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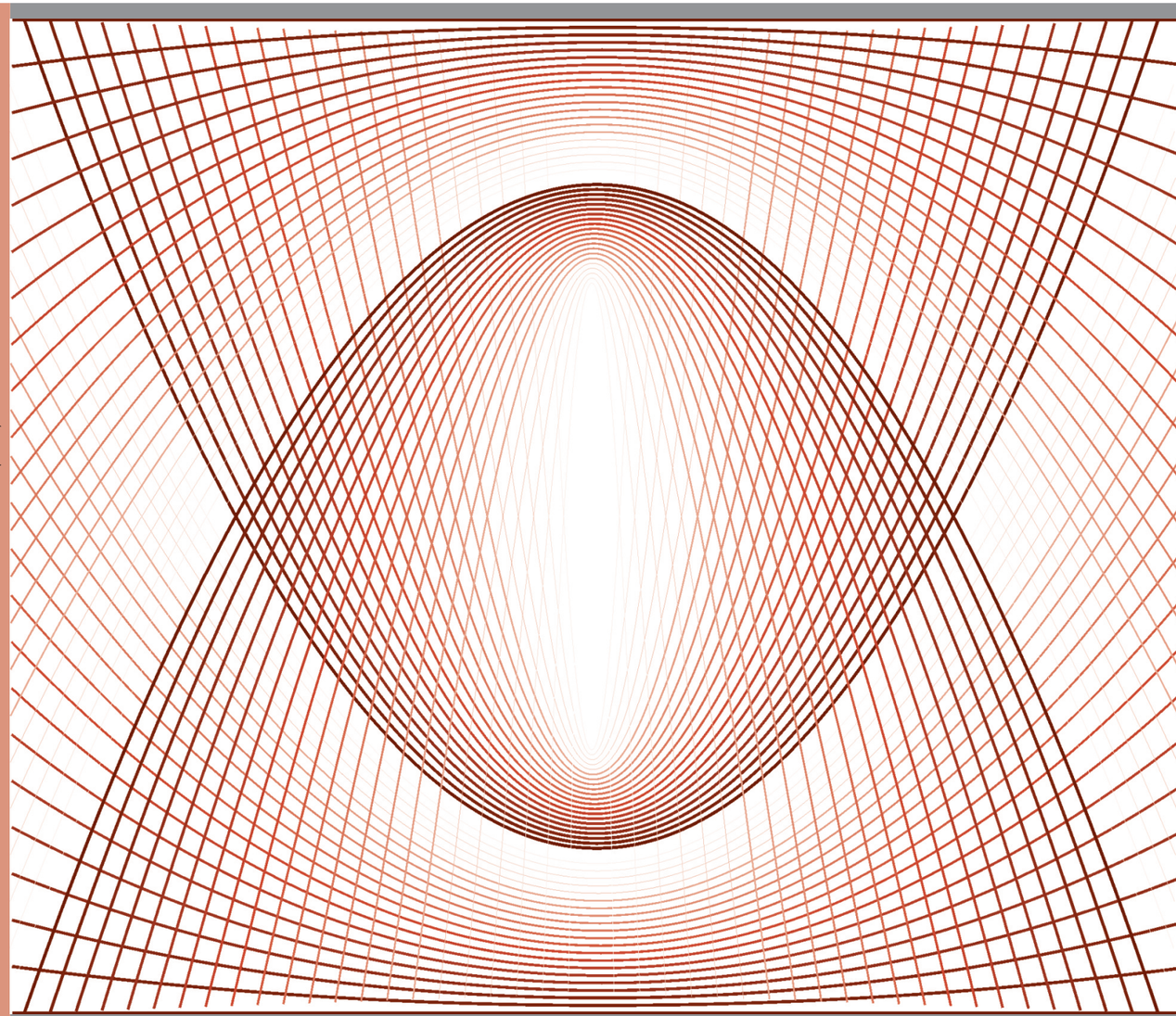

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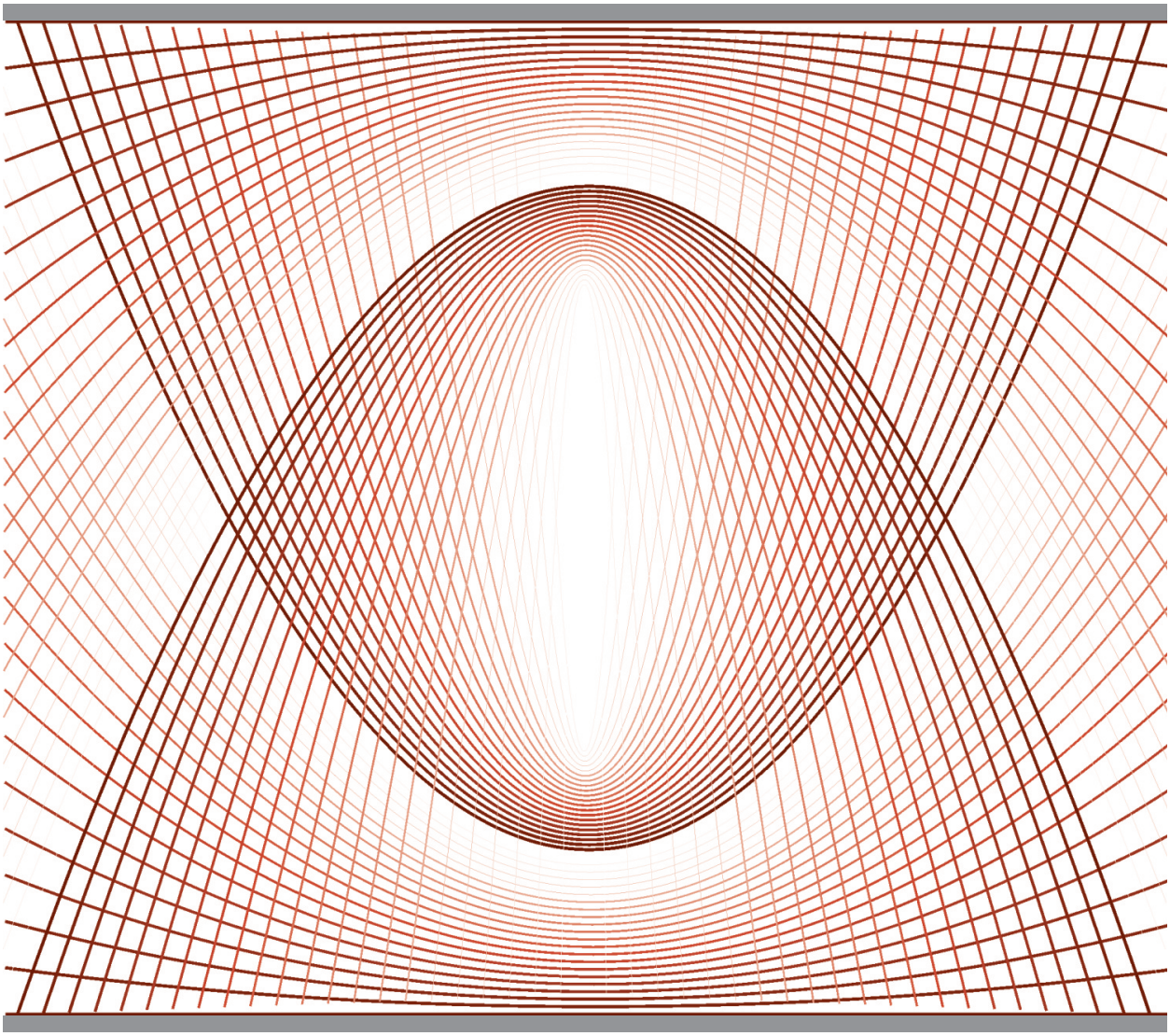

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Distance learning tools in adult education

Maryam Khodamoradi [1] , Esmaeel Ghorbani [2] , Mehran Bozorgmanesh [3] and Abbas Emami [4]

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Abstract: While there is still prejudice surrounding some distance learning, it is increasingly being accepted as an alternative to traditional classroom learning. Courses can be offered via the Internet, where students are able to interact with instructors and other students without physically being in the same room. Getting a college education can be difficult for people with inflammatory bowel disease (IBD). Frequent trips to the restroom, exhaustion, doctor visits, and medication side effects are all barriers to the traditional college experience. What if you could get the degree without ever setting foot on a campus? You can do just that through distance or virtual learning. Distance learning has been around for a long time (we've all seen the commercials on TV).
[Maryam Khodamoradi, Esmaeel Ghorbani, Mehran Bozorgmanesh and Abbas Emami. **Distance learning tools in adult education.** *Academ Arena* 2012;4 (12):1-4] (ISSN 1553-992X). http://www.sciencepub.net/academia. 1

Keywords: adult education, distance learning

Introduction:

As in most European countries, adult education has been a tradition for several centuries. The present structure of formal adult education - evening and correspondent institutions on the three levels of education - was developed between 1945 and 1950.

Adult education before the 2nd World War was mainly in the framework of courses, which form was preserved after 1945 as well, but in a radically restructured form.

The folk high school bandwagon that developed intensively between the two World Wars, withered away after 1949 for political reasons. At the same time, the "educational" subsector of adult education in organised forms under state supervision, Only the negative consequences are obvious: getting more education often means leaving one's family and community for jobs and opportunities for advancement somewhere else. The future of Kentucky depends on uplifting the quality of life and economy of all of Kentucky. The social and economic costs of neglect of large parts of the state will drag down the rest of the state and seriously hinder its capacity to compete in the global economy.

Much like strategies to curb epidemic, strategies to reduce illiteracy and raise the educational attainment of Kentucky's population must include both short-term efforts to face the immediate crises as well as long-term strategies to get at the underlying causes. Short-term crises include the imperative to keep helping welfare clients make the transition from welfare to work within the constraints of federal and state mandates and the need to train workers for immediate employer demands. Long-term prevention must address the underlying, persistent problems of the state's economic structure as well as the low awareness--if not appreciation--among segments of the population of the vital connection among education, employment, and improved standards of living.

The everyday approach towards the expression of *adult education* is general and covers everything in connection with formal teaching, educating, training of adults .

In parallel with this concept, there is another interpretation of what is rather an education policy or an education administration nature, namely that adult education covers programmes with well-determined purposes and functions that have results visible in real life, particularly in the labour market.. By this concept adult education and adult training are differentiated, *adult education* means formal learning in institutions where general programmes dominate, and *adult training* covers everything that is oriented to give a mainly specialized and professional knowledge, or is not a systemic part of formal education.

The Adult Education Act (Act 101 /CI/, 2001), which came into force in 2001 uses the general interpretation of the concept as a starting point, which on one hand regulates only a part of it, training outside formal education, and on the other hand it extends it with services that are in connection with adult education. This act defines the training user target group (adults) as persons or individuals who have fulfilled their compulsory school attendance, which means people over 18 according to Hungarian regulations still in force. (At the same time, students in tertiary education with student status are not included).

adult education in the local agricultural education program is an essential component of the "total" program. Offering adult education programs helps to keep farmers and agribusiness employees better informed of current trends and provides them with opportunities to learn new skills and improve existing ones. Teaching adults can be very challenging, but also

very rewarding. Most teachers would agree that the benefits derived from a successful adult education program in agriculture far outweigh the costs. In addition to the direct benefits to adult participants, the teacher, the school, the community, and the secondary program also benefit from a quality adult education program in agriculture.

The role of the agriculture teacher should be as a facilitator of the learning process. Most adults reject the traditional teacher-student relationship, which is necessary to maintain in secondary programs. Teachers should be encouraged to view themselves as partners with adult participants in the learning process. The democratic philosophy of shared responsibility for planning, conducting, and evaluating adult education programs distinguishes adult education from secondary education.

A local plan for adult education in agriculture should consist of two major components. Namely, a broad statement of philosophy, goals, and objectives of the local adult education program, and an annual calendar of program activities.

Distance Learning Program

Distance learning is one of the fastest-growing components of higher education. Almost 3.5 million students were enrolled in at least one distance learning course in the fall of 2006 and online enrollments are increasing every year. The convenience of taking classes at any time from any location appeals to today's adult learner, especially those who work, have families or live in rural areas. Below are several important factors to consider in choosing a distance learning program.

1. **Accreditation.** Accreditation is a means of ensuring the quality and effectiveness of higher education institutions and programs in the United States. Eight regional accrediting agencies accredit most of the colleges and universities in the United States. A host of national and professional accrediting organizations also exist, including the Distance Education and Training Council (DETC), an organization that identifies and accredits distance learning programs. These twelve questions outlined by the Council for Higher Education Accreditation are helpful in examining a distance learning program's claims of acccreditation.

   In evaluating distance learning paralegal programs, determine if the school is accredited by one of the regional accrediting bodies and by the American Bar Association (ABA). ABA-approval signifies that the school has met certain standards in terms of academics, facilities and instruction. Graduating from an ABA-approved school may give you an advantage in the legal job market.
2. **Reputation.** The reputation of the distance learning program you attend may hinder or enhance your post-graduate employment prospects. In evaluating the reputation of a distance learning program, you should not solely rely on the school's website or marketing materials. Other ways to investigate the reputation of a distance learning program include:
3.
   - Visiting the school.
   - Talking to alumni (contact the career services department for alumni names and contact information).
   - Researching the distance learning program's record with the Better Business Bureau.
   - Talking to paralegals, attorneys and legal employers about the reputation of the school you are considering.
   - Researching the school in print publications, news articles and on the Internet.

1. **Academic Offerings.** When evaluating distance learning programs, it is also important to consider the program's academic offerings. A quality distance learning program offers a comprehensive curriculum with a variety of options, electives and advanced coursework. Talk to professors or an academic dean regarding the content and delivery of courses. The American Association for Paralegal Education (AAfPE) recommends that paralegal instructional content include courses in legal research and writing, litigation, ethics, contracts, business organizations and torts. In addition, courses should develop students' critical thinking, communication, computational, computer and organizational skills, and competency to handle ethical issues, according to the AAfPE.

   Legal programs should also offer an experiential learning component such as an internship, practicum, pro bono work or clinical experience. These are great resume-building opportunities and allow you to learn practical skills and gain real-world experience.
2. **Instructional Technologies.** Distance learning courses can be delivered in a variety of ways through a growing array of technological tools including audio tapes, CD or DVD ROM's, e-mail, telephone conferences and web-based

delivery systems. Questions to ask include whether the program employs a mix of instructional technology? Is hands-on training and support provided? Can students preview courses online and try out the technologies before enrolling?

