time, absence of interest, absence of mentoring training and scarcity of experienced teachers
5. Novice teachers have problems in accommodating students' difference in the classroom, effective organization of the classroom and effective technique of evaluation

Recommendations

On the basis of the findings of the study, the following recommendations are suggested:

1. The school principals, supervisors and officers should provide the necessary assistance for implementation of effective mentoring program
2. The concerned bodies (Woreda expertise, school principals and supervisors) should evaluate the mentoring program.
3. The woreda should allocate budget and employ experienced teachers to reduce work load of novice teachers
4. Woreda education office should encourage teachers having three or more years of experience to continue in the same school for longer time
5. Cluster supervisors, school principals and mentors should design experience sharing programs to reduce challenges faced by the novice teachers

6. Interested teachers and other stake holders may investigate in more detail and depth the current situation of the mentoring program with different settings to suggest improvement

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An Introduction to Personality Structure

Ripenjeet Kaur*
Surjeet Memorial College of Education, Malwal, Ferozepur, Punjab – 142 052

Abstract

Personality is the product of interaction between inherited potentialities and environmental forces. It is reflected in all activities and it differs from individual to individual. Personality Structure can be defined as a trait inferred from the individual's behaviour i.e. a mode of behaviour. Individual personality is contributed by the big five traits (important for understanding and interpreting an individual's personality profile, mainly in getting a broad overview of their personality make-up at highest level of personality organization) - emotional stability and neuroticism, extraversion and introversion, intellect and openness to experience, agreeableness and conscientiousness. Different type of definitions of personality, different personality factors and the possibility of defining personality structure as a complex and multidimensional model by identifying the individual in terms of these five traits are presented.

Key words: Personality structure, traits, personality factors

Introduction

The word personality structure identifies whole scientific literature and ways of thinking about personality. Personality is the product of interaction between inherited potentialities and environmental forces. It is reflected in all activities and it differs from individual to individual. Personality Structure can be defined as a trait inferred from the individual's behaviour i.e. a mode of behaviour. Allport (1937), one of the America's leading psychologists, after combing the literature for various meanings, assigned to the term personality, reported six varieties of definition that are persistent to the way in which personality theorists conceive their topic. Varieties of definition are discussed below:

External appearance (Mask)

The conception of external appearance (mask) stems from the Latin word 'Persona', the root of the word personality, persona referred to the theatrical mask worn by the actors in the classical drama. In mask definition, the personality is equated with the overt behaviour and appearance of the individual. Other examples of this type of concept are: 'Personality refers to the characteristic way in which a person behaves' and 'the personality is person's stimulus values for others'.

So conceived, personality is in the eyes of the beholder. It is the way in which one person influences other people what they think of him, how they rate. This view assumed that whatever may be going on beneath the mask of behaviour is irrelevant to an understanding of personality.

Omnibus definitions

Omnibus definitions stated that 'Personality is the sum of person's attributes'. These are the definitions of enumeration of qualities. For example, 'Personality is the sum total of the individual's inherited and acquired mental abilities'. Since qualities are added together, their position denies the significance of relations or interactions that may obtain among the stated qualities. Personality is seen as an aggregate not an organization or configuration.

Integrative definitions

In the integrative variety, the components of the total personality do not

*** E-mail: noorbrar29@yahoo.com**

simply make additive contribution to the properties of the whole. Rather, each component interacts in a significant way with other components in a non-additive fashion. Thus, integrative definitions stressed the organization or morphology of personal attributes. An illustration of this type of definition of personality is 'the characteristic pattern of an individual's thoughts, motives, feelings and emotions'.

Hierarchical definitions

Hierarchical definitions, like the integrative, stress the organization of the personality but focus on levels of integration of organization. This conception of personality is in terms of layers of processes or characteristics usually with some unifying agency at the top. An example would be Freud's tripartite division of personality with the 'Id' representing the primitive instincts; justice the 'Superego' as moral agency and the 'ego' whose task is to mediate the other two.

Adjustive definitions

The adjustive group of definitions conceives personality as a mechanism of survival in the Darwinian sense. The person's ability to relate successfully to the world is the focus of the adjustive approach. An example of this is the statement: 'Personality is that which determines the degree to which the person can adjust to his environment.'

Distinctiveness

The distinctiveness conception of person stresses the uniqueness of the individual. Those holding the view would say the personality constitutes those characteristics that set one individual off from others. This point of view focuses on the way in which people are different qualitatively rather than one what they have in common. 'Those attributes of the individual which make that individual unique' is an example of this kind of definition of the personality.

Hence, personality is concerned about a person's nature, qualities, inner aspects as well as outer appearance. It is the dynamic organization within the individual of those psycho-physical systems that determine his unique adjustment to his environment (Allport, 1961). Here 'Dynamic Organization' emphasizes the fact that personality is constantly developing and changing; although at the same time the organization or system binds together and relates the various components of personality. The term 'Psycho-physical' reminds that personality is neither exclusively mental nor exclusively physical. The 'organization' entails the operation of body and mind, fused into a personal unity. The word 'determine' makes clear that personality is made up of determining tendencies that play an active role in individual's behaviour. "Personality is something and does something". It is what lies behind specific acts and within the individual. This definition reflects that man's personality is organized which is constantly evolving and changing. Man is both body and brain with the help of which he does something which makes him different from others. Therefore every human being is unique in time, place, person, adjustment and quality. Personality is the mode of survival.

Discussion

Rogers (1961) regards human beings to have a positive direction to expand, extend, become autonomous, develop and mature. In other words, the need for the positive regard remains active throughout life and it is important for all individuals to have need for positive self-regard in order to have the stage of self-actualization. Maslow (1970) explains personality as a dualistic theory of motivation in terms of hierarchy of human needs ranging from physiological needs or self-actualizing needs.

Personality structure is extremely important in organizational setting: Perception, learning and motivation, deals with some specific aspects of human behaviour. The concept of structure refers to the more stable and enduring aspects of personality. They represent the building blocks of personality. The humanistic

approach to understand personality as espoused by different psychologists, did not explain personality in concrete terminology. The factor approach to identify personality characteristics remained core element in personality research. Cattell (1943) identified sixteen traits to describe personality in terms of ability and temperament. Cattell (1946) found that the structure of personality is multi-level and hierarchical, with a structure of interdependent primary and secondary level traits. Again Cattell (1950) defined that as which permits a prediction of what a person will do in a given situation. The goal of psychological research in personality is, thus to establish laws about what different people do in all kinds of social and general environmental situations. Personality is the first place concerned with all the behaviour of the individual, both overt and under the skin. It is concerned with a range of behaviour extending from the individual's political and teaching views to the way he digests the food. However, at one extreme it is concerned with behaviour of groups of personalities. Accordingly, a trait is "a mental structure", an inference that is made from observed behaviour to account for regularity and consistence in human behaviour. Cattle's 16 personality factors derived from questionnaire data are the following:

Factor	With low score	With high Score
A	Stiff, reserved, cool, detached, critically rigid	Outgoing, warm-hearted, easy going, participating
B	Lower scholastic mental capacity, less intelligent and concrete thinking	
C	Lower ego strength that's affected by feelings, emotionally less stable and easily upset	More intelligent, abstract thinking, bright, higher scholastic mental capacity
E	Humble, mild, accommodating and conforming	Assertive, independent, aggressive, competitive and stubborn
F	Sober, prudent, pessimistic and serious	Enthusiastic, cheerful, active, talkative, carefree and optimistic
G	Expedient, evading rules and feeling few obligations	Conscientious, preserving, staid, rule- bound
H	Shy, restrained, diffident and timid	Venturesome, socially-bold, uninhibited and spontaneous
I	Tough-minded, responsible, unmoved and cultured	Tender-hearted, protected, day-dreaming, demanding and impatient
L	Trusting, adaptable, free of jealous tendencies and easy to get on with	Suspicious, self-opined, hard to fool, poor team member
M	Practical, careful, conventional and regulated by external realities	Imaginative, wrapped up in inner urgencies, careless of practical matters and absent minded
N	Natural, artless and sentimental	Calculative, worldly, penetrating and shrewd
O	Placid, self-assuming, confident and serene	Apprehensive, worrying, depressive and troubled
Q1	Conservative, respecting established ideas, tolerant of traditional difficulties	Experimenting, critical, liberal, analytical, free-thinking
Q2	Group-depending, team man and sound follower (group adherence)	Self-sufficient, prefers own decisions, resourceful
Q3	Undisciplined, self-conflicting, careless of protocol, follows own urges (low integration)	Controlled, socially precise, following self image (high self control)
Q4	Relaxed, torpid, un-frustrated (low tension)	Tense, frustrated, driven to tension

The structure in terms of traits/factors explains personality in simple terminology. As the personality structure expresses an association among behaviours that do vary together to form a unitary, independent dimension of personality. No doubt, this structure in terms of traits did explain personality in a multidimensional mode; still it is not feasible to explain personality structure as it is. In this continuity to explain personality structure in simple words, according to Eysenck (1960) "Personality is more or less stable and enduring organisation of a person's character, temperament, intellect and physique which determines his unique adjustment to his environment". His definition of personality includes four main sectors of behaviour patterns. The cognitive sector (intelligence), the conative sector (character), the effective sector (temperament) and the somatic sector (constitution) Thus, personality is the sum total of the actual or potential behaviour patterns of an organism as determined by heredity and environment. Eysenck (1960), conducted extensive research on trait dimensions by applying the quantitative technique of factor analysis. The two personality dimensions extraversion and neuroticism were described in his book Dimensions of Personality. It is common practice in personality psychology to refer the dimensions by the first letters, E and N. E and N provided a 2-dimensional space to describe individual differences in behaviour. An analogy can be made to latitude and longitude describing a point on the face of the earth. Also, Eysenck noted how these two dimensions were similar to the four personality types first proposed by Greek physician Hippocrates as:

1. High N and High E = Choleric type
2. High N and Low E = Melancholic type
3. Low N and High E = Sanguine type
4. Low N and Low E = Phlegmatic type

Eysenck and Eysenck (1969) gave two dimensional descriptive model i.e. introversion-extroversion and neuroticism (stable-unstable) with some specific/unique traits. Here extroverts are recognized as out going, uninhibited, impulsive, lively, assertive, sensation seeking, carefree, dominant, venturesome and socially inclined persons; but introverts are unstable, over emotional and reacting, insecure, self-conscious, temperamental, quiet, introspective, worrisome, disciplined and well-orderly people. Eysenck believed that purely extrovert and introvert people were rarely found. Therefore he preferred to use a dimension i.e. a continuum ranging from introversion to extroversion instead of naming type as introverts and extroverts. The second major dimension is Neuroticism, involves emotional instability at the lower end and emotional stability at the upper end. Thus, at its lower end are persons who are moody, calm, carefree, even-tempered and dependable. The relationship of these two basic dimensions of personality structure to the four major temperamental types distinguished by the Greek physicians Hippocrates and Galen and to a wider range of personality characteristics is presented in the following diagram.