3. **Teaching Staff.** The faculty is the backbone of any distance learning program. Are the courses taught by professors or are the courses pre-taped correspondence instruction? If the courses are taught by instructors, what is the background and qualifications of the teaching staff? Are classes taught by paralegals, attorneys or a mix of both?
4. **Career Services.** Another important consideration in any distance learning program is the extent and quality of its career services program. Research indicates that the greater the resources offered by the career services department, the greater the program's job placement success. You might inquire as to what percentage of graduates find related employment following graduation and whether the career center offers personalized career counseling, job placement assistance, job search seminars, online job boards or resume assistance.

Conclusion:

Additional material for the next stage of learning often means to be expected when developing your learning skills Learners to increase awareness and enjoyment of reading and studying to operate.

To improve the quality of life, learning materials should reinforce the skills they acquired previous. This material should have access to information and provide new technology. should also have to make learning more fun. Additional materials should provide opportunities for literacy skills to read and to strengthen their cognitive awareness.

Track materials (continued) which increased literacy skills and knowledge gained is also effective in enriching learning environment for learners are important. Participatory materials to ensure the participation of learners in the learning process and codification are included out of class activities, dialogue, role playing, etc.

In traditional programs that the principles of psychology and curriculum planning, less attention is the form of content presentation ie codification and providing books, original format and have the dominant form, while for adult content that could have valuable experience in addition to writing, other ways also be provided Affect the selection of pictures and images related to the concepts and content produced by including them.

Learning activities such as activities outside the classroom, dialogue, role playing and ... Another type of content is presented. Duties are placed on the learner, a resource for developing knowledge, skills and insights he considered.

Curriculum content only from the training provided to learners or not, but put together their learning through activities that can inform or does, skills and attitude to achieve. In this case, apart from learning that the assays taught learners directly to sustainable and effective learning occurs in his.

Another way of providing content that is educational activities outside the learning environment possible for learning more and better enables adult learners. For example, hits, field trip experiences for learners or transfer is provided, develop knowledge, insight and skills they will.

To ensure that science curriculum and educational aspects, according to community needs and audiences, application form is provided or not, the content selection criteria should be considered. These criteria is being include knowledge, effectiveness, flexibility, diversity, relevance and practical learning

The geographical distribution indicates that large areas have been left or abandoned without any provision. In a county with several hundred thousand inhabitants and where the rate of people with unfinished basic education is over the national average, there is just one institute. This occurred despite the fact that these schools have a demonstrable function to provide a second chance for underachievers who score below literacy level, to improve their literacy skills.

There are two main reasons which have led to the reduction in number of institutes and their vanishing role, firstly the need for them has dropped (the rate of people with unfinished basic education has decreased within the population), and secondly because the supporting system has changed and the responsibilities (maintaining schools and their specializations) is now the task of local authorities, and the state budget gives significantly less support compared with the refunds for initial education.

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Using Learning Styles in adult education

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Abstract: There are many tests available to help you and your students discover your best learning style. Generally speaking, however, if you are someone who is more likely to think in pictures, prefer to meet with someone in person, and are more likely to want visual diagrams when completing a project you have tendencies towards visual learning. Similarly, if you are more likely to think in terms of sounds, prefer to speak on the phone with someone, and want verbal instructions then you tend towards auditory learning. Finally, if you are more likely to think in terms of moving images like mini-movies in your mind, prefer to participate in an activity when you meet to speak with someone, and tend to jump right into a project without reading directions you tend towards tactile/kinesthetic learning.
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Keywords: learning styles, adult learning

Introduction:

As indicated earlier, a strength of adult education in Kentucky is the dedication of the many teachers often serving under difficult conditions, without adequate support, and often with compensation and benefits less than teachers in the public schools. Testimony before the task force characterized the work of adult educators as "missionary" work. Recognizing the seriousness of the adult literacy issue in Kentucky, it should be a major concern that the Commonwealth does not have a comprehensive approach to the professional preparation, development, and support of adult educators.

The challenge for Kentucky will be to move from a system that still depends on teachers with limited training in working with adults, to one in which professional competence in working with adults is a basic requirement. Any strategy to make this transition must involve both professional development and support for the teachers now in the field as well as a new system for a new generation of adult educators.

To be successful, the Commonwealth's strategies must energize and gain the commitment of all the state's political, education, business, and civic leaders. No strategy will succeed unless it engages leaders in each community and county to identify needs and develop programs and services appropriate to the community's unique circumstances. The most serious challenge will be to motivate low-skilled, under-educated adults within the working age population to seek further education. Simply expanding the number of providers and programs will not necessarily increase demand from the populations and communities where the needs are greatest. Deepseated social, economic and cultural barriers—many dating back generations—lead people to undervalue education. In addition, in many counties it is difficult for people to see a direct relationship between better education and better-paying jobs. Either there are no jobs available or many existing employers do little to emphasize the connection between better education and the possibilities for getting a job, keeping a job, or earning a higher wage. For many, getting more education and earning a high school diploma or a college degree has little positive meaning.

Only the negative consequences are obvious: getting more education often means leaving one's family and community for jobs and opportunities for advancement somewhere else. The future of Kentucky depends on uplifting the quality of life and economy of all of Kentucky. The social and economic costs of neglect of large parts of the state will drag down the rest of the state and seriously hinder its capacity to compete in the global economy.

Much like strategies to curb epidemic, strategies to reduce illiteracy and raise the educational attainment of Kentucky's population must include both short-term efforts to face the immediate crises as well as long-term strategies to get at the underlying causes. Short-term crises include the imperative to keep helping welfare clients make the transition from welfare to work within the constraints of federal and state mandates and the need to train workers for immediate employer demands. Long-term prevention must address the underlying, persistent problems of the state's economic structure as well as the low awareness--if not appreciation--among segments of the population of the vital connection among education, employment, and improved standards of living.

The field of adult education and literacy is plagued by confusion about definitions. Over the years definitions have evolved from provisions in federal law and initiatives of groups advocating particular

methodologies or the needs of specific adult populations. The result is that definitions tend to merge statements about the goals to be achieved (e.g., improving the literacy of a particular population) with a particular means (e.g., adult basic education) to achieve the goal.

Therefore, it is helpful to distinguish between at least these dimensions of the issue:

1. "Literacy" refers to the knowledge, skills, and competencies of individuals. The federal Adult Education and Family Literacy Act (Title II of the Workforce Investment Act)1 defines literacy as "an individual's ability to read, write, speak in English, compute and solve problems, at levels of proficiency necessary to function on the job, in the family of the individual, and in society." Literacy is often defined in terms of specific domains such as "basic academic skills," "workplace skills," "life skills," "parenting skills," or skills necessary to exercise one's rights and responsibilities for citizenship. Different dimensions of literacy are often categorized by terms that cluster several dimensions of literacy important for different clients. Examples include workplace literacy (combining both basic academic skills and workplace skills), and family literacy (combining basic academic skills and other skills essential for successful parenting).

2. "Education attainment" usually refers to the numbers of years of schooling completed or the level of credential (e.g., high school diploma or associate degree) an individual has obtained. Despite concerns about the meaning of credentials, there is a strong correlation between educational attainment and literacy.

3. "Literacy initiatives" often are defined in terms of the needs of a particular target group. These may be parents of young children, youth who have dropped out of high school without earning a high school diploma, welfare recipients, persons with limited English-speaking ability, incarcerated adults, or adults in the workforce.

4. Other literacy initiatives are defined in terms of a particular educational service, strategy, or means to address a target population's literacy problems. "Adult basic education" and "family literacy" are examples. These initiatives are often defined in terms of a particular configuration of services for the target population (e.g., assessment and information and counseling services).

5. The term "lifelong learning" is often associated with "literacy." Lifelong learning is a means to the goal of maintaining necessary levels of literacy throughout one's lifetime. The goal of lifelong learning has implications for both individual adult's learning behavior as well as education policy and the design of the education system.

Goal six of the National Education Goals illustrates a broadly stated goal that incorporates expectations about both adult literacy and the kinds of policies and services that should be in place to improve literacy. Goal six, "Adult Literacy and Lifelong Learning," states that, "By the year 2000, every adult will be literate and possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship." The objectives related to this goal touch on several of the common elements of definitions listed above, for example:

- Different dimensions of literacy (e.g., academic and workplace skills),
- The level of education attainment (e.g., increasing the number of persons who complete postsecondary degrees),
- The needs of target groups (e.g., parents, minorities, or part-time learners),
- The need to increase the availability of particular educational services, strategies or means (e.g., accessibility of libraries to part-time learners or opportunities for parental involvement), and
- The importance of lifelong learning, both in the learning behavior of individuals and in the educational system's responsiveness to the needs of adult learners.

Literacy goals include:

- Providing primary education in childhood that adults were deprived
- raising awareness for adults;
- knowledge bases and adults about their cultural heritage;
- increase confidence in adults.

Professional education goals include:

- Equipped with the necessary skills to adults living;
- providing the necessary manpower for the country's goals;
- achieving social equality and equity and eliminate the existing differences between different classes.

Adult characteristics:

to understand the characteristics of adult learners, their mental and physical condition should be considered in the following referred to some of them.

Operating speed:

slow reaction in adults is natural that necessarily means reducing the logic and practice skills,

not due to weakness and increased awareness of natural forces and their skills.

Consciousness:

no stimulus and incentives encouraging, despite inhibiting stimuli, slow transfer rate, mental, and weak inhibitors of natural forces (mostly visual and auditory) are factors that slow reaction affect individual mental and cognitive activities, but never able to understand, understanding and learning ability (which varies with the speed of learning) is not relevant.

Health:

what is most age, longer duration is necessary to be heard by listening issue. Why is that when elderly people and old could not hear well, their confidence and vulnerable to the possibility that negative beliefs about their find, they are great. Visual abilities can be like other people, usually decreases with age.

Background of knowledge - skills and beliefs of adults:

adults, social experiences, many have already learned different values and beliefs in their pronouns have stabilized, so changes in the new act very cautiously. The idea of such a manner that skill and applying them older and longer life is, Similar resistance to accept new ideas will be more and more severe. Thus, the adult criteria for the built and paid for their ideas and beliefs that are forming. Because of these criteria and the beliefs that they are afraid of failure, Therefore, to prevent it, sometimes against the resistance of new phenomena are only the material taught and its face that make reinforced concrete and tangible interference situation is.

Characteristics of adult education:

flexibility in time:

In the past, usually one of the obstacles in the way of learning and development of adult education was being inflexible and time courses were programs. But now most countries have to consider that the speed limit of time and learning ability and facilities must be adults. Flexibility in time means that not only should the time classes and programs for adults is appropriate, but necessary facilities should be provided for independent study.

Flexibility in the location:

One of the aspects of flexible space is that individuals can, regardless of their residence to the study and advancing their knowledge and skills pay. For example, adults in remote villages should like people who live in the city use of educational programs. After flexibility in other places is that the issue of specificity of location is not considered primarily educational.

Flexibility in age:

Educational opportunities for certain age should not use it for all regardless of their age, is possible. In fact, educational programs must use people of different ages to prepare.

Flexibility in admission:

No adult should not only be deprived of education because of the necessary conditions for admission in the class does. Of course this is not such a person without academic records to participate in university classes is accepted, Adoption order is that the adults in educational programs at different levels, according to the possibility of using the opportunity that is provided must be based on the experience and knowledge and their knowledge is.

To combine education and job responsibilities:

Adults should be able to work during that time engaged in training classes take them. In other words, their presence in the class should be considered part of their work. This means that low-literate or illiterate working people who are allowed to work an hour of your daily spending surpassed participation in educational programs.

The Three Different Learning Styles:

Style 1: Visual

Fleming states that visual learners have a preference for seeing material in order to learn it.

- **Strengths of the visual learner:** Instinctively follows directions, can easily visualize objects, has a great sense of balance and alignment, is an excellent organizer
- **Best ways to learn:** Studying notes on overhead slides, reading diagrams and handouts, following a PowerPoint presentation, reading from a textbook, studying alone
- How do you know if you're a visual learner?

Style 2: Auditory

With this different learning style, students have to hear information to absorb it.

- **Strengths of the auditory learner:** Understanding subtle changes in tone in a person's voice, writing responses to lectures, oral exams, story-telling, solving difficult problems, working in groups
- **Best ways to learn:** Participating vocally in class, making tapes of class notes and listening to them, reading assignments out loud, studying with a partner or group

- How do you know if you're an auditory learner?

Different Learning Style 3: Kinesthetic

Kinesthetic learners tend to want to move while learning.

- **Strengths of the kinesthetic learner:** Great hand-eye coordination, quick reception, excellent experimenters, good at sports, art, drama, high levels of energy
- **Best ways to learn:** experiments, acting out a play, standing, moving, or doodling during lectures, studying while performing an athletic activity like bouncing a ball or shooting hoops

How do you know if you're a kinesthetic learner?

Conclusion:

Beyond the issues relating directly to DAEL (Department of Adult Education and Literacy), the task force heard a number of concerns about the Commonwealth's overall approach to adult literacy.

- Lack of coherent statewide leadership and coordination among multiple complementary initiatives aimed at the same problem.
- Lack of continuity in state leadership. Cited in particular was the difficulty sustaining a high level commitment to the issue long enough to make a difference because of changes in priorities of the state's political leaders. A high level of turnover in the leadership of the Department of Adult Education and Literacy has also contributed to the instability.
- Tendency to think of adult education as a separate categorical program rather than a strategy that cuts across the mission and responsibility of multiple Commonwealth programs and initiatives (e.g., early childhood education, welfare reform, economic development, and corrections).
- Multiple uncoordinated categorical federal initiatives that tend to drive (and fragment) policy for an overall state effort that is largely funded by Kentucky.
- A tendency to commingle and confuse different functions. The most important distinction is between functions focused on the needs of clients (adult learners, employers, communities, regions, and the Commonwealth as a whole) and functions associated with the operations and performance of providers. It is important that each of these functions receive attention, yet the tendency is for one (e.g., overseeing a network of providers) to drive out attention to overall system strategy.
- Inadequate coordination of services to meet the needs of individual adults, communities, employers, and regions is hindered by:

- Vertical financing and regulatory relationships between separate federal and state programs and local providers and administrative units. These vertical relationships can hinder the horizontal coordination of services for individual adult learners, communities, and employers.

- Turf wars among providers, local politics, and long-standing conflicts among neighboring counties.