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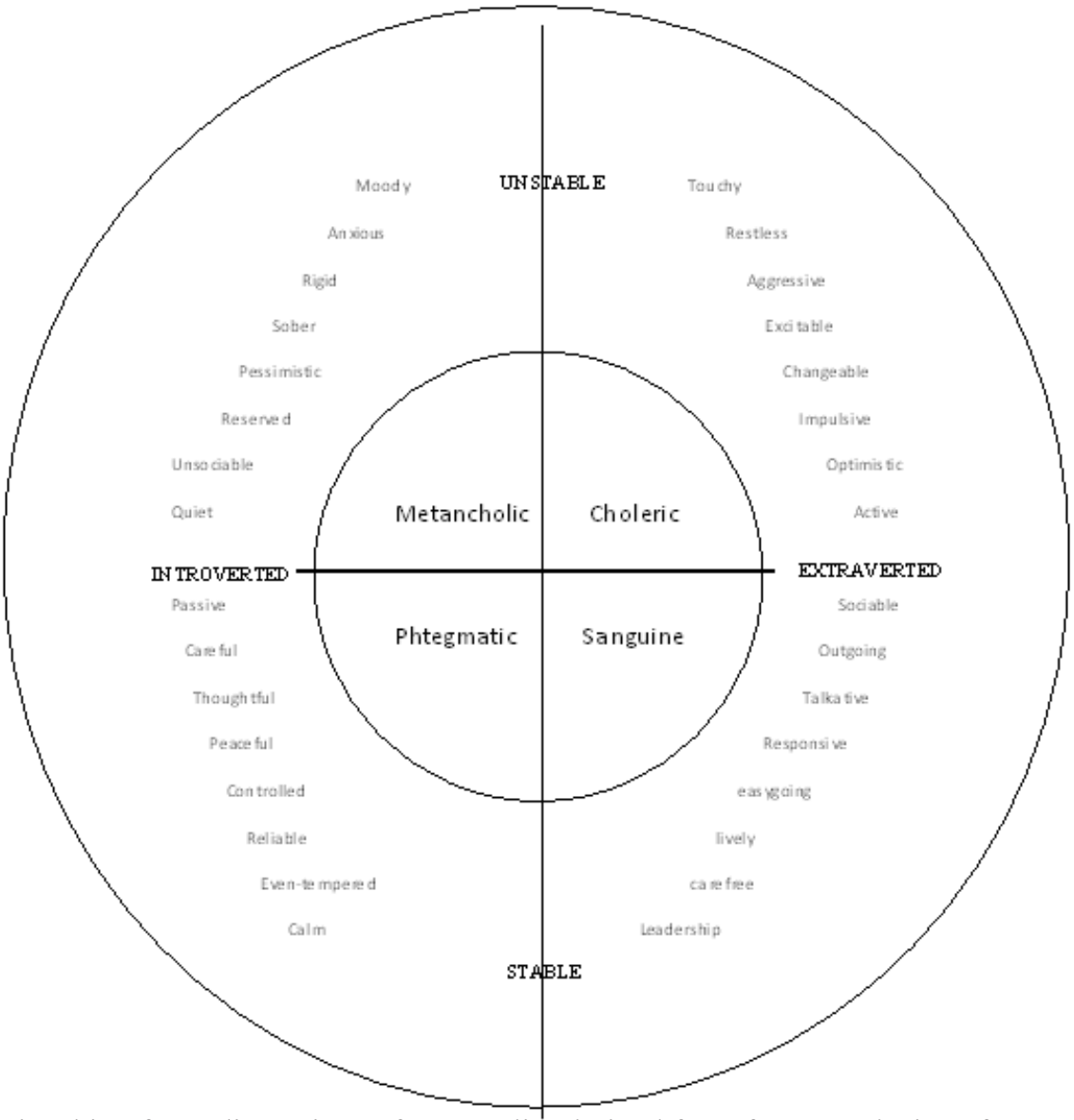

The relationship of two dimensions of personality derived from factor analysis to four greek temperamental types. (Eysenck, 1970, Reprinted by permission, Routledge & Kegan Paul Ltd. Publishers).

Eysenck and Eysenck (1976) further expanded these to dimensions by adding third dimension of Psychoticism. The Psychoticism dimension subsumes the continuum from normal behaviour through criminal and psychotic behaviour to schizophrenic and other psychotic states in which contact is lost with reality and there is severely disordered cognition effect and behaviour. People high on this dimension tend to be solitary, intensive, uncaring about others and opposed to research, Cattell found that the structure of personality was multi-level and hierarchical, with a structure of interdependent primary and secondary level traits. The sixteen primary factors were a result of factor-analyzing hundreds of measures of everyday behaviour to find the fundamental traits behind them. Then they discovered the five global (or second-order) factors by factor-analyzing the sixteen primary traits themselves, to find the basic, organizing forces among the sixteen basic traits. They consistently found that the primary traits themselves came together in particular, meaningful groupings to form broader secondary or global traits, each with its own particular focus and

function within personality (Cattell and Schuerger, 2003). The first global trait extraversion-introversion was composed from the primary traits as Warmth (Factor A), Liveliness (Factor F), Social Boldness (Factor H), Forthrightness (Factor N), Affiliative (Factor Q2), second global factor Receptivity or Openness (versus Tough-Mindedness) was made up of four primary traits as: Sensitivity) (Factor I), Abstractness (Factor M), Openness-to-change (Factor Q1), Warmth (Factor A) and another global factor self-controlled (or conscientious) versus Unrestrained resulted from the natural coming together of primary factors as Rule-consciousness (Factor G), Perfectionism (Factor Q3), Seriousness (Factor F) and Groundedness (Factor M). Today the global traits of personality are commonly known as the Big Five. Similarly, in the Big Five model two traits extraversion and neuroticism are same as in Eysenckian model. However, what Eysenck calls the trait Psychoticism corresponds to two traits in the big five model: Conscientiousness and Agreeableness. Eysenck's personality system did not address Openness to experience.

Hence we can conclude that the big five model of personality structure is not totally new concept but derived from the models of Cattell and Eysenck (loc. cit). The big five traits are the most for getting an abstract, theoretical understanding of the big, over-arching domains of personality, and in understanding how different traits of personality relate to each other and how different research findings relate to each other. The big-five are important for understanding and interpreting an individual's personality profile mainly in getting a broad overview of their personality make-up at highest level of personality organization (Goldberg, 1999; Paunonen and Ashton, 2001). The big five factors are commonly measured by the NEO by McCrea and Costa (1976). The big five factor model includes:

- Emotional stability and neuroticism
- Extraversion and introversion
- Intellect and openness to experience
- Agreeableness

Conscientiousness (McCrae and Costa, loc. cit.). Each super trait is measured by six facets or subordinate traits as:

N	**E**	**O**	**A**	**C**
Anxiety	Warmth	Fantasy	Trust	Competence
Anger, hostility	Gregariousness	Aesthetics	Straight forwardness	Order
Depression	Assertiveness	Feelings	Altruism	Dutifulness
Self-consciousness	Activity	Actions	Compliance	Achievement striving
Impulsiveness	Excitement seeking	Ideas	Modesty	Discipline
Vulnerability	Positive emotion	Values	Tender mindedness	Deliberation

These big five factors of personality structure are discussed and conceptualized as:

Neuroticism

It represents individual differences in the tendency to experience distress. High neuroticism scores experience chronic negative effects and are prone to the development of a variety of psychiatric disorders. They have nervous tension, frustration and irrational thinking, low self-esteem, poor control of impulses and carvings and somatic complaints. The person with a tendency towards neuroticism is more worried, temperamental and prone to sadness. Emotional stability is related to calm, stable and relaxed persons, whereas neuroticism is linked to anger, anxiousness and depression.