- Inadequate links with and leverage of other public and private initiatives and investments to reach the target population. Major sources of help include employers, postsecondary education, and workforce development.
- Lack of a state financing policy and strategy for provider performance incentives and collaboration, and tax and other employer incentives for leverage of non-state resources.
- Lack of programmatic and administrative flexibility to meet the rapidly changing needs of adult learners, employers, regional economies, and communities.

Some research findings that can be a learning process for the Guidelines for training operations are applied, is given below:

1- - Preparation for adults to learn how much he depends on previous learning. Knowledge that has accumulated because of an ability to absorb new information more person is. Past educational experience features a diverse group of adult learners, the starting point of any activity on the diversity training is emphasized.

2- intrinsic motivation, learning a deeper and make them sustainable. When the need is met directly by the learning itself, what is learned, but is complementary learning. Creating a training activity in adult learning needs, learning ensures stable

3- Positive reinforcement (reward) learning to reinforce the negative (punishment) is more effective. Many adults because of negative experiences at the beginning of schooling, are weak and afraid. Feeling of success in adult learning for continuous learning and adult participation is essential.

4- To maximize learning, information must be provided an organized manner. Entries can be simple or complex can be arranged around related concepts are organized. Starting point for organizing content knowledge for adults and adults is linked to past experiences

5- Learning, especially regarding skills development, will be added frequently.

6 - Duties and meaningful content than meaningless subjects are learned more easily and are later forgotten. This issue, especially for older adult learners is true. Challenges of adult learning facilitators by the way that content was significantly associated with the experiences and needs of learners is.

7- Passive than active participation in learning activities, learning increases. Adult educators are allowed to participate actively in India, a stable and meaningful learning to help

8- Environmental factors affect the learning. Tangible things such as noise, crowded places, temperature, light and ... Learning process can be prevented. Other factors such as stress, ridicule, pressure, fatigue and low health can also reduce learning.

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The Impact of Effective Marketing Strategy on Buying Behavior of the International Consumer

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Abstract: The main objective of this study is to examine the purchasing habits of the international consumer. The two factors which have a strong impact on consumer buying behavior are social and cultural elements. These two factors are directly related to the income level of the consumer. The cultural and social factors affect the buying pattern of the international consumers more effectively if backed by purchasing power. This study explains the role of 4 P's of marketing, which if properly develop would be more helpful to serve the target market. The marketing managers should effectively form a marketing strategy keeping focus on income level, cultural and social factors. This study is qualitative in nature and the variables and conceptual framework is supported with the help of literature review. The marketing mangers can be benefited from the study and enhance their marketing strategy for serving the target international consumers.

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Key words: marketing mix; cultural factors; social factors; income level; buying pattern.

1. Introduction

The consumers are the ultimate or final buyers of the products or services which they acquire for personal use. On the other hand international consumers are the buyers and households in international markets who purchase or buy goods and services for personal use. In different researchers many factors are held to be responsible for the buying behavior of the consumers in the international market but the main focus in this research study is on three important factors cultural, social and income level. However these three factors can be effectively targeted if the marketing strategy is made taking into account of 4'ps of marketing mix elements. The firms when introduces new products and services in the international market they faces many challenges as consumers are not very aware of the products or services or they have little knowledge about the firm products or services. The international consumer buying behavior or pattern is very difficult to change specially in case of new products or services as they have been already loyal to some existing brands. To understand the buying behavior of the consumers is not only difficult for the firm operating in a single country but a compounded problem for the firms operating globally. The buying behavior of the consumers indicates their decision making style. The decision making style if better understand by the firms can help them answer many questions regarding consumer buying pattern like, what consumers buy, where they buy, how much they buy, when they buy and most importantly why they buy. The marketing strategy including the 4 P's (product, price, place and promotion) will help the firms to predict the consumer behavior internationally. Many researches have focused on the better quality, easy distribution, affordable price and effective promotion to grab the attention of international consumer to change or influence their buying pattern. These 4 P's of marketing strategies are targeted specially for the consumption pattern of international buyers when they are most influenced by the social and cultural factors. However other than these factors income another important element also contributes to influence the buying behavior of the international consumer. The high or low income of the consumer will highly affect their buying pattern. The consumer with high income will tend to consume more products and services than from the low income consumer. The income level in this research paper is taken as an intervening variable between social and cultural factors to influence the buying behavior.

2. Literature Review

As Schiffman et al. (2001); Arnould et al. (2002); Kotler and Keller (2006) defined that every single person considered as consumer who have purchasing power. So for the firms it is very important to gain and develop strategy for the consumer buying behavior. Whereas there is growing trend in the attitudes of the retailers and firms for becoming global as they find more and more opportunities in international markets. These firms and companies spend millions of dollars to reach or server their potential consumers. But the firms or business faces a difficult situation because of increasing economic instability and intense competition around the world (Seock and Lin, 2010). Due to these and other external factors the buying behavior of the

consumers changes rapidly as a result they switch over to the brands which they feel will satisfy their needs to the maximum extend. Wulf and Odekerken-Schtoder (2003) also described culture as an important factor in explaining the varying behavior of the international consumer. So the firms operating at a global level must understand the cultural forces influencing the buying pattern of the international consumer behavior. The researchers Kim et al. (2002) in their study considered the importance of values (cultural values) which are more influencing factor in one country than to those in the other country. The success of the firms will only be making sure if they adopt or develop such marketing strategy which gain a deep insight of the cultural differences of the consumers across different countries (Kawabata and Rabolt 1999; Lam 2007). The complex and intense competition in the international market also makes the loyalty of consumers as an important factor in their buying behavior (Siu and Cheung 2001; Srinivasan et al. 2002). For the firms or business the ultimate goal is to make loyal consumers as mush as possible for the survival Sirgy et al. (2000). However other than loyalty and cultural values Dittmar et al. (1996); Walsh et al. (2001) describes decision making styles as a contributing factor for understanding buying pattern of the consumers. The measure named consumer style inventory (CSI) was defined by Sproles and Kendall (1986) which can easily determines the decision making styles of the consumers. This decision making of the consumer is backed or supported by the cultural and social choices available to them. They defined consumer's decision-making style as ''a patterned, mental, cognitive orientation toward shopping and purchasing, which constantly dominates the consumer's choices in a relatively-enduring personality.'' The styles can be strategies for shopping or choices of the consumers. "Sproles and Kendall developed a model of eight decision making styles which are as follows: perfectionism consciousness (considering the quality), brand consciousness (paying attention to the brand), novelty and fashion consciousness (choosing the trendy and new things to buy), recreational and hedonistic consciousness (buying for the fun of it), price and value consciousness (considering the value and the price), impulsiveness and carelessness (buying regardless of any thought before) confused by over choice (consumer does not know what to buy due to lots of choices), and habitual and brand loyal orientation (loyalty and buying because you are used to doing so)". However the social factors can impact the consumption of the international consumer in specific situation. The different behavior of these consumers can range from particular religion, social environment and ethnic group. The situation in which international consumer is most influenced can be a social identity when arise in a given environment (Joy, 2001). A person, let suppose, will have different behavior and buying pattern with a family but the same person will have different attitude when hanging out with friends. These types of behavior effect greatly the buying habit of the international consumer as these differences exist in many countries. According to Belk (1975) and Wooten (1995) the social and situational factors also influenced the individual level behavior. The daily lives of the people are greatly affected by the cultural factors which are blend of demographic and economic factors. As in western countries the single families exists while in the Asian countries there is trend of joint family system which in return then affect the buying pattern of the whole family. The same is the case of the urbanization of living in the country. In urban areas of the country people are tend to hang out, have different life style as a result the consumption pattern varies from urban to rural area (Douglas and Samuel, 2010). On the other side different researches empirically tested those differences do exist in the culture and social and these differences are the factors which influence or change the buying pattern of the international consumer." A better way is to treat cultural and social factors as exogenous factors and integrate them into price perception models. According to Hofestede's (1980a ; 2001b) culture theory, culture can be treated as a five-dimension construct, which includes long term orientation, individualism/collectivism, uncertainty avoidance, masculinity/femininity, and power distance". To target the international consumer more effectively it is necessary that a strong marketing strategy should be adopted. However other than the 4 P's of marketing, one important element for effective strategy is relationship marketing (Harker and Egan, 2006). The strong relationship marketing will ensure the maximum satisfaction and loyalty of international consumer (Sheth and Parvatiyar 1995; Gummesson 1999). The main aim of the relationship marketing is getting customers rather then keeping them. Whereas it is not only about manufacturing, distribution and advertisements of the products and services (Buttle, 1996), and holds the promise of keeping customers loyal (Gummesson 1994; Bulger 1999). The reasonable price, effective distribution, innovative advertisements and creative marketing strategy will strongly influence the behavior of the international consumer.

3. Rationale of the Study

In today's worlds everything is becoming global and technology advance. This globalization and advancement not only brings opportunities to the companies but broaden their perspective to operative effectively in international market. However with the opportunities these international firms face challenges in international market for the adoption and acceptance of products and services. The challenges are result of

the international consumer buying behavior. It is very difficult for the companies to change or influenced the buying pattern of the international consumer which is already in habit of using other locally and famous brands products and services. The consumer buying pattern is most influence by the two factors which are cultural, and social. To change the buying pattern of the international consumer the firms must have an effective marketing strategy which should be focused on these two factors. This research study also aims to target the main elements of the two factors for effective marketing strategy. These two factors (social and cultural) are directly related to the income level of the consumers. So if marketers studied the income level of the international consumer, they can influence the buying pattern of the consumers. The objective of the study is to direct the firms and marketers in proper way, where they can target their potential consumer in international market and effectively develop a strategy by using the 4 P's of marketing i.e. affordable price, proper place, effective promotion and high quality products. With the adoption of such strategy, the firms, no doubt, can operate very successfully in the global market.

4. Discussion

As with the expansion of global market, the marketing and sales managers faces a challenge of understanding the different culture aspects which influence the consumer buying pattern specially the challenge is even more complicated when those firms operate in a larger span of different culture in different segments of the world (Terpstra and David, 1991) and specially the aim of the managers are to target the segments more profitably. The managers in order to strengthen the equity of the brands should focus the main aspects of the culture which have strong impact on the consumer. The "Global Consumer Culture Positioning" (GCCP) a new brand strategy was conceptualized by Alden et al. (1999). Authors reported the support of his brand positioning concept in brand advertisement (promotion) for different countries and laid an emphasis on further research for these concepts. "In addition, the effectiveness of such brand positioning strategies is believed to be driven by individual consumer differences (Alden et al. 1999; Batra et al. 2000)". The main five dimensions of the culture are as follows;

- Long term orientation: "Long Term Orientation stands for the fostering of virtues oriented towards future rewards, in particular perseverance and thrift" (Hofstede, 2001).
- Individualism/Collectivism: In an individualism based cultures the ties between the individuals are loose. Everyone is responsible for his/her own acts or his immediate family. However in collectivism culture the strong bonds exist between individuals. The in-groups in collectivism are responsible for the individual's activities.
- Uncertainty Avoidance: "Uncertainty expresses the deficit that people tolerate ambiguous situations and need formal rules. Uncertainty is the extent to which the members of a culture fell threatened by uncertain or unknown situation".
- Masculinity/femininity: In masculinity cultures the men have more authority and powers where they are responsible for every decision and are concerned for quality of life. Whereas in feminity culture both men and female are responsible for decisions making but female tend to more authoritative.
- Power Distance: The power distance in culture explains the unequal distribution of power and authority among the members. The powerful members of the society free to use their powers in any manner.

The international consumer buying behavior is very much influenced by the social factors which also include the groups and social status to which the consumer belongs. In these groups to which the consumer belongs, many individuals interact and influence the buying decision. The main groups in the social factors are the opinion leader, consumer's family and reference groups. The consumer's family is the most important group in social factor to which the consumer belongs. In the family the decisions are combining and made jointly and hence consumer behavior starts within the family environment. The roles and preferences in the family are role models for the consumers. The family also performs a role of interpreter for culture and social values to the consumer. The reference groups in the social factors are those group of people where consumer identify itself and take on or adopts many of the values, norms and behaviors. These reference groups have both negative as well as positive influence on the consumers which then indirectly affect their purchasing decisions. The three most important reference groups are membership groups, aspiration groups and disassociate groups. In memberships groups the consumer "belongs to" reference groups. The marketer should focus the desires of the consumer which belong to reference groups. Whereas if the group members approved any product or service they are more likely communicate that product or service to other members of the group. The aspiration is those reference groups for which consumer "wants to belong to". The international consumer has a strong tendency towards these aspiration groups, so marketing managers should develop a marketing strategy which should target the aspiration groups effectively. The rarest form of the reference groups in social factors is disassociating groups for which international consumer "do not want to belong to". This type is very rare so it is beyond the scope of this research study. The reference groups can only influence the purchase decisions of the

international consumer if the consumer itself is very much involve in the particular reference groups. The third type in social factors is opinion leader. The opinion leaders have strong impact on buying behavior of the consumer as they are role model. However marketers must try to attract the consumers by communicating strong message through opinion leaders.

These groups also perform some roles which are as follows;

- Initiator: The first person who suggests or taken initial step for purchasing a particular brand or service.
- Influencer: The person whose idea or advice have strong impact on the buying decision of the consumer.
- Decider: The person in a group who has the financial power and authority to make the final choice for the purchasing of product and service.
- Buyer: The person who performs the final transaction.

Figure 1 shows the conceptual framework of the study.

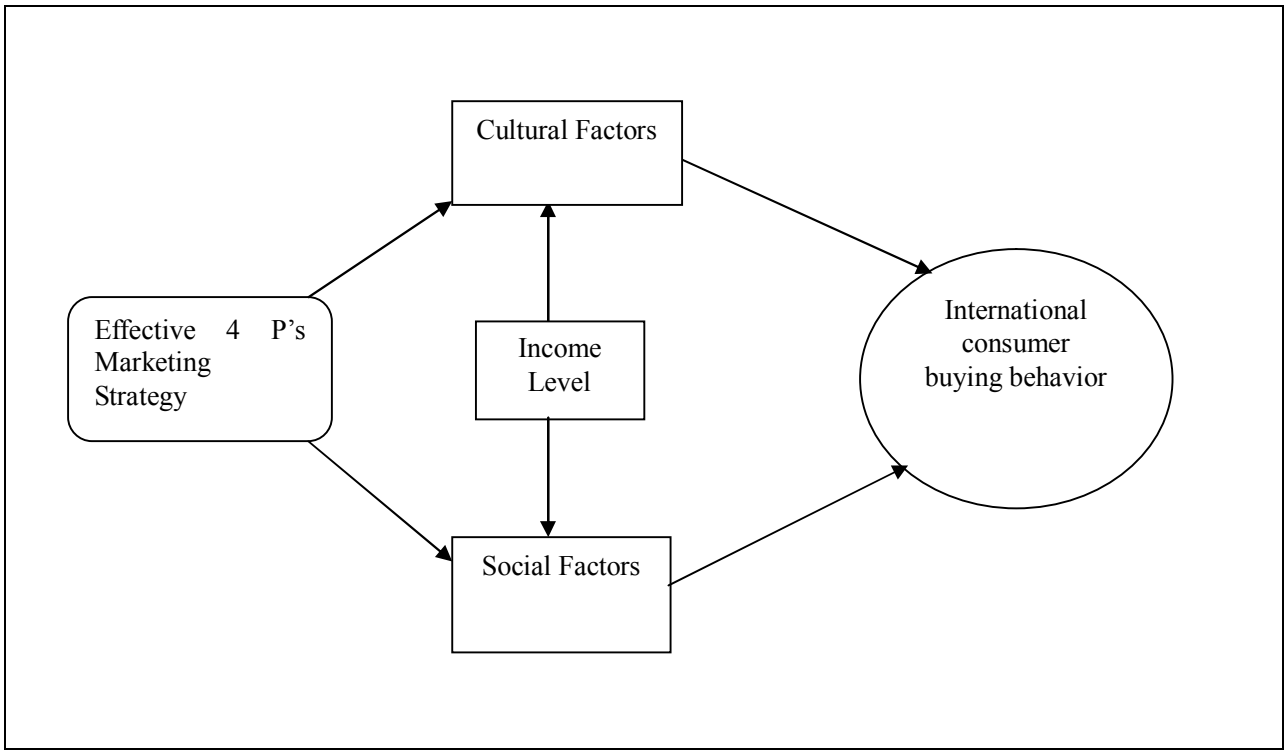

Figure 1: Conceptual Framework
Source: Self extract

The cultural and social factors do play an important role but these factors are more likely to be influenced by the income level of the consumers. Let suppose if consumers are not backed by purchasing power whatever influence they have in social or cultural factors they are not likely to buy the particular product or service. The literature shows that consumers who are more stable in terms of income level are more influence by the cultural and social factors from those consumers which have less income level. The income level is taken as additional variable in this research study which is not cover in many of the research topics especially for the international consumer buying behaviour. The marketers should develop an effective marketing strategy taking income as an important element in order to target the segment more properly in which they are serving. If for example a firm target a low level income group for Honda car, it is , no doubt, the firm will face failure, because the low level income group, despite the desire for the care will not be able to purchase it. Same is mass marketing should be done for daily consumption goods as it is consumed both by low income group as well as high income group. According to (Biemans, 2011) "greater variety of food products, higher incomes, better choices in retailers, have all resulted in changes of consumers' personal systems".

The three income levels are as follows;

- High Income Group: The high income groups are those groups which have more money as compare to other members of the society and they are considered as rich in that particular society.
- Middle Income Group: The middle income group represents the middle class of the society which lies between upper middle class and lower middle class.

- Low Income Group: The low income group are the poor people of the society which are deprived of even basic necessity of the life.

The most difficult area of decision for mangers operating in marketing department is whether to use the same 4 P's marketing strategy globally or locally. Whereas the every important element of the strategy whether advertisement (promotion) (see, Pae et al, 2002; Wong and Merrilees, 2007), should be effective. The findings of the Theodosiou and Leonidou (2003); Lehmann et al (2008) and Wong and Merrilees, (2007) shows that firms should make effective marketing strategy globally, especially for the international consumer. The marketing strategy with 4 P's is the influential factors which can affect the firms demand for products and services. They are very much different from the competitive and environmental factors which are not in control of firms actions. The marketing mix strategy with price is the allowances, distribution, deals, mark-ups, coupons and discount etc. The product includes the quality, features, models, sizes, packaging and brands etc. Whereas as promotion comes with advertising, sales promotions, publicity and personal selling. The place includes the channels, outlet, location, warehousing, stores, retail outlets etc. These elements of 4p's vary with the firm's strategy but remain standard in terms of marketing mix. The marketing manager with such an effective strategy can target the international consumer focusing their income level with social and cultural factors.

The qualitative research is one of the useful techniques which tend to interpret, describe, explain, and translate the meanings of the naturally occurring phenomena in the social world (Van Maanen, 1983). According to Miles and Huberman, (1994), "Qualitative data are rich and holistic, with strong potential for revealing complexity; such data provide thick descriptions that are vivid, nested in a real life context and have a ring of truth that has impact. One of the main advantages of the qualitative research is that it has a strong control on the concepts which help the researcher to handle the real life. The main focus of the qualitative research is to have deep understanding and provides flexibility and suitability for the underlying concepts (Carson et al, 2001). The main source of this study is secondary data and qualitative in nature. Different research papers were examined to pin point the main influencing factors for the international consumer. However with many other aspects, two variables are taken for this research which is cultural and social factors. The importance of both factors is explained in literature review. The additional variable is taken into consideration which has strong and direct effect on both cultural and social factors as well as buying pattern of international consumer. The marketing strategy with 4 p's (product, price, place and promotion) should develop in such a way which effectively targets the income level of the international consumer. Likewise, the high price products should only be advertise (promotion) only to high income level consumer. Whereas daily consumption good or fast moving consumer goods (FMCG) can be advertise and distribute (place) to both high income as well as low income level consumers in the international market. The independent variables for this research study are income level, cultural factors, social factors and marketing strategy while dependent variable is international consumer buying behavior.

5. Conclusion

It is concluded from the literature that the consumers buying intentions can only be represented completely when their attitudes motivations and income level must be taken into considerations. The consumer's attitude towards products can only be changed if the marketing mix elements are targeted specifically on the culture and social factors of the consumers. However the income level acts as an intervening variable which will change the buying pattern of the international consumer even if there are social and cultural barriers. The marketing mix with four P's i.e. product, price, place and promotion plays a significant role in influencing the buying pattern. Whereas the main elements of culture i.e. long term orientation, individualism/collectivism, uncertainty avoidance, masculinity/femininity and power distance also affect the purchasing behavior of international consumers. The main elements of social factors like opinion leader, consumer's family and reference groups can be very effective in changing the buying pattern of the international consumer if the income groups of high, middle and low are also taken into considerations. Overall the study with the support of literature review supports the conceptual framework of the study.

5.1. Limitations and Future Research Area

This research study focuses on the buying pattern of the international consumer. The income level is taken as important indicator which can affect the consumer buying intention. With the help of literature review a deep understanding of income level with social and cultural factors is presented. However this study is descriptive in nature but still it has some limitation. One of the major limitations is that the study is qualitative in nature whereas quantitative data is more suitable with support of empirical evidence. The second limitation is that this study is general explanation of international consumer buying behaviour. The specific countries should be taken for the study where different firms are operating at international level. The third limitation is that some products or services should be selected and their success level should be studied in different

countries. The forth and last limitation is that specific income groups around the globe should be taken into consideration. The future research can be done keeping in view these limitations.

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Microbiological And Mycotoxins Evaluation Of Cereals - Based Baby Food Samples Sold In Nigeria Market

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Abstract: Occurrence of microbial contaminants and mycotoxin level of cereal-based baby foods (flours) sold in Nigeria and its health impact on infants was evaluated. Random sampling of processed cereal based foods and infant formulae were done in different stores and markets in the cities of Ibadan and Uyo metropolis. The total heterotrophic count ranged from 1.0 - 7.5x10^3cfu/g, Total Coliform count (1.0 - 2.0 x 10^3cfu/g) and 1.0 x 10^3cfu/g for *Salmonella-Shigella* count, Total fungi count ranged from 1.0-4.0x10^3cfu/g. The microbial contamination was not above the maximum limits (10^3cfu/g) by ICMSF and USFDA. The bacteria isolated from the samples include: *Proteus mirabilis, Proteus penneri, Bacillus subtilis, Bacillus licheniformis* and *Salmonella sp. B. subtilis* had the highest frequency of occurrence (33.33%). The fungi isolated were *Aspergillus niger, A. fumigatus, A. terreus, A. flavus, A. glaucus, R.stolonifer, Penicillium sp. Fusarium semithectum, Furasium proliferatum* and *F. sacchari*. *F.sacchari* had the highest frequency of occurrence (28.57%). Afloatoxin: AFB_1, AFB_2, AFG_1, AFG_2, AFM_1 and AFM_2 concentration ranged from 0.89 – 4.67 µg/kg, 0.00 – 2.47µg/kg, 0.00 – 0.21µg/kg, 0.00 – 0.07µg/kg, 0.41 – 13.34µg/kg and 0.00 – 4.15µg/kg. Samples FGWMC and FRMC had the highest concentration. Aflatoxins B_2, G_1, G_2 and M_2 were not detected in some of the samples. Ochratoxin (OTA) concentration ranged from 0.07 – 1.45µg/kg, the highest concentration was recorded in sample FGWMC. OTB and OTC were not detected in the samples. Fumonisin: FB_1 and FB_2 concentration ranged from 1.08 – 6.43 µg/kg and 0.00 – 0.44 µg/kg the highest was recorded in sample FRMC and MWC. Patulin concentration ranged from 0.03 – 0.21µg/kg, sample FRMC had the highest.

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1. INTRODUCTION

Breast milk has been proven to be the perfect food for the infant during the first six months of life. It contains all the nutrients and immunological factors an infant requires to maintain optimal health and growth. Furthermore, breast milk also protects infants against the two leading causes of infant mortality, upper respiratory infections and diarrhea (UNICEF, 1999). However, at the age of six months and above when the child's birth weight is expected to have doubled nutritious complementary foods (weaning foods) are therefore introduced which typically covers the period from six to twenty four months of age in most developing countries (WHO, 2010).

Infants are a vulnerable part of the population due to, in part, their physiology, a fairly restricted diet and a higher consumption relative to their body. Therefore, the significance and potential health risk of any contaminant in foods consumed by infants is increased and diligent attention must be paid to this particular area. Cereals and milk are an important source of nutrition in infant diet and are among the first solid foods eaten. The presence of chemical contaminants in the human diet, and especially in the diet of vulnerable populations such as infants, is of great concern (Shephard *et al*., 2006). Among the most important chemical contaminants found in foodstuffs are natural toxins such as mycotoxins and they are of primary concern when considering chronic health risks (EC, 2006).

Mycotoxins, particularly aflatoxins (AFTs) and ochratoxin A (OTA) pose a significant threat to human health. Aflatoxins are potent carcinogens and, in association with hepatitis B virus, are responsible for many thousands of human deaths per annum, mostly in non-industrialized tropical countries (EC, 2006).

Ochratoxin A is a probable human carcinogen, and it was reported to cause urinary tract cancer and kidney damage in people from Eastern Europe. Exposure to OTA seems to be the biggest hazard correlated to microscopic fungi for the European consumers of cereals (Cowan, 1985).

EC Regulation 1881/2006 sets a limit of 0.25 µg kg−1 (dry product) for aflatoxin M_1 (AFM_1) for infant formulae and follow-on formulae, including infant milk and follow-on milk, and a limit of 0.10 µg kg−1 for aflatoxin B1 (AFB_1) and 0.50 µg kg−1 for OTA for processing cereal-based foods and baby foods for infants and young children (Holt *et al*., 1994).

This research work aim of assessing the microbial quality and mycotoxins level of baby and infant foods formulae sold in Nigeria market. Results will be compared with the maximum levels established in the

EU and the available literature

1. MATERIALS AND METHODS

2.1 Microbiological analysis

Ten grams of the baby food samples were taken for microbiological analysis. Standard pour plates were prepared from 10 – fold dilutions into a nutrient agar medium for total heterotrophic bacteria counts, MacConkey agar was used for total Coliform counts, Salmonella/Shigella agar for total Salmonella/Shigella counts, Thiosulphate citrate bile salt sucrose agar for total Vibrio counts, MRS agar for lactic acid bacteria count, Yeast extract agar for the total yeast count and Sabouraud dextrose agar with chloramphenicol (250mg/100ml) for total fungal counts. The bacterial plates were incubated at 37^{o}C for 24-48 hours, while fungal plates were incubated at room temperature (28 ± 2^{o}C) for 3-5 days. Colonies were selected randomly and were characterized using morphological and biochemical test such as Gram stain, spore stain, motility, catalase, oxidize, coagulase, indole, MR-VP and Urease and sugar fermentation tests. Bacterial isolates were identified with reference to Cowan and Steel's Manual for the identification of Medical Bacteria **(**Sampson *et al.,* 1984) and Bergey's Manual of Determinative Bacteriology **(**AOAC, 1998). Fungal isolates were identified based on their morphological and cultural characteristics as recommended by (Sampson *et al.,* 1984).

2.2 Mycotoxin analysis

Aflatoxins detection and quantification

All aflatoxins analyses were performed by extracting the aflatoxins from the samples with chloroform according to the AOAC method (1998). The extract was concentrated and stored in dark bottles in the freezer prior to detection and quantitative determination. Thin layer chromatography of toxins extracted from the samples and aflatoxin standards of known concentration were performed on silica gel DG 254. Of the extracted samples 5, 10 and 15µl were spotted on three different points on a ruled base line of the Tin Layer Chromatography (TLC) plates. Also 5, 10 and 15µl of the aflatoxin standard were spotted on another three points near spotted points of the previous sample extract.

The plates were developed first with diethyl ether and then with chloroform: acetone (9:1v/v). Aflatoxin was identified on the basis of co-migration with aflatoxin standards (Fluka) and by their characteristic fluorescent color under ultraviolet (UV) illumination at 360nm and upon exposure to sulfuric acid (50:50v/v). The fluorescent spots of aflatoxin B_1, AFB_2, AFG_1, AFG_2, AFM_1 and AFM_2 were scraped off the TLC and eluted by chloroform: methanol (9:1 v/v). The solvent was evaporated under nitrogen to dryness and the residue was dissolved in methanol. The concentration of the aflatoxins in solution was estimated using a spectrophotometer (Cecil Instrument CE 505) at a wavelength of 360nm respectively.