Extraversion and introversion

The extraverts tend to be more physically and verbally active whereas the introverts are independent, reserved, steady and like being alone. The person in the middle of the dimension likes a mix between social situations and solitude. Extroversion is the outward turning of psychic energy toward the external world, while introversion refers to the inward flow of psychic energy towards the depths of the psyche. Extraversion is characterized by positive emotions, and tendency to seek out stimulation and the company of others. The trait is marked by pronounced engagement with the external world. Extraverts enjoy being with people and are often perceived as full of energy. They tend to be enthusiastic, action-oriented individuals who are likely to say "Yes!" or "Let's go!" to opportunities for excitement. In groups they like to talk, assert themselves, and draw attention to themselves. Introverts lack the social exuberance and activity levels of extraverts. They tend to seem quiet, low-key, deliberate and less involved in the social world. Their lack of social involvement should not be interpreted as shyness or depression. Introverts simply need less stimulation than extroverts and more time alone. They may be very active and energetic, simply not socially.

Openness

People with a high openness have broader interests, are liberal and like novelty. This factor relates to intellect, openness to new ideas, cultural interest, educational aptitude and creativity. These individuals are cultured, aesthetic, intellectual and open. It includes elements such as active imagination, sensitivity, attentiveness of inner feelings, preference for variety, intellectual curiosity and independence of judgment. It is also characterized by curiosity about both inner and outer worlds, accompanied by experimentally rich life, willingness to entertain novel ideas and inconvenience, values and experience both positive and negative emotions in an intense manner. It has general appreciation for art, emotion, adventure, unusual ideas, imagination and variety of experience. The trait distinguishes imaginative people from 'down-to-earth' conventional people. The people are open to experience, are intellectually curious, appreciative of art and sensitive to beauty. They tend to be, compared to close people, more creative and more aware of their feelings. They are more likely to hold unconventional beliefs. People with low scores to openness tend to have more conventional, traditional interests. They prefer the plain, straightforward and obvious, over complex, ambiguous and subtle. They may regard the arts and sciences with suspicion or even view their endeavours as uninteresting.

Agreeableness

It is linked to altruism, nurturance, caring and emotional support versus hostility, indifference, self-centeredness and jealousy. Agreeable people are altruistic, gentle, kind, sympathetic and warm. It is a dimension that appears to involve the more humane aspects of humanity characteristics. It is a tendency to compassionate and cooperative rather than suspicious and antagonistic towards others. The trait reflects individual differences in general concern for social harmony. Agreeable individuals are value getting along with others. They are generally considerate, friendly, generous, helpful and willing to compromise their interests with

others. Agreeable people also have an optimistic view of human nature. They believe people are basically honest, decent and trustworthy. Disagreeable individuals place self-interest above getting along with others. They are generally unconcerned with others' well-being, and are less likely to extend themselves for other people. Sometimes their scepticism about others' motives causes them to be suspicious, unfriendly and uncooperative.

Conscientiousness

The conscientious, focused person is concentrating on only couple of goals and strives hard to perceive them. He is career oriented, while the flexible person is more impulsive and easier to persuade from one task to another. It has been linked to educational achievement and particularly to the will to achieve. The more conscientious a person, he is more competent, dutiful, orderly, responsible and thorough. Conscientiousness has been drawn upon as a resource in situations where achievement is important value i.e. in context of work, learning and education. The construct represents the drive to accomplish something, and it contains the characteristics necessary in such pursuit: being organized, systematic, efficient, practical and steady. The trait **A** shows a preference for planned rather than spontaneous behaviour. It influences the way in which we control, regulate and direct our impulses.

Hence personality structure conjures up images of the big five traits of an individual that make his unique identity. It is possible to define personality structure as a complex and multidimensional model by identifying the individual in terms of these five traits.

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Pheromones – Function and Importance

A. G. Ramachandran Nair*
Venkateswara College of Education, Moolakulam, Puducherry - 605 010

Abstract

The ever increasing importance of the application of pheromones in efficient and environment friendly procedures for the destruction of pest insects, trapping pests for monitoring purposes, controlling the population by creating confusion, disrupting mating, as well as preventing further egg laying etc. is common knowledge among the students of biology, agriculture and phytochemistry. More and more pheromones are detected, isolated and synthesized to use them as pest traps for controlling the population of increasing pest insects as well as for examining more precisely their utility as sex attractants and sexual stimulants in humans - both males and females- and their probable beneficial effects in analysis of human immune system and socio-sexual behaviour. Many of the pheromones offer interesting challenges in their stereo-selective synthesis and testing for their influence in modifying mood in humans. In continuation of the series of articles on molecular basis of explanation of biological phenomena published in Vetri Education and with a view to sensitizing the young researchers on the vast scope of study and research in this ever fertile field, this article is presented.