2.3 Confirmatory tests for aflatoxin

Three different derivatives were prepared by treating portions of the isolated toxin or the aflatoxin standard with formic acid thionyl chloride, acetic acid-thionyl chloride and tri-fluoroacetic acid. The test was done according to the method of Stoloff and Friedman (Stolof 1976)

2.4 Ochratoxins detection and quantification

About 1ml of chloroform and 0.2ml of the reconstituted extract was spotted on a precoated 20 x 20cm TLC plate along with ochratoxin standards of known concentration. The spotted TLC plate was developed in an equilibrated tank containing Toluene: acetylated: 90% formic acid (5:4:1v/v/v). The developed TLC was air-dried at an ambient temperature (28±20C) and ochratoxins was identified on the basis of co-migration with ochratoxin standards (Fluka) and by their characteristic fluorescent color under ultraviolet (UV) illumination at 366nm and upon exposure to sulfuric acid (50:50v/v). Preparative TLC plates (0.5um thick) were employed for the quantification. 0.8ml stored extracts was applied to the plate as a band rather than a spot to chromatography the maximum amount of samples at the same time. The preparative TLC plates were developed in an equilibrium tank as in ochratoxin extraction. The solvent front was allowed to rise to about $^{3}/_{4}$ of the total length of the plate; the plate was examined under the UV light. The area containing toxin of interest was scraped off, eluted with chloroform and filtered with Whatman No 1 filter paper. The extract was evaporated to dryness over a hot water bath and reconstituted with 3ml of chloroform. The 3ml reconstituted solution and ochratoxin standard of 10ug/ml concentration (Sigma and Aldrich, St Louis, MO USA) was used to read the absorbance on an Ultraviolet Spectrophotometer (Cecil Instrument CE505) at wavelength of 366nm. Ochratoxin concentration in µg/kg was calculated.

2.5 Fumonisin determination and quantification

The fumonisin was extracted from the food samples using 85% acetonitrile and 20g alumina was added. The mixture was filtered using Whatman No 1 filter paper. Standard of known concentration of Fumonisin B_1 and B_2 was prepared. An aliquot of the sample extract was prepared and 2ml of Dimethyl -formamide (DMF) was added to different concentration of the known standard and aliquot of the sample extract. The absorbance was taken after color development with 95% DMF at a wavelength of 560nm. Fumonisin B1

and FB2 in µg/kg was calculated.

2.6 Statistical Analysis:

The Duncan multiple range test was used to compare significant differences between the means Duncan (1956).

1. RESULTS

The microbial load of the baby food samples is shown in Table 1. The total heterotrophic count ranged from 1.0 - 8.5x10^3cfu/g in which sample NMSB had the highest. Total Coliform count ranged from 1.0 - 2.0 x 10^3cfu/g and 1.0 x 10^3cfu/g for *Salmonella-Shigella* count and LAB count ranged from 1.0 x 10^3, Total fungi count ranged from 1.0-6.0x10^3cfu/g. There was no observable growth on TCBS agar and Yeast extract agar respectively.

Frequency of occurrence of the bacteria and fungi isolated from the baby food samples are shown in Figure 1 and 2. The bacteria isolated from the baby food samples include: *Proteus mirabilis, Proteus penneri, Bacillus subtilis, Bacillus licheniformis* and *Salmonella* sp. *B. subtilis* had the highest frequency of occurrence (33.33%). The fungi isolate were *Aspergillus niger, A. fumigatus, A. terreus, A. flavus, A. glaucus, R. stolonifer, Penicillium* sp. *Fusarium semithectum, Furasium proliferatum* and *F. sacchari*. *F. sacchari* had the highest frequency of occurrence (28.57%).

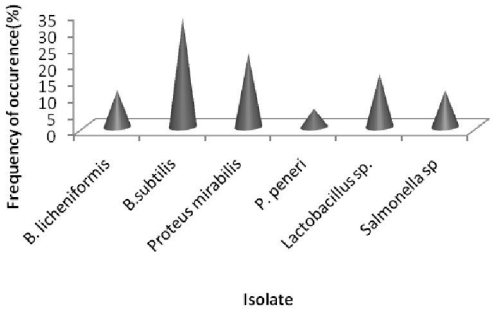

Figure 1: Frequency of occurrence (%) of bacteria isolated from the infant baby food samples

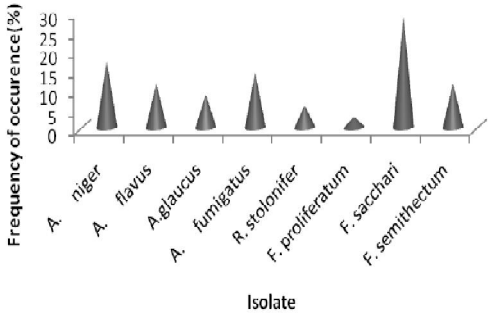

Figure 2: Frequency of occurrence (%) of Fungi isolated from the Infant baby food samples

The concentration of aflatoxins level in the infant formula samples is shown in Table 2a-c. The detected minimum and maximum level were 0.89 – 7.29 µg AFB_1 kg^{-1}, 0.06 – 2.75µg AFB_2 kg^{-1}, 0.03 – 0.24µg AFG_1/kg^{-1}, 0.02 – 0.06 µg AFG_2 kg^{-1} respectively. This was very high since some of the samples contained AFBs above the maximum limit.

About 18 samples had AFBs above the maximum limit (0.10 /kg) acceptable level for infant formulae and baby foods as shown in Table 2a-c. Most of the samples are not contaminated with AFB_2, AFG1 and AFG_2 respectively.

The detected levels of AFB_1 were at 0.89 µg kg^{-1} in minimum and 7.29 µg kg^{-1} at maximum.

AFM_1 and AFM_2 minimum and maximum were 0.33 – 14.28µg/kg and 0.26 – 5.94µg/kg respectively. The level in some samples was higher than the acceptable limit (0.025 µg/kg)

About 98% and 20% of the samples were contaminated with FB_1 and FB_2 respectively. The detected levels of FB_1 and FB_2 were at 1.08µg/kg and 0.28µg/kg in minimum, 6.43µg/kg and 0.44µg/kg with a maximum. The highest was recorded in the MWC.

About 69% of the baby food samples were contaminated with Patulin. The detected minimum and maximum Patulin concentration in the samples was 0.07 µg/kg and 0.21µg/kg in which sample CMF had the highest as shown in Table 3.

The detected minimum and maximum OTA level in the samples was 0.07 µg/kg and 2.28µg/kg. The highest concentration was recorded in sample NSMS. About 98% of the samples were found contaminated with OTA and the level in some samples exceeds the permitted level (Table 4).

4.0 DISCUSSION

The microbial contamination of the samples was not above the maximum limits (10^3cfu/g) by ICMSF (1982) and USFDA, (1991). The presence of isolated bacteria species in baby Food sample is of particular interest because of their involvement in different infant (Elegbede, 1998). Most of the microorganisms isolated are potential pathogens. *Proteus mirabilis* and *P. penneri* has been reported as causative agent of opportunistic infection in humans and urinary tract infection, wound infection, pneumonia and septicemia and this calls for concern (Prescott *et al*., 2005).

Salmonella sp have incriminated in enteritis (enteric fever) which include typhoid fever caused by *S. typhi* and paratyphoid fever caused by paratyphi A and B which are transmitted by water and food and has been implicated in a clinical case (Prescott *et al*., 2005).

Bacillus subtilis are not considered as human pathogen; they can contaminate food but rarely causes food poisoning. They produce proteolytic enzyme *subtilisin.* Some strains of *B. subtilis* have been

considered safe, and in some cases, use as probiotics in foods or in pharmaceutical preparations (Sanders *et al*., 2003). *B. licheniformis* are also common contaminant of dairy product and industrially produced baby food (Tatzel et al.,1994, Vuorio *et al*., 1998). The *Bacillus subtilis* and *B. licheniformis* isolated from the baby food samples might have been introduced into samples in a variety of ways, a major source of the contamination may be from the raw materials during food harvest, processing and handling operation since Bacillus species especially *B. subtilis* are inhabitants of soil where food crops are cultivated (Gordon *et al.,* 1973). The presence of *Bacillus* species in baby food samples may also be due to their ability to form spores which are able to resist chemical and physical stress. This emphasizes the importance of quality control procedures at reducing *Bacillus* spore counts in baby food.

Occurrence of *Aspergillus* sp. and *Fusarium* sp. in the samples may be as a result of the fact that they attack cereals during pre and post harvest period and also during storage. *Aspergillus* sp. and *Fusarium sp* also cause cancer, oedema, leukaencephalomacia and other kinds of the diseases especially in animals. The incidence of *Aspergillus* sp. and *Fusarium* sp. can be checked by reducing the moisture content of cereals; they should be well dried to a level where these fungi species cannot grow. Also during storage the cereals should be well stored where mold cannot grow.

The detected levels of AFB_1 were at 0.89 µg kg^{-1} in minimum and 7.29 µg kg^{-1} at maximum. Using a similar approach by Beretta *et al*. (2002), the risk of AFB_1 intake from baby foods can be estimated. If a 5-month-old child with a body weight of 6.5 kg can consume 26 g of formula per portion, according to the manufacturer's suggestion, with the highest quantity of AFB_1 detected (7.29µg/kg), 29.16 µg AFB_1/kg body weight would be taken at a time. AFB_1 is the most potent carcinogen known in mammals, the risk assessment of which is very well established.

AFM_1 and AFM_2 minimum and maximum were 0.33 – 14.28µg/kg and 0.26 – 5.94µg/kg respectively. The level in some samples was higher than the acceptable limit (0.025 µg/kg)

With a similar calculation to AFB_1 mentioned above, a child with body weight of 6.5kg would uptake the maximum 57.12 µg AFM_1/kg body weight at a time. Since AFM_1 is a gene-toxic carcinogen, the risks against infants and young children from AFM_1 exposure need careful consideration (Nakajima *et al*., (2004).

The detected minimum and maximum OTA level in the samples was 0.07 µg/kg and 2.28µg/kg. According to European Commission the maximum level of OTA in baby foods and processed cereal –based baby foods for infants and young children was 0.50µg/kg. OTA limit by the Commission Regulation (EC, 2006) was considered as the guide in this study. About 98% of the samples were found contaminated with OTA and the levels in some samples exceed the permitted level (Table 4).

According to the instructions on the label, a baby consumes 25 g of formula per portion. If a 5-month old child with body weight of 6.5 kg and infant formula with the highest quantity of ochratoxin A found (2.28µg/kg) were considered, the maximum portion intake would be 8.77 µg/kg OTA per body weight (kg). The provisional tolerable weekly intake (PTWI) is 0.1 µg/kg body weights for ochratoxin A (Herrman and Walker, 1999) so that there is a serious toxicological risk for a child that consumes a formula with OTA contamination above the permitted level. OTB and OTC were not detected in all the samples.

About 98% and 20% of the samples were contaminated with FB_1 and FB_2 respectively. The fumonisin level in all the samples was below the maximum limit recommended by European Commission (EC, 2006). According to the instructions on the label, a baby consumes 25 g of formula per portion. If a 5-month old child with body weight of 6.5 kg and infant formula with the highest quantity of FB_1 and FB_2 found (6.43 and 0.44µg/kg) were considered, the maximum portion intake would be 24.738 µg FB_1 kg^{-1} and 1.6 µg FB_2 kg^{-1} per body weight (kg). It can be said that there is a mild toxicological risk of a child that consumes a formula with FB_1 and FB_2 contamination. However, the total daily mycotoxin intake with the other sources of mycotoxin could be an important risk to infants and young children. About 69% of the baby food samples were contaminated with Patulin.

The result revealed the microbiological quality and mycotoxins in infant baby food samples. Most of the samples under consideration were contaminated with AFB_1, AFB_2, AFG_1, AFG_2, AFM_1 AFM_2, OTA, FB_1, AFB_2 and Patulin. The presence of these microbial isolates and mycotoxins in the food samples can cause serious health problems in infants and babies such as poor growth, suppressed immune system, and cancer. An accurate prediction of the possible health impact of individual mycotoxins in foods for the vulnerable group is difficult; possible additive and synergistic effects of multiple mycotoxins make the task even more complex and the long-term effects are beyond foresight. Climate and environmental conditions during growth, harvest and storage have great influence on mycotoxin levels, which are probably also reflected in the levels in foodstuffs (Bennett and Klich, 2003; Creppy, 2002; Skaug, 1999).

Since it is difficult to remove the mycotoxin once formed, the best way of control is prevention. However, many measures have been to minimize the occurrence of mold such as alternative methods of soil

cultivation, development of mold resistant species and drying and storage techniques (Creppy, 2002).

Microbiological examination and mycotoxins concentration in baby foods must be routinely monitored at every step of manufacturing and marketing. Manufacturing companies involved in the production of foods for infants and young children should give an extreme importance to microbial and mycotoxin content. Enough information and training to minimize health hazards and to form the public policies should be made available for pediatricians, health-care personnel and parents. In order to protect public health, it is essential to keep contaminants at levels toxicological acceptable. Ultimately, surveillance should be continuous, widespread and must be conducted by the government and related ministries as the quality of the end product depend on the precise controlling at every step of the production.