Key words: Pheromones, message molecules, pest control, socio-sexual stimulant

Introduction

Pheromones (derived from the Greek word pherein, meaning to carry) are highly selective "Chemical messengers "released by insects (or other animals) to influence fellow members of the species, usually through the sense of smell. Obeying commands relayed by pheromones, insects will honour territorial rights, mate, discover food, dispose of the dead, muster allies when attacked, become belligerent, choose leaders and regulate their populations (Brewster, et al., 1977). Wikipedia (The free Encyclopaedia, 2012) describes pheromone as derived from Greek phero "to bear" + hormone from "impetus" as a secreted or excreted chemical factor that triggers a social response in members of the same species. Pheromones are chemicals capable of acting outside the body of the secreting individual to impact the behaviour of the receiving individual. A more general definition (smithsonianmag.com) considers pheromone as a chemical substance produced and released into the environment by an animal, especially a mammal or an insect, affecting the behaviour or development of other species. Here is an attempt to provide a short review on this.

Discussion

A picturesque account of the function of pheromone is presented by Brewster, et al. (1977): A female gypsy moth, cued by the light of dawn, releases a number of molecules of her special scent, which are carried by the prevailing breezes for miles. When a few of these molecules reach the antennae of the male gypsy moth, he takes of like a guided missile to find the female and mate with her. Wilson of Harvard University is quoted to provide an assessment on the potency of pheromone of female gypsy moth: "She can attract a billion males if she released all of her sex attractant pheromone at one time". Another estimate from Freeman, a flavours and fragrance researcher: "A bath-tub full of a pheromone could be mixed into all of the world's oceans, and a teaspoon full of the

*** E-mail: ramchand2211@gmail.com**

resulting of the sea water will still exhibit a definite pheromone effect" elicits surprise.

The high effectiveness at very low concentration of the pheromone has led farmers and foresters to use a suitable pheromone as insect trap in place of widespread use of insecticides. Pheromone baits are employed to harvest fish much easily than conventional methods.

As chemical communication appears to be the only type of communication available to them, insects have developed highly sophisticated pheromone generation and detection systems. Most pheromones are highly specific and carry just one message. A dead ant, for example, emits a pheromone which directs other ants to dispose of his body. If some one paints a live ant with this pheromone and returns him to the nest, the other ants dutifully cart him to the burial ground outside the nest. Naturally he resists and scurries home. However, until the scent wears off by evaporation, the other ants cart him back to the burial heap again and again.

There are physical limits on the practical size of organisms employing pheromones, because at small sizes pheromone diffuses away from the source organism faster than it can be produced, and a sensible concentration accumulates too slowly to be useful. So bacteria are too small to use pheromones as sex attractants on an individual basis but do use them to determine the local population density of similar organisms and control behaviours that take more time to execute (quorum sensing) or to promote natural competence for transformation (genetics, i.e. sexual gene transfer). In similar manner, the simple animals rotifers are, it appears, also too small for females to lay down a useful trail, but in the slightly-larger copepods the female leaves a trail that the male can follow (Dusenbery, 2009).

Pheromones have evolved in all animal phyla, to signal sex and dominance status, and are responsible for stereotypical social and sexual behaviour among members of the same species. In mammals, these chemical signals are believed to be detected primarily by the vomeronasal organ (VNO), a chemosensory organ located at the base of the nasal septum. The VNO is present in most amphibia, reptiles and non-primate mammals but is absent in birds, adult catarrhine monkeys and apes (Keverne, 1999). An active role for the human VNO in the detection of pheromones is disputed; the VNO is clearly present in the foetus but appears to be atrophied or absent in adults. Three distinct families of putative pheromone receptors have been identified in the vomeronasal organ (V1Rs, V2Rs, and V3Rs). All are G protein-coupled receptors but are only distantly related to the receptors of the main olfactory system, highlighting their different role (Pantages and Dulac, 2000).

There are various types of pheromones for specific functions and proper commands. A few of the well known among them are: Aggregation, Alarm, Epideictic, Releaser, Signal, Primer, Territorial, Trail, Information and Sex pheromones.

Aggregation pheromones function in defence against predators, mate selection, and overcoming host resistance by mass attack. A group of individuals at one location is referred to as an aggregation, whether consisting of one sex or both sexes. Male-produced sex attractants have been called aggregation pheromones, because they usually result in the arrival of both sexes at a calling site, and increase the density of conspecifics, surrounding the pheromone source. Most sex pheromones are produced by the females and small percentage of sex attractants are produced by males. Aggregation pheromones have been found in members of the Coleoptera, Diptera, Hemiptera, Dictyoptera and Orthoptera. Aggregation pheromones are among the most chosen for ecologically selective pest suppression methods. They are nontoxic and effective at very low concentrations (Landolt, 1997).

Epideictic pheromones are different from territory pheromones, when it comes

to insects. It is observed and noted how "females who lay their eggs in the fruits deposit these mysterious substances in the vicinity of their clutch to signal to other females of the same species they should clutch elsewhere."

Some species release a volatile substance when attacked by a predator that can trigger flight (in aphids) or aggression (in ants, bees, termites) in members of the same species (Šobotník et al., 2008). Pheromones also exist in plants: Certain plants emit alarm pheromones when grazed upon, resulting in tannin production in neighbouring plants. These tannins make the plants less appetizing for the herbivore (Bothma, 2002).

Releaser pheromones are pheromones that cause an alteration in the behaviour of the recipient. For example, some organisms use powerful attractant molecules to attract mates from a distance of two miles or more. In general, this type of pheromone elicits a rapid response, but is quickly degraded. In contrast, a primer pheromone has a slower onset and a longer duration. As example, rabbit (mothers) release mammary pheromones that trigger immediate nursing behaviour by their babies (Kimbal, 2008).

Signal pheromones cause short-term changes, such as the neurotransmitter release that activates a response. For instance, GnRH molecule functions as a neurotransmitter in rats to elicit lordosis behaviour - an abnormal inward (forward) curvature of the vertebral column (Kohl et al., 2001).

Primer pheromones trigger a change of developmental events (in which they differ from all the other pheromones, which trigger a change in behaviour).

Territorial pheromones mark the boundaries of an organism's territory in the environment. In cats and dogs, these hormones are present in the urine, which they deposit on landmarks serving to mark the perimeter of the claimed territory. In social seabirds, the preen gland is used to mark nests, nuptial gifts and territory boundaries with behaviour formerly described as 'displacement activity'.