Table 1: Microbial Load of the Infant Baby Food Samples

SAMPLES CODE	Microbial count x 10^3 (cfu/g)						
	Total heterotrophic count	Coliform count	Vibrio count	Lactic acid bacteria count	Salmonella /Shigella count	Yeast count	Fungi count
NMSB(cereal+ soymilk)	8.5±0.028[a]	NG	NG	NG	1.0±0.01[b]	NG	1.0±0.005[e]
CMM(cereal based + milk)	4.96±0.057[d]	NG	NG	NG	1.0±0.01[b]	NG	4.0±0.05[b]
CRM(Rice +milk)	5.0±0.05[d]	NG	NG	NG	1.7±0.001[a]	NG	1.0±0.1[e]
CMF (Cereal+mixed fruit +milk)	7.0±0.005[b]	2.0±0.02[b]	NG	NG	NG	NG	6.0±0.01[a]
CWM(Wheat + milk)	2.0±0.01[j]	1.0± 0.01[a]	NG	1.0±0.01[a]	1.0±0.01[b]	NG	2 .0±0.02[d]
FCRB(Rice + milk)	6.5±0.057[c]	NG	NG	NG	NG	NG	2.0±0.02[d]
FCW(Cereal + wheat)	2.2±0.058[i]	NG	NG	NG	NG	NG	1.0±0.02[e]
FMCW(Milk + wheat)	4.0±0.01[f]	NG	NG	1.0±0.01[a]	1.0±0.01[b]	NG	3.0±0.01[c]
FGWM(Milk + wheat)	1.0 ±0.06[k]	1.0 ±0.01[a]	NG	NG	NG	NG	1.0±0.015[e]
MW(Milk - wheat)	2.4±0.01[h]	NG	NG	NG	NG	NG	2.0±0.01[d]
GCP(Cereal based)	2.7±0.006[g]	NG	NG	NG	NG	NG	3.0±0.02[a]
GFC Cereal based)	1.0±0.05[k]	1.0±0.01[a]	NG	NG	NG	NG	1.0±0.01[c]
GFB Cereal based)	1.0±0.01[k]	NG	NG	NG	NG	NG	1.0±0.01[e]

Values are means of three triplicates. Mean values in rows with different superscript letters are significantly different (P≥0.05), NG- NO GROWTH

Table 2a. Occurrence of Aflatoxins in the infant baby foods and infants Formulae

SAMPLES CODE	AFLATOXINS (µg/kg)					
	AFB_1			AFB_2		
	Minimum	Maximum	Mean±SD	Minimum	Maximum	Mean±SD
NMSB(cereal + soymilk)	2.79	4.67	3.6475±0.84	0.00	1.98	0.4950±0.9
CMM(cereal based + milk)	0.00	3.68	1.5675±1.86	0.00	0.00	0.0000

CRM(Rice +milk)	0.00	3.46	1.7050±1.46	0.00	0.00	0.0000
CMF (Cereal +mixed fruit +milk)	0.00	4.26	1.8600±2.19	0.00	0.00	0.0000
CWM(Wheat + milk)	0.00	3.05	1.5050±1.73	0.00	0.00	0.0000
FCRB(Rice + milk)	4.05	4.67	4.3600±0.35	0.09	0.19	0.1533±0.05
FCW(Cereal + wheat)	1.67	1.99	1.9025±0.15	0.00	0.00	0.0000
FMCW(Milk + wheat)	0.00	3.76	1.8775±2.16	0.00	0.00	0.0000
FGWM(Milk + wheat)	0.00	7.29	3.6425±4.20	0.00	2.75	1.3050±1.51
MW(Milk - wheat)	3.97	5.17	4.5700±0.68	0.06	0.14	0.1025±0.04
GCP(Cereal based)	0.89	0.97	0.9400±0.03	0.00	0.00	0.0000
GFC (Cereal based)	0.00	0.00	0.000	0.00	0.00	0.0000
GFB (Cereal based)	0.00	0.00	0.000	0.00	0.00	0.0000

Table 2b. Occurrence of Aflatoxins in the infant baby foods and infants Formulae

SAMPLES CODE	AFLATOXINS (µg/kg)					
	AFG_1			AFG_2		
	Minimum	Maximum	Mean±SD	Minimum	Maximum	Mean±SD
NMSB(cereal + soymilk)	0.00	0.03	0.0075±0.01	0.05	0.08	0.006±001
CMM(cereal based + milk)	0.00	0.00	0.0000	0.00	0.09	0.03±0.51
CRM(Rice +milk)	0.00	0.00	0.0000	0.00	0.00	0.0000
CMF (Cereal +mixed fruit +milk)	0.00	0.00	0.0325±0.06	0.00	0.00	0.000
CWM(Wheat + milk)	0.00	0.00	0.0000	0.00	0.00	0.0000
FCRB(Rice + milk)	0.18	0.22	0.2000±0.018	0.00	0.00	0.00
FCW(Cereal + wheat)	0.00	0.00	0.0000	0.00	0.00	0.0000
FMCW(Milk + wheat)	0.00	0.00	0.0000	0.00	0.00	0.0000
FGWM(Milk + wheat)	0.00	0.00	0.0000	0.00	0.00	0.0000
MW(Milk - wheat)	0.06	0.24	0.1500±0.09	0.00	0.00	0.00
GCP(Cereal based)	0.00	0.00	0.0000	0.00	0.00	0.0000
GFC Cereal based)	0.00	0.00	0.0000	0.00	0.00	0.0000
GFB Cereal based)	0.00	0.00	0.0000	0.00	0.00	0.0000

Table 2c. Occurrence of Aflatoxins in the infant baby foods and infants Formulae

SAMPLES CODE	AFLATOXINS (µg/kg)					
	AFM_1			AFM_2		
	Minimum	Maximum	Mean±SD	Minimum	Maximum	Mean±SD
NMSB(cereal + soymilk)	1.66	5.49	4.0425±**1.65**	0.00	3.26	0.0000
CMM(cereal based + milk)	0.00	4.96	2.18 ±2.56	2.68	4.13	0.0000
CRM(Rice +milk)	0.00	4.96	2.9150±2.14	0.00	0.00	0.0000
CMF (Cereal +mixed fruit +milk)	0.00	12.88	3.9375±6.11	0.26	5.94	0.0000
CWM(Wheat + milk)	0.00	3.17	1.5825±1.82	0.00	0.00	0.0000
FCRB(Rice + milk)	12.75	13.34	13.0450±0.34	0.00	0.00	4.13±0.01
FCW(Cereal + wheat)	0.45	0.69	0.570±0.138	0.00	0.00	0.0000
FMCW(Milk + wheat)	0.00	4.26	2.13±2.45	0.00	0.00	0.0000
FGWM(Milk + wheat)	0.00	8.36	4.18±4.82	0.00	0.00	0.0000
MW(Milk - wheat)	4.84	14.28	9.56±5.45	0.00	0.00	0.00
GCP(Cereal based)	0.33	0.41	0.370±0.04	0.00	0.00	0.0000
GFC Cereal based)	0.00	0.00	0.0000	0.00	0.00	0.0000
GFB Cereal based)	0.00	0.00	0.0000	0.00	0.00	0.0000

Table 3. Occurrence of Fumonisins (µg/kg) in the infant baby foods and infants Formulae

SAMPLES CODE	FUMONISIN (µg/kg)					
	FB_1			FB_2		
	Minimum	Maximum	Mean±SD	Minimum	Maximum	Mean±SD
NMSB(cereal + soymilk)	1.09	4.12	2.5625±1.46	0.28	0.44	0.360±0.09
CMM(cereal based + milk)	0.00	4.67	1.8625±2.28	0.00	0.11	0.055±0.06
CRM(Rice +milk)	0.00	4.28	2.2500±1.84	0.00	0.00	0.00
CMF (Cereal + mixed fruit + milk)	0.00	5.08	2.4925±2.87	0.00	0.00	0.00
CWM(Wheat + milk)	0.00	6.18	0.3450±0.69	0.00	0.00	0.00
FCRB(Rice + milk)	5.33	2.15	5.7550±0.60	0.00	0.00	0.360±0.09
FCW(Cereal + wheat)	1.87	5.47	2.0100±0.16	0.00	0.00	0.00
FMCW(Milk + wheat)	5.37	3.78	5.4200±0.05	0.00	0.00	0.00
FGWM(Milk + wheat)	0.00	6.43	1.8900±2.18	0.00	0.00	0.00
MW(Milk - wheat)	4.25	1.23	5.3400±1.25	0.00	0.00	0.0550±0.06
GCP(Cereal based)	1.08		1.1550±0.08	0.00	0.00	0.00
GFC Cereal based)	0.00		0.000	0.00	0.00	0.00
GFB Cereal based)	0.00		0.000	0.00	0.00	0.00

Table 4 Occurrence of Ochratoxins **(**µg/kg**)** and Patulin **(**µg/kg**)** in the infant baby foods and infants Formulae

SAMPLES CODE	OCHRATOXINS (µg/kg)					PATULIN(µg/kg)		
	OTA			OTB	OTC	PAT		
	Minimum	Maximum	Mean ±SD	CONC.	CONC.	Minimum	Maximum	Mean±SD
NMSB(cereal + soymilk)	0.18	2.28	0.7750±1.00	0.00	0.00	0.00	0.03	0.00
CMM(cereal based + milk)	0.00	0.51	0.1850±0.24	0.00	0.00	0.00	0.05	0.007±0.015
CRM(Rice + milk)	0.00	0.56	0.2750±0.25	0.00	0.00	0.00	0.14	0.012±0.025
CMF (Cereal + mixed fruit + milk)	0.00	0.47	0.1500±0.22	0.00	0.00	0.16	0.21	0.057±0.069
CWM(Wheat + milk)	0.00	0.49	0.1225±0.24	0.00	0.00	0.11	0.15	0.00
FCRB(Rice + milk)	0.67	0.94	0.8050±0.15	0.00	0.00	0.07	0.19	0.185±0.028
FCW(Cereal + wheat)	0.11	0.27	0.1900±0.09	0.00	0.00	0.00	0.00	0.00
FMCW(Milk + wheat)	0.34	0.44	0.3900±0.05	0.00	0.00	0.00	0.00	0.130±0.023
FGWM(Milk + wheat)	0.00	1.45	0.7250±0.83	0.00	0.00	0.00	0.00	0.00
MW(Milk + wheat)	0.77	0.84	0.8050±0.04	0.00	0.00	0.00	0.00	0.130±0.069
GCP(Cereal based)	007	0.9	0.0800±0.011	0.00	0.00	0.00	0.00	0.00
GFC Cereal based)	0.00		0.00	0.00	0.00	0.00	0.00	0.00
GFB Cereal based)	0.00		0.00	0.00	0.00	0.00	0.00	0.00

ABREVIATION
UNEP - Unite Nations Environmental Programme
ICMSF- International Commission of Microbiological Specification for Food
NAS – NRC - National Academy of Sciences - National Research Council.
FNB - Food and Nutrition Board.
FAO - Food and Agricultural Organization

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CONCLUSSION

Putting this results into consideration, it could be concluded that mycotoxin incidence in some samples selected from commonly consumed baby food in Nigeria, poses a serious public health problem at the moment.

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Production Of Cellulases By *Trichoderma* Species

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ABSTRACT: Twelve *Trichoderma* strains (*Trichoderma reesei, Trichoderma harzarium, Trichoderma viride, Trichoderma longibrachiatum, Trichoderma asperellum, Trichoderma arundinaceum, Trichoderma konnigii, Trichoderma pseudokonnigii, Trichoderma ciroviride, Trichoderma fertile, Trichoderma polysporum* and *Trichoderma crassum*) obtained from our prevoious work was used during this study. All the isolates were screened for their ability to produce cellulases on solid agar using carboxymethyl cellulose (CMC) and congo red as an indicator. Six isolates were selected as the best cellulases producer. The cellulases: Filterpase production ranged from 2.2172 - 4.3254 x10^{-7}units/ml in which *Trichoderma reesei* had the highest production, Endoglucanase production ranged from 1.5707 - 3.3064 x10^{-7}units/ml in which *Trichoderma asperellum* had the highest production and β-glucosidase production ranged from 1.1071 - 3.4668 x10^{-7}units/ml. On submerged fermentation, agitation condition had a profound effect on cellulase production. The highest yield of cellulases was recorded at 30^{o}C, pH 6, 6days incubation time and Tween80 at 0.15ml concentration. Among the carbon and nitrogen sources tested glucose and urea induced Filterpase and β-glucosidase production (1.1826 - 5.5522 x 10^{-7}units/ml) by *Trichoderma reseei*, manitol and casein supported Endoglucanase production (0.3513 - 1.5984 x10^{-7}units/ml) by *Trichoderma viride*.
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Keywords: Screening**,** Filterpase, Endoglucanase, β-glucosidase, *Trichoderma*

1. INTRODUCTION

Fungal species belonging to the genus *Trichoderma* are worldwide in occurrence and are easily isolated from soil, decaying wood, poultry farms, and other forms of plant organic matter. They are mostly classified as imperfect fungi because they have no known sexual stage. There are rapid growth rate in culture and the production of numerous spores (conidia) that varies in shades of green characterize fungi in this genus. The reverse side of colonies is often uncolored, buff, yellow, amber, or yellow-green, and many species produce prodigious quantities of thick-walled chlamydospores in submerged mycelium (Gams and Bisset, 1998). Trichoderma produces a wide array of enzymes, being a saprophyte which adapted to thrive in diverse situations. Industrial quantities of enzyme can be produced by selecting strains that produce a particular kind of enzyme, and culturing them in suspension. T. reesei is used for cellulase and hemicellulase, T. longibratum is used for xylanase, and T. harzianum is used for chitinase (Liming and Xueliang, 2004).

Cellulase is an enzyme which breaks down cellulose to beta-glucose. At least two steps in cellulose degradation by microorganisms begin with the preparatory prehydrolytic first step involving an enzyme which swells and/or hydrates anhydroglucose chains. The second step uses hydrolytic enzymes and beta glucosidase (cellobiase). *Trichoderma reesei* has an extensively studied cellulase enzyme complex. This complex converts crystalline, amorphous, and chemically derived celluloses quantitatively to glucose (Kumar, 1998). Cellulases have a wide range of enormous potential applications in biotechnology; they are used in textile industries, detergent, pulp and paper industry, improving digestibility of animal feeds, in food industry and enzymes account for a significant share of the world (Bhat and Bhat, 1997).

2. MATERIALS AND METHODS

2.1. Collection of Samples

Soil samples were collected aseptically at a depth of 2cm from three different locations in Ibadan: Cocoa Research institute of Nigeria, University of Ibadan Botanical Garden and a decayed wood sample in Microbiology Department, University of Ibadan. The samples were conveyed to the laboratory in sterile polythene bags for further analysis.

2.2. Isolation and identification of *Trichoderma* species from collected samples.

Serial dilution of the collected samples was carried out (Olutiola *et al.*2000) and 1ml of the diluents was pour plated on Potato Dextrose agar (PDA) supplemented with streptomycin. The plates were incubated at 28^{o}C for 3 days. Morphological appearances of the inoculated plates (at room temperature) were observed and distinct colonies were sub-cultured to obtain pure isolates which were then maintained on PDA slants and stored at 4□C for further study. Microscopic observations were made for the pattern of conidiation and hyphal branching of the

pure fungi isolates after which identification was done with reference to Barnett's Compendium of Soil Fungi (1980), Rifai (1969) and other relevant electronic documentations on the genus *Trichoderma*.