Trail pheromones are common in social insects. For example, ants mark their paths with these pheromones, which are volatile hydrocarbons. Certain ants lay down an initial trail of pheromones as they return to the nest with food. This trail attracts other ants and serves as a guide. As long as the food source remains, the pheromone trail will be continuously renewed. The pheromone must be continuously renewed because it evaporates quickly. When the supply begins to dwindle, the trail making ceases. In at least one species of ant, trails that no longer lead to food are also marked with a repellent pheromone. Methyl-(4-methyl-pyrrol-2-carboxylate) is the trail pheromone of leaf cutting ant.

Information pheromones are indicative of an animal's identity or territory. For example, dogs and cats deposit chemicals in and around their territory, which then serve as an indicator for other members of the species about the presence of the occupant in that territory (Kohl et al., 2001).

In animals, sex pheromones indicate the availability of the female for breeding. Male animals may also emit pheromones that convey information about their species and genotype. At the microscopic level, a number of bacterial species (e.g. Bacillus subtilis, Streptococcus pneumoniae, Bacillus cereus) release specific chemicals into the surrounding media to induce the "competent" state in neighbouring bacteria (Benstein and Benstein, 1997). Competence is a physiological state that allows bacterial cells to take up DNA from other cells and incorporate this DNA into their own genome, a sexual process called transformation.

Among eukaryotic microorganisms, pheromones promote sexual interaction in numerous species (O'Day and Horgen, 1981). These species include the yeast Saccharomyces cerevisiae, the filamentous fungi Neurospora crassa and Mucor mucedo,

the water mold Achlya ambisexualis, the aquatic fungus Allomyces macrogynus, the slime mold Dictyostelium discoideum, the ciliate protozoan Blepharisma japonicum and the multicellular green algae Volvox carteri. In addition, male copepods can follow a three-dimensional pheromone trail left by a swimming female, and male gametes of many animals use a pheromone to help find a female gamete, for fertilization (Dusenbery, 2009).

Many insect species release sex pheromones to attract a mate, and many lepidopterans (moths and butterflies) can detect a potential mate from as far away as 10 kilometres. Traps containing pheromones are used by farmers to detect and monitor insect populations in orchards.

Pheromones are also used in the detection of oestrus in sows. Boar pheromones are sprayed into the sty, and those sows that exhibit sexual arousal are known to be currently available for breeding. Sea urchins release pheromones into the surrounding water, sending a chemical message that triggers other urchins in the colony to eject their sex cells simultaneously.

This classification is however incomplete and there are other types of pheromones exhibiting different types of effects like Nasonov pheromones (worker bees), Royal pheromones (bees), Calming (appeasement) pheromones (mammals), Necromones, given off by a deceased and decomposing organism; consisting of oleic and linoleic acids, they allow crustaceans and hexapods to identify the presence of dead conspecifics (Yao et al., 2009)

Most important function of pheromones, in insects, is in facilitating effective species-specific mating for the production and preservation of healthy generatios. The female monarch butterfly (Danaus plexipus) tests and evaluates the concentration of the intra species specific pheromone elaborated by the male mate before engaging in courtship. The transfer of the contact pheromone from the male to female, during pairing, serves as a protector for the latter from predators. The male fly on its part collects pyrrolizidine alkaloids from the nectar of flowers of fresh plants or by extracting wilted parts or dry plant parts by injecting fluid through their proboscis and subsequently sucking out the various substances. In doing so the male receives large doses of pyrrolizidines which are stored in concentrations up to 10% in their body. In some species part of this is used for defence, while another part of the macrocyclic pyrrolozidines, originally obtained from the plant, is metabolized to give pyrrole derivatives, serving as pheromone for the male and are presented to the female on expanded abdominal hair pencils during courtship (Nahrstedt, 1989).

Plants biosynthesize and use Pheromones either to attract insects for effective pollination or to serve as alarm pheromones to drive away harmful herbivorous insects. Thus, E-â Farnesene of Solanum berthaulti i (wild potato) is an alarm pheromone for many insects, protecting the plant and even its neighbours within 3 metres. The Bolas spider (Mastophora cornigera) shows more ingenuity in biosynthesizing and releasing a mixture of three or four female sex pheromones for a number of species of moth, and the spider is thus able to lure male moths to their deaths (Mann, 1994). Zea mays (Corn plant) releases a mixture of terpenoids on attack by the caterpillars of Spdoptera exigua (Beet army worm), acting as the attractant pheromone of the wasps (Cotesia marginiventris) who ovipost on the invader caterpillar and subsequently, the wasp caterpillar, eat away the original plant eating insect – behaving as friend to the plant, being enemy's enemy.

Pheromones of pest insect species, such as the Japanese beetle and the gypsy moth, can be used to induce many behavioural changes. As a result, a pheromone trap can be used to trap pests for monitoring purposes, to control the population by creating confusion, to disrupt

mating, as well as to prevent further egg-laying.

Cat fish, which are normally nearly blind, is reported to use their powerful sense of smell to regulate much of their behaviour. When over crowded, cat fish emits a tranquilizing pheromone which keeps them at peace. When water from a tank which is overcrowded with cat fish is added to a tank containing a few belligerent cat fish, the latter soon becomes calm. A "boss" cat fish, when defeated, in a fight with another cat fish, emits a smell of defeat; other cat fish no longer pays any attention to the former 'boss' there after (Brewster et al., 1977).

While humans are highly dependent upon visual cues, when in close proximity smells also play a big role in socio-sexual behaviours. There is an inherent difficulty in studying human pheromones because of the need for cleanliness and odourlessness in human participants (Grammer, 2005). The focus of the experiments on human pheromones has been on three classes of putative pheromones: axillary steroids, vaginal aliphatic acids, and stimulators of the vomeronasal organ.

Further evidence of a role for pheromones in the modulation of socio-sexual behaviour comes from two double blind, placebo-controlled experiments. The first, by Cutler, employing 38 male volunteers applying either a male pheromone or control odour, recorded six different socio-sexual behaviours over two weeks. This study found that there is an increase in sexual behaviour in the pheromone users compared to the control group (Cutler, 1998). The study by McCoy and Pitino was similar to the Cutler study, only females instead of males were subjects. Females treated with female pheromones reported significant increases in many of the behaviours including 'sexual intercourse', 'sleeping next to a partner', 'formal dates', and 'petting/affection/kissing'. The researchers believed that the pheromones had a positive sexual attractant effect (Mc Coy, 2008).

Cornwell et al. (2004) investigated whether preferences for masculine and feminine characteristics are correlated across two modalities, olfaction and vision. In study 1, subjects rated the pleasantness of putative male (4, 16-androstadien-3-one; 5 - á-androst-16-en-3-one) and female (1, 3, 5(10), 16-estratetraen-3-ol) pheromones, and chose the most attractive face shape from a masculine-feminine continuum for a long- and a short-term relationship.

For long-term relationships, women's preferences for masculine face shapes correlated with ratings of 4,16-androstadien-3-one and men's preferences for feminine face shapes correlated with ratings of 1,3,5(10),16-estratetraen-3-ol. These studies link sex-specific preferences for putative human sex pheromones and sexually dimorphic facial characteristics. These findings suggest that putative sex pheromones and sexually dimorphic facial characteristics convey common information about the quality of potential mates (Grammer et al., 2004; Conwell et al., 2004)

A possible theory being studied now is that these axillary odours are being used to provide information about the immune system. Milinski and colleagues found that the artificial odours that people chose are determined in part by their major histocompatibility complexes (MHC) combination (Milinski, 2001). Information about an individual's immune system could be used as a way of "sexual selection" so that the female could obtain good genes for her offspring (Grammer, 2005). Wedekind and colleagues found that both men and women prefer the axillary odours of people whose MHC is different from their own (Wedekind, 1995).

Researchers investigating body odours have speculated that pheromones are keys in mediating socio-sexual effects. "Pheromones, which are ubiquitous among animals, have only recently been seriously considered as signals in human mate choice" (Cornwell et al., 2004). Researchers

are still at odds about where pheromones are interpreted within humans, though Wysocki and Pereti (2004) believe that the olfactory system detects and interprets pheromones. Grammer et al. (2004) suggested that humans use multiple signals as a way of reducing error when assessing mate quality. Pheromones are a biological measure to help reduce error.

Up to this point, human pheromones have been known chemically as volatile steroid molecules (Beier et al., 2004). The most studied steroid within humans, called 4, 16-androstadien-3-one, is found in secretary epithelium. Apocrine glands develop in the embryo, but become functional only with the onset of puberty. At sexual maturation, these glands produce steroidal secretions derived from 16-androstenes via testosterone. The androstadienone is significantly higher in males than females (Grammer et al., 2004). "The apocrine glands and androstadienone work together to correlate structure and function with approaching sexual maturity and do not begin their secretary activity until puberty (Beier et al., 2004). They hypothesize that there is a direct link between androgen action and induction of pheromone production in the aprocrine glands of the human axilla.

High concentration of apocrine glands found in the armpits led to the term axillary organ (Grammer et al., 2004). This is considered an independent organ of the human odour production. Axillary secretions and odorants are centralized in areas where hair and sweat can be found together. The centralized point in men is positioned at the nose level of average-height women – men's arm pits. When apocrine is first secreted, it is odourless, but it is then transformed by bacteria.

A derivative of testosterone, it is found in male sweat as well as in saliva and semen. It smells somewhat musky. "It really tells us that a lot of things can be triggered by smelling sweat," Claire Wyart, who led the study, said. The researcher measured levels of hormone, cortisol in the saliva of 48 female undergraduates of

Berkely, around age 21, after taking 20 sniffs from a jar of androstadienone. Cortisol is secreted by the body to help maintain proper arousal and sense of well being, respond to stress and other functions.

Cortisol levels in the women who smelled androstadienone shot up within roughly 15 min. and stayed elevated for about an hr. Consistent with earlier study, the women also reported improved mood, higher sexual arousal and had increased blood pressure, heart rate and breathing. This is the first instance of showing that smelling a specific chemical secreted by people to effect hormonal levels. It's presumed that other components of male sweat may have similar women's hormone influencing effect. This finding suggested a better way to stimulate cotrtisol levels in patients who need it. Instead of giving cortisol in pill form, having side effects such as peptic ulcers, osteoporosis, weight gain and mood disorders, smelling a chemical like androstadienone could be used.

Inhaling jasmine oil molecules is said to transmit messages to a brain region involved in controlling emotions. This brain region also influences the nervous system. Thus, smell of jasmine is reported to possess certain 'valium' like calming effect (Sunday Express, 2010).

Explanation why crying can be a big turn off for men (crocodile tears!), is provided recently (NIE, 2011). Women who cry in front of their husbands or lovers may elicit sympathy but they will make themselves less attractive to them. Scientists have discovered that chemicals or pheromones in tears appear to act as a "turn of" and can make them less physically attracted to the person shedding them. Scientists do not know why this is so but believe it could be an evolutionary "throwback" to less sophisticated times when crying acted as a deterrent to amorous males. Shedding emotional tears, as opposed to tears caused by physical pain, is thought to be a unique human ability.

Some body spray advertisers claim that their products contain human sexual pheromones that act as an aphrodisiac. Despite these claims, Hays (2003) believes that no pheromonal substance has ever been demonstrated to directly influence human behaviour in an unequivocal manner. Thus, the role of pheromones in human behaviour remains speculative and controversial, needing more concrete evidence that might change sexual attraction for members of either sex (Bear et al., 2006)

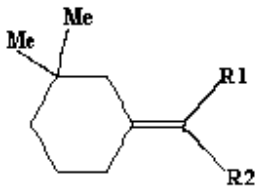
Though many of the pheromones are simple molecules and can easily be prepared some are more complicated and species-specific in activity. Sex pheromones are almost invariably species specific; complex mixtures of secondary metabolites are often required to ensure that non-productive inter species mating does not occur. Thus, female cabbage looper moths (Trichoplusia ni) and soya been looper moths (T. includens) use (7Z)-Dodecenyl acetate as a major component of their sex pheromones. However, T. ni also releases three species-specific compounds – (5Z) - dodecenyl acetate, (7Z)-tetra decenyl acetate and (9Z) - tetradecenyl acetate – and T. includens has two such compounds – (7Z)-dodecenyl propionate and (7Z)-dodecenyl butyrate (Mann, 1994).