2.4. Plate Screening for Cellulase Production

The isolates were screened using Caboxymethylcellulose – Agar (CMC - Agar) medium was used. This medium consist of: 1.00% (w/v) CMC 0.65% (w/v) $NaNO_3$, 0.65% (w/v) k_2HPO_4, 0.03% (w/v) yeast extract, 0.65% (w/v) KCl, 0.3% (w/v) $MgSO_4$, 0.65% (w/v) glucose, 1.7% (w/v) agar and 0.1 % (w/v) triton X-100. Also, conidia from one week old PDA plates were suspended in sterile water. A small well created in the middle of the screening plates and same number of conidia of each isolate was inoculated into the wells. Plates were incubated at 28^0C for three days followed by 18h at 50^0C. For cellulolytic activity observations, plates were stained with 1% Congo red dye for 0.5-1hr following by staining with 1M NaCl solution for 15-20min.

2.5. CELLULASE PRODUCTION

Spores of *Trichoderma* species were suspended in CMC broth containing g L^{-1} of CMC -1, Yeast Extract - 0.1, $(NH_4)_2SO_4$ -0.5, KH_2PO_4-10.0, $MgSO_4$ $7H_2O$ -0.1, NaCl -0.2, pH -5.0 and incubated on orbital shaker at 28 ± 2^0C for 3days and used to inoculate enzyme production media for submerged fermentation. For enzyme production, Erlenmeyer flasks containing 100ml of basal synthetic medium containing gL^{-1} of $(NH_4)_2SO_4$-0.5, KH_2PO_4 -10, K_2HPO_4 -5, $MgSO_4$ -0.1, NaCl -0.2, Yeast Extract, 0.1g with 1g of CMC were inoculated 10^6 spores ml^{-1} prepared inoculums were incubated at 28^0C ± 2 on orbital shaker (150rpm) for 10days. The mycelium free extract was used as crude cellulose preparation (Kocher *et al*., 2008)

2.6. Dry Cell Weight Determination

The mycelium from each flask was filtered and then washed. The washed mycelium was dried in British-made Gallenkamp oven at 110□C to a constant mass and the mass was determined using an automatic electronic balance.

2.7. Statistical analysis

Experiments were performed in triplicate and the results were analyzed statistically. The treatment effects were compared and the significant difference among replicates has been presented as Duncan's multiple range tests in the form of probability values.

3. RESULTS AND DISCUSSION

A total of twelve fungi belonging to the genera *Trichoderma* (*Trichoderma reesei, Trichoderma harzarium, Trichoderma viride, Trichoderma longibrachiatum, Trichoderma asperellum, Trichoderma arundinaceum, Trichoderma konnigii, Trichoderma pseudokonnigii, Trichoderma ciroviride, Trichoderma fertile, Trichoderma polysporum* and *Trichoderma crassum*) were isolated from soil samples collected from University of Ibadan Botanical garden, Cocoa Research Institute of Nigeria and decayed wood in the Department of Microbiology garden. Identification of genus was based on morphological and cultural characteristics compared to fungi compendium (1980), and an illustrated manual on identification of *Trichoderma* species was used.

Table 1 shows the cultural, morphological and microscopic characteristics of the *Trichoderma* species.

The frequency of occurrence of the fungal isolates is shown in Figure 1. *Trichoderma asperellum* had the highest frequency of occurrence (16.8%) followed by *Trichoderma crassum* (12.6%) and *Tricoderma arundinaceum* (8.9%).

Table 2 shows the screening of isolates for cellulase production on solid agar using CMC as the sole carbon source and congo red as an indicator. *Trichoderma crassum, Trichoderma viride, Tricoderma harzarium* had the highest diameter of 1.8mm, 1.6mm, 1.5 mm on the sixth day of incubation followed by *Trichoderma asperellum, Trichoderma longibractum, Trichoderma reesei* with a diameter of 1.45mm, 1.4mm, 1.35 mm. *Trichoderma konnigii* had the least diameter of 0.7 mm on the sixth day of incubation. Based on screening for cellulases on solid agar, six isolates were selected for further studies using submerged fermentation.

Cellulase productions by the selected *Trichoderma* species cultivated in submerged fermentation are shown in Table 3.1. It was observed that there was variation in cellulase production by the selected isolates during the fermentation period. Optimum production of cellulase was recorded when the fermentation medium was agitated. The cellulase production ranges from 2.2172 - 4.3254 $x10^{-7}$ units/ml in which *Trichoderma reesei* had the highest production for Filterpase, Endoglucanase ranged from 0.5707 - 3.3064 $x10^{-7}$units/ml in which *Trichoderma asperellum* had the highest production and β-glucosidase ranged from 1.1071 - 3.4668 $x10^{-7}$units/ml in which *Trichoderma reesei* had the highest production.

The effect of temperature on **c**ellulase production by selected *Trichoderma* species cultivated in submerged fermentation using CMC as the sole carbon source is shown in Table 3.2a, b and c. It was observed that optimum production of Filterpase and Endoglucanase was attained at 30^oC and the highest β-glucosidase production was attained at 25^oC for all

the isolates. Filterpase production ranged from 0.3218 - 6.8033 x10^{-7}units/ml, Endoglucanase ranged from 0.0549 - 3.3274 x10^{-7}units/ml and β-glucosidase ranged from 2.3558 - 5.5578 x10^{-7}units/ml and *Trichoderma reesei* had optimum production in the 3 hydrolytic enzymes.

Incubation time had a profound effect on enzyme production as shown in Table 3.3a, b and c respectively. The best incubation time for enzymes (FPA (Filterpase), Endoglucanase and β-glucosidase) production was at six days of fermentation. Filterpase production ranged from 0.0329 - 1.8544 x10^{-7}units/ml in which *Trichoderma reesei* had the highest production, Endoglucanase ranged from 0.1296 - 3.7269 x10^{-7}units/ml in which *Trichoderma viride* had the highest production and β-glucosidase ranged from 0.0766 - 5.5336 x10^{-7}units/ml in which *Trichoderma reesei* had the highest production. Table 3.4a, b and c show the effect of different pH on the three hydrolytic enzyme productions by the selected isolates. pH 6 was found to be the best for enzymes production. For Filterpase production it ranged from 0.3088 - 3.7473 x10^{-7}units/ml, for endoglucanase production it ranged from 0.6048 - 2.9204 x10^{-7}units/ml and for β-glucosidase production it ranged from 0.0702 - 2.1977 x10^{-7}units/ml.

Influence of different concentrations of inducers on enzymes production is shown in Table 3.5a, b and c respectively. Tween80 enhanced the highest production of cellulases at 0.15ml in which *Trichoderma reesei* and *Trichoderma asperellum* had the highest production of Endoglucanase, *Trichoderma reesei* and *Trichoderma crassum* had the optimum production of Filterpase while *Trichoderma viride* has the least production of Filterpase. β-glucosidase production ranged from 3.8086 - 5.7828 x10^{-7}units/ml. Effect of different carbon sources on cellulases production is shown in Table 3.6a, b and c respectively. It was observed that Glucose induced the higher level of Filterpase and β-glucosidase production. Filterpase production ranged from 1.1826 - 5.5522 x 10^{-7}units/ml in which *Trichoderma reesei* had the highest production while β-glucosidase ranged from 0.2052 - 2.0088 x10^{-7}units/ml in which *Trichoderma crassum* had the highest production. Carbon sources had effect on Endoglucanase production by the isolates. Manitol supported the production of Endoglucanase and it ranged from 0.3513 - 1.5984 x10^{-7}units/ml in which *Trichoderma viride* had the highest production. Table 3.7a, b and c show the effect of different nitrogen sources on cellulase production by the selected isolates. Urea supported the optimal production of Filterpase and β-glucosidase enzyme, Filterpase production ranged from 2.7432 - 7.6862 x10^{-7}units/ml, β-glucosidase production ranged from 0.3564 - 1.8608 x10^{-7}units/ml in which *Trichoderma crassum* had the highest production. There was a significant difference in Endoglucanase production by the selected isolates in which casein supported the optimum production and *Trichoderma viride* 1.9284a x10^{-7}units/ml had the best production.

Table 1: Cultural and Morphological Characteristic of *Trichoderma* species obtained from soil samples.

Isolate code	Appearance on Agar	Growth pattern	Microscopic spore shape	Probable Identity
ASB1	Dark green granular colony	Rapid with coconut odour	Phialides typically crowded arising from broad cells, Conidiophore with branches	*Trichoderma viride*
AS2	Yellow green conidia formed densely over the center and in undulating concentric rings	Fairly rapid	Globose, intercalary hyphae and Terminal phialides	*Trichoderma harzianum*
AW3	Dark green, mottled with white flecks	Fairly rapid	Phialides mainly arising singly, in divergent whorls and typically cylindrical	*Trichoderma longibrachiatum*
AW14	White with a diffusing yellow pigment	Fairly rapid	Phialides in whorls at the tip of fertile branches	*Trichoderma polysporum*
AW5	Wooly green rings	Fairy rapid	Paired lateral branches	*Trichoderma pseudokoningii*
AW16	Yellowish green	Rapid	Phialides held in whorls	*Trichoderma arundinaceum*
AS7	Greenish mycelium	Fairly rapid	Phialides supported by a base cell typically terminating cells of branches in pairs	*Trichoderma citrinoviride*
AW8	Dark green, dense wooly colony	Rapid	Phialides formed on conidiophores within pustules	*Trichoderma asperellum*
AS9	Yellowish brown granules	Rapid	Intercalary within hyphae	*Trichoderma crassum*
AW10	Diffusing yellow pigment		Phialides held in whorls	*Trichoderma*

	conidiation	Fairly rapid		*konnigii*
NUB5	Greenish, uniformly dispersed colonies	Fairly rapid	Long straight phialides, typically flask-shaped and enlarged in the middle	*Trichoderma reesei*
NUB8	Conidia formed densely in a central disk and concentric rings of conidial production. No pigment in the agar	Fairly rapid	Basal phialides tending to be held in more or less divergent whorl while terminal phialides slightly hooked	*Trichoderma fertile*

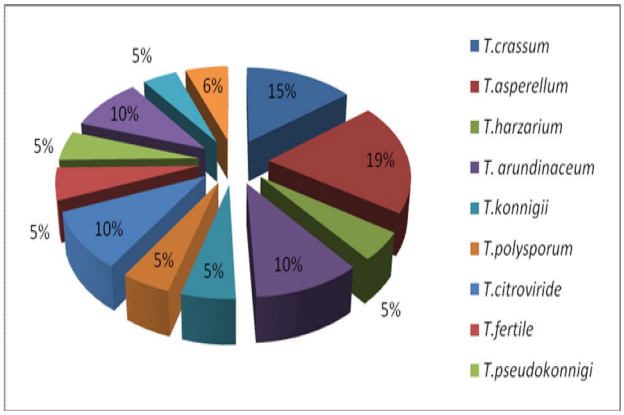

Figure 1 Percentage frequency of occurrence of microorganisms isolated from the soil samples

Table 3.2b: Effect of Temperature on Endoglucanase production (units/ml) x10^{-7} by *Trichoderma* species

Isolate code	Endoglucanase production (units/ml) x10^{-7}				
	Temperature (^{o}C)				
	25	30	35	40	45
T. reesei	1.9224^{b}	3.3274^{a}	0.5184^{d}	0.2916^{e}	0.6642^{c}
T. viride	1.5606^{b}	1.9656^{a}	0.594^{d}	0.7344^{c}	0.3024e
T. harzarium	1.1344^{b}	1.9224^{a}	0.4482^{e}	1.053^{c}	0.9504^{d}
T. longibrachiatum	1.2636^{b}	2.2194^{a}	0.6588^{d}	0.8316^{c}	0.3672^{e}
T .crassum	2.1875^{b}	3.1752^{a}	0.7837^{e}	1.0044^{c}	0.6318^{d}
T.asperellum	3.1374^{b}	3.3048^{a}	2.1276^{c}	0.0972^{d}	0.0549^{e}

Values are means of three triplicates. Mean values in columns with different superscript letters are significantly different (P≥0.05), NG- NO GROWTH

Table 3.2c: Effect of Temperature on β-glucosidase production (units/ml) x10^{-7} by *Trichoderma* species

Isolate code	β-glucosidase production (units/ml) x10^{-7}				
	Temperature (^{o}C)				
	25	30	35	40	45
T. reesei	5.5578^{a}	4.79682^{c}	4.6186^{d}	4.8773^{b}	3.0904^{e}
T. viride	4.5921^{b}	4.2606^{c}	4.7422^{a}	3.9644^{d}	2.5362^{e}
T. harzarium	6.9373^{a}	5.5566^{b}	4.3070^{c}	4.2525^{d}	3.1696^{e}
T. longibrachiatum	4.5191^{a}	4.32108^{b}	3.9349^{d}	4.2154^{c}	2.3558^{e}
T .crassum	5.0970^{a}	4.97772^{b}	4.8880^{c}	4.0829^{d}	3.1338^{e}
T.asperellum	4.7579^{a}	4.5829^{b}	4.0905^{c}	4.1466^{d}	2.7999^{e}

Values are means of three triplicates. Mean values in columns with different superscript letters are significantly different (P≥0.05), NG- NO GROWTH

Table 3.3a: Effect of incubation time on FPA production (units/ml) x10^{-7} by *Trichoderma* species

Isolate code	FPA production (units/ml) x10^{-7}			
	Incubation Time (Days)			
	3	6	9	12
T. reesei	0.3672^{d}	1.8544^{a}	0.5308^{b}	0.3974^{c}
T. viride	0.0329^{d}	0.2613a	0.2527^{b}	0.1182^{c}
T. harzarium	0.1776^{a}	1.4520^{b}	0.0725^{d}	0.5616^{c}
T.longibrachiatum	0.2413^{c}	1.8098^{a}	0.2100^{d}	0.3682^{b}
T. crassum	0.0453^{d}	0.1760^{a}	0.4455^{b}	0.2062^{c}
T. asperellum	0.0469^{d}	0.5535^{a}	0.0610^{c}	0.8289^{b}

Values are means of three triplicates. Mean values in columns with different superscript letters are significantly different (P≥0.05), NG- NO GROWTH

Table 3.3b: Effect of incubation time on Endoglucanase production (units/ml) x10^{-7} by *Trichoderma* species

Isolate code	Endoglucanase production (units/ml) x10^{-7}			
	Incubation Time (Days)			
	3	6	9	12
T. reesei	0.3618^{c}	1.4644^{a}	0.2096^{d}	1.3554^{b}
T. viride	0.2106^{d}	1.3458^{a}	0.4057^{b}	0.2758^{c}
T. harzarium	0.3024^{d}	3.7269^{a}	0.3294^{c}	0.8802^{b}
T.longibrachiatum	0.2376^{d}	4.9146^{a}	0.8046^{b}	0.6642^{c}
T. crassum	0.6804^{d}	1.9512^{b}	1.0348^{c}	2.7275^{a}
T. asperellum	0.1998^{c}	0.2594^{b}	0.6588^{a}	0.1296^{d}

Values are means of three triplicates. Mean values in columns with different superscript letters are significantly different (P≥0.05), NG- NO GROWTH

Table 3.3c: Effect of incubation time on β-glucosidase production (units/ml) x10^{-7} by *Trichoderma* species

Isolate code	β-glucosidase production (units/ml) x10^{-7}			
	Incubation Time (Days)			
	3	6	9	12
T. reesei	2.2561^{b}	5.5336^{a}	0.3029^{c}	0.1981^{d}
T. viride	2.4953^{b}	4.2584^{a}	0.1506^{d}	0.2019^{c}
T. harzarium	2.4067^{b}	5.2666^{a}	0.1312^{d}	1.7220^{c}
T.longibrachiatum	3.6844^{b}	4.5851^{a}	0.0766^{d}	0.9547^{c}
T. crassum	3.9841^{b}	5.3502^{a}	1.4315^{c}	1.0503^{d}
T. asperellum	3.2103^{b}	4.2514^{a}	0.6598^{d}	1.2733^{c}

Values are means of three triplicates. Mean values in columns with different superscript letters are significantly different (P≥0.05), NG- NO GROWTH

Table 3.4a: Effect of Tween80 on FPA production (units/ml) x10^{-7} by *Trichoderma* species

Isolate code	FPA production (units/ml) x10^{-7}				
	Tween80 concentration (ml/l)				
	0.05	0.1	0.15	0.25	0.3
T. reesei	5.5236^{c}	6.1576^{b}	7.9632^{a}	5.3087^{e}	5.3271^{d}
T. viride	4.5311^{e}	5.5679^{c}	6.9502^{a}	6.6047^{b}	5.2336^{d}
T. harzarium	6.1570^{c}	6.5647^{b}	6.9595^{a}	5.6802^{e}	6.1009^{d}
T.longibrachiatum	4.7476^{e}	6.7483^{b}	6.8358^{a}	5.5857^{c}	4.7968^{d}
T. crassum	4.9053^{e}	6.7640^{c}	7.7392^{a}	7.1393^{b}	6.2823^{d}
T. asperellum	5.4556^{c}	5.2369^{e}	6.0388^{a}	5.7148^{b}	5.4340^{d}

Values are means of three triplicates. Mean values in columns with different superscript letters are significantly different (P≥0.05), NG- NO GROWTH

Table 3.4b: Effect of Tween80 on Endoglucanase production (units/ml) x10^{-7} by *Trichoderma* species

Isolate code	Endoglucanase production (units/ml) x10^{-7}				
	Tween80 concentration (ml/l)				
	0.05	0.1	0.15	0.25	0.3
T. reesei	1.2204^{d}	2.0736^{b}	2.1066^{a}	2.0173^{c}	0.5076^{e}
T. viride	0.2268^{c}	0.3078^{b}	0.7028^{a}	0.2214^{d}	0.0819^{e}
T. harzarium	0.7295^{d}	1.3608^{c}	1.6146^{a}	0.7128^{e}	1.5126^{b}
T.longibrachiatum	0.2754^{e}	0.5454^{d}	1.0152^{a}	0.6485^{b}	0.6219^{c}
T. crassum	0.4914^{d}	0.9504^{b}	1.0476^{a}	0.3024^{e}	0.8532^{c}
T. asperellum	1.6473^{e}	2.1067b	2.1546^{a}	1.7015^{d}	1.8414^{c}

Values are means of three triplicates. Mean values in columns with different superscript letters are significantly different (P≥0.05), NG- NO GROWTH

Table 3.4c: Effect of Tween80 on β-glucosidase production (units/ml) x10^{-7} by *Trichoderma* species

	β-glucosidase production (units/ml) x10^{-7}				
	Tween80 concentration (ml/l)				
Isolate code	0.05	0.1	0.15	0.25	0.3
T. reesei	4.1596^{e}	4.2357^{b}	5.6104^{a}	4.1817^{d}	4.2260^{c}
T. viride	3.8863^{e}	3.9884^{d}	4.1223a	3.9863^{c}	4.0638^{b}
T. harzarium	4.1720^{d}	4.5252^{b}	4.6580^{a}	4.5241^{c}	4.0840^{e}
T.longibrachiatum	3.9857^{e}	4.2129^{c}	4.6018^{a}	4.0240^{d}	4.5079^{b}
T. crassum	4.4814^{c}	4.2303^{d}	4.7806^{a}	3.8086^{e}	4.4890^{b}
T. asperellum	4.2417^{e}	4.5096^{b}	5.7828^{a}	4.3151^{c}	4.2897^{d}

Values are means of three triplicates. Mean values in columns with different superscript letters are significantly different (P≥0.05), NG- NO GROWTH

Table 3.5a: Effect of pH on FPA production (units/ml) 10^{-7} by *Trichoderma* species

Isolate code	FPA production (units/ml) 10^{-7}			
	pH			
	3	6	10	14
T.reesei	3.6666[b]	3.7473[a]	0.5626[c]	0.1544[d]
T.viride	0.5194[b]	1.0319[a]	0.4973[c]	0.3088[d]
T.harzarium	1.3651[b]	1.2587[a]	0.4401[c]	0.1512[d]
T.longibrachiatum	1.0087[c]	3.8421[a]	1.7911[b]	0.3861[d]
T.crassum	0.9844[b]	1.2047[a]	0.4552[c]	0.4509[d]
T.asperellum	1.9035[b]	2.3441[a]	1.2576[c]	0.9498[d]

Values are means of three triplicates. Mean values in columns with different superscript letters are significantly different (P≥0.05), NG- NO GROWTH

Table 3.5b: Effect of pH on Endoglucanase production (units/ml) 10^{-7} by *Trichoderma* species

Isolate code	Endoglucanase production (units/ml) 10^{-7}			
	pH			
	3	6	10	14
T.reesei	2.1384[b]	2.9204[a]	1.2332[c]	1.1286[d]
T.viride	0.6048[d]	1.5444[a]	1.4526[b]	1.2312[c]
T.harzarium	1.7982[c]	2.7594[a]	2.5812[b]	1.4958[d]
T.longibrachiatum	1.0044[d]	2.0314[a]	1.0412[b]	1.0358[c]
T.crassum	0.9072[c]	2.6092[a]	0.8532[d]	1.0898[b]
T.asperellum	0.8478[d]	2.9164[a]	1.9173[c]	2.0304[b]

Values are means of three triplicates. Mean values in columns with different superscript letters are significantly different (P≥0.05), NG- NO GROWTH

Table 3.5c: Effect of pH on β-glucosidase production (units/ml) 10^{-7} by *Trichoderma* species

Isolate code	β-glucosidase production (units/ml) 10^{-7}			
	pH			
	3	6	10	14
T.reesei	1.1691[b]	2.1977[a]	0.2203[c]	0.2149[d]
T.viride	1.0984[b]	1.7368[a]	0.4849[c]	0.4870[d]
T.harzarium	0.5718[c]	1.2652[a]	1.2128[b]	0.3407[d]
T.longibrachiatum	1.0319[b]	1.5222[a]	0.5994[c]	0.1166[d]
T.crassum	0.8148[c]	1.9286[a]	0.8693[b]	0.7360[d]
T.asperellum	0.3099[c]	0.3904[a]	0.3574[b]	0.0702[d]

Values are means of three triplicates. Mean values in columns with different superscript letters are significantly different (P≥0.05), NG- NO GROWTH

Table 3.6a: Effect of carbon sources on FPA production (units/ml) x10^{-7} by *Trichoderma* species

Isolate code	FPA production (units/ml) x10^{-7}					
	Carbon sources (g/l)					
	Sucrose	Glucose	Fructose	Lactose	Maltose	Manitol
T.reesei	1.4504^{f}	5.5522^{a}	1.5768^{e}	2.9862^{c}	3.0024^{b}	2.1708^{d}
T.viride	3.6187^{c}	4.3595^{a}	4.1848^{b}	2.5164^{f}	3.5856^{d}	2.8404^{e}
T.harzarium	3.3082^{c}	4.8178^{a}	2.7648^{d}	4.1256^{b}	1.1826^{f}	2.7216^{e}
T.longibrachiatum	2.6196^{f}	3.8728^{a}	3.6724^{b}	3.2945^{c}	3.0942^{e}	3.2562^{d}
T.crassum	3.8074^{e}	5.2542^{a}	4.2822^{d}	3.3756^{f}	4.8924^{c}	4.9734^{b}
T.asperellum	2.1168^{f}	3.9786^{a}	3.7908^{b}	3.2778^{d}	3.8232^{c}	2.4138^{e}

Values are means of three triplicates. Mean values in columns with different superscript letters are significantly different (P≥0.05), NG- NO GROWTH

Table 3.6b: Effect of carbon sources on Endoglucanase production (units/ml) x10^{-7} by *Trichoderma* species

Isolate code	Endoglucanase production (units/ml) x10^{-7}					
	Carbon sources (g/l)					
	Sucrose	Glucose	Fructose	Lactose	Maltose	Manitol
T.reesei	0.7294^{e}	0.5487^{f}	0.9828^{d}	1.2966^{b}	1.1744^{c}	1.2986^{a}
T .viride	1.0856^{b}	0.6534^{e}	0.5886^{f}	0.7293^{d}	0.8137^{c}	1.5984^{a}
T. harzarium	0.8262^{e}	0.6858^{f}	1.2096^{c}	1.1448^{d}	1.8576^{b}	1.3239^{a}
T. longibrachiatum	0.7992^{b}	0.3513^{f}	0.7074^{c}	0.5346^{e}	0.6858^{d}	0.9774^{a}
T. crassum	1.0962^{b}	0.8802^{e}	0.9018^{d}	0.6048^{f}	0.9726^{c}	1.2964^{a}
T. asperellum	1.1556^{e}	1.2646^{cd}	1.0906^{b}	1.2528^{d}	0.9180^{f}	1.0926^{a}

Values are means of three triplicates. Mean values in columns with different superscript letters are significantly different (P≥0.05), NG- NO GROWTH

Table 3.6c: Effect of carbon sources on β-glucosidase production (units/ml) x10^{-7} by *Trichoderma* species

Isolate code	β-glucosidase production (units/ml) x10^{-7}					
	Carbon sources (g/l)					
	Sucrose	Glucose	Fructose	Lactose	Maltose	Manitol
T.reesei	0.5292^{e}	1.4202^{a}	0.2052^{f}	0.6048^{d}	0.7398^{c}	1.4634^{b}
T.viride	0.1782^{f}	1.9978^{a}	1.0701^{c}	0.8748^{d}	0.5948^{e}	1.4904^{b}
T.harzarium	0.8100^{d}	1.7554^{a}	1.5926^{b}	0.6966^{e}	0.4968^{f}	1.3716^{c}
T.longibrachiatum	0.6534^{d}	1.4472^{a}	0.5022^{e}	0.5184^{d}	0.7776^{c}	1.4148^{b}
T.crassum	0.8154^{e}	2.0088^{a}	1.8738^{b}	0.59446^{f}	0.9828^{d}	1.7016^{c}
T.asperellum	0.5508^{d}	1.4824^{a}	0.3564^{f}	0.4266^{e}	0.7668^{c}	1.358^{b}

Values are means of three triplicates. Mean values in columns with different superscript letters are significantly different (P≥0.05), NG- NO GROWTH

Table 3.7a: Effect of nitrogen sources on FPA production (units/ml) x10^{-7} by *Trichoderma* species

Isolate code	FPA production (units/ml) x10^{-7}					
	Nitrogen sources (g/l)					
	Casein	Yeast	$NaNo_3$	Urea	NH_4No_3	$(NH_4)_2SO_4$
T. reesei	4.0402^{c}	3.4938^{d}	4.6548^{b}	4.7182^{a}	2.8188^{f}	3.4837^{e}
T. viride	4.7412^{c}	3.5802^{e}	3.6993^{d}	5.7244^{a}	5.3942^{b}	2.9268^{f}
T. harzarium	3.4678^{d}	4.9518^{b}	4.8168^{c}	4.9842^{a}	3.0186^{e}	2.7432^{f}
T.longibrachiatum	3.7422^{e}	4.8978^{c}	2.6194^{f}	7.6862^{a}	5.2468^{b}	4.2391^{d}
T. crassum	5.2542^{b}	3.6234^{d}	4.7466^{c}	6.4854^{a}	3.4452^{f}	3.4722^{e}
T. asperellum	3.9582^{c}	3.3966^{b}	3.4236^{d}	4.0186^{a}	3.3514^{e}	2.9268^{f}

Values are means of three triplicates. Mean values in columns with different superscript letters are significantly different (P≥0.05), NG- NO GROWTH

Table 3.7b: Effect of nitrogen sources on Endoglucanase production (units/ml) x10^{-7} by *Trichoderma* species

Isolate code	Endoglucanase production (units/ml) x10^{-7}					
	Nitrogen sources (g/l)					
	Casein	Yeast	$NaNo_3$	Urea	NH_4No_3	$(NH_4)_2SO_4$
T. reesei	1.1082^{a}	0.1085^{f}	0.9072^{c}	1.0962^{b}	0.8478^{d}	0.7452^{e}
T. viride	1.9284^{a}	1.1178^{d}	1.2474^{c}	0.7884^{e}	1.3554^{b}	0.6966^{f}
T. harzarium	1.8856^{a}	1.0886^{d}	1.0908^{c}	0.8532^{e}	0.4536^{f}	1.1178^{b}
T.longibrachiatum	1.1826^{a}	0.3834^{f}	0.7992^{c}	0.5778^{e}	0.9967^{b}	0.6534^{d}
T. crassum	1.3212^{a}	0.4482^{f}	1.0024^{b}	0.6102^{c}	0.9072^{d}	0.7839^{e}
T. asperellum	1.6578^{a}	1.2636^{b}	0.9504^{e}	1.1883^{d}	0.6534^{f}	1.2312^{c}

Values are means of three triplicates. Mean values in columns with different superscript letters are significantly different (P≥0.05), NG- NO GROWTH

Table 3.7c: Effect of nitrogen sources on β-glucosidase production (units/ml) x10^{-7} by *Trichoderma* species

Isolate code	β-glucosidase production (units/ml) x10^{-7}					
	Nitrogen sources (g/l)					
	Casein	Yeast	$NaNo_3$	Urea