From the stand point of organic chemistry more is known about insect pheromones than those of higher life forms. In terms of function, there are several types of insect pheromones and a few of them are listed with their chemical structure, source organism and specific activity below:

(Z) - CH_3 - COO - $(CH_2)_7$-CH=CH-$(CH_2)_2$-CH_3: Sex attractant of Oriental fruit moth

(E) and (Z) HO-$(CH_2)_9$ –CH= CH-CH=CH-$(CH_2)_2$-CH_3: Sex attractant of Silk worm moth

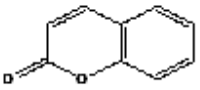
CH_3-$(CH_2)_{14}$ -CH $(CH_3)_2$: Sex attractant of Tiger moth



R1= H, R2 = CH_2OH; R1= H, R2 = CHO; R1 = CHO, R2 =H
Aggregation attractants of Male boll weevil

CH_3-$(CH_2)_4$ - COOH: Trail pheromone of Termite (*Zootermopsis nevadensis*)

(Z), (E) HO-$(CH_2)_2$- CH = CH-CH_2-CH= CH- CH=CH-$(CH_2)_2$- CH_3:
Trail pheromone of Southern Subterranean termite



Coumarin: A sweet cloverattractant for the sweet corn weevil

4-Methy acetophenone: A rise attractant for the rise stem borer moth

CH3 – $(CH_2)_{11}$- CH (CH_3)-$(CH_2)_{17}$ –CH_3: An attractant for Microplitis croceipis
(a parasite), secreted by the larvae of corn earworm moth

2- methyl cyclopentanone: Alarm pheromone of fire ants (Solenopsis invicta)
and Azteca ants (An easily prepared and conveniently tested compound in the lab)

Conclusion

The varied and characteristic effects produced by pheromones on the mood and behaviour of different organisms and species ranging from microbe to man provide great scope for further multi-disciplinary study and research to establish more precisely their role in humans from a point of view of sexual attraction, selection, socio-sexual behaviour and information on the immune system of an individual in the selection of the proper mate. Identifying and synthesizing new molecules and use of them after evaluation of their pheromone activity on the opposite sex in human, might lead to a more desirable attraction and sexual enjoyment among the youngsters, who appear to have partly lost the art of making

love, maintenance of favourable and pleasant mood for mating and long and lasting sexual enjoyment. Pest control, employing suitable pheromones, will soon become the environment friendly green choice. Their importance is remarkable in devising more efficient fish harvesting methods.

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Herbal Pills to beat Radiation

Herbal capsules to keep you safe during nuclear attacks! Might sound strange but Indian Life Sciences scientists have made inroads in making this a realty?

These radio-protectors could safeguard you against gamma radiation during nuclear attacks, explosion or leaks. Developed by Defense Research and Development Organization (DRDO), the herbal capsules are made out of extracts from two plants – Podophyllum hexandrum and Hippophae rhamnoides found in central Himalayas.

In an interview to Express, William Selvamurthy, DRDO's chief controller and Life Sciences' head said that the wonder drug is part of a Rs. 285 crore project sanctioned by the cabinet committee on security (CCS) in 2009. "We have completed the pre-clinical trials of the radio protectors on rodents at Delhi based institute of Nuclear Medicine and Allied Sciences. The clinical trials will now be done by Drugs Controller General of India", Selvamuthu said. Developed as part of DRDO's Nuclear – Biological-Chemical (NBC) Defense Technology project, the capsules will be available for use in the next one year. "We will make the capsules available for the Quick Reaction Teams (QRTs), who will be pressed into service first during nuclear attacks or leaks. Cancer patients exposed to radio therapy will benefit next and finally those living in areas with high-level radio substances' active presence", Selvamuthu said. When consumed, the herbal capsules act as de-corporating agents, reducing the risks in case a person came in contact with nuke.

Gut reaction (Polymer gel squeezes and strains like an intestine)

Chemists in Japan have demonstrated that the oscillating Belousov-Zhabotinsky reaction can be exploited to push a cargo along a length of smart polymer tubing in a process not unlike the peristaltic contractions of the intestine. Yusuke Shiraki and Ryo Yoshida of the University of Tokyo incorporated the ruthenium catalyst of the B-Z reaction into an N-isopropylacrylamide polymer gel to mimic peristalsis. The oscillating reaction starts up when this material is added to a solution of malonic acid, sodium bromate and nitric acid. The team has been developing smart gels since the 1990s, but the directional pumping of this chemical system might now have potential in "powering" microelectromechanical systems (MEMS) or driving reagents and analytes around a lab-on-a-chip.

Frustrated radicals (Frustrated Lewis Pair Starts a New Radical Family)

Persistent nitroxide radicals can be generated by exploiting the ability of a frustrated Lewis pair (FLP) to capture nitric oxide through the synergistic action of the acid-base species. FLPs have both an acid and a base component but their bulky substituents preclude them from getting close enough to neutralize one another, hence their frustration. This frustration is equivalent to pent up reactivity, of course. Now, researchers in Germany and the US have shown that FLPs comprising dimesitylphosphanes and bis (pentafluorophenyl) borane can trap nitric oxide to form novel radicals. These materials can in turn abstract hydrogen from cyclohexadiene and toluene, leading to O-substituted alkoxyamine derivatives, a potentially useful step for organic synthesis.

(Indebted to: Nature, Science, New Scientist, Online Daily Mail, Alchemist News Letter, The Science and Advanced Materials Journal, British J. Nutrition, Discover Newsletter, Agence France-Presse, Journal of Science transactional Medicine The daily telegraph, New Indian Express, Google and BBC)

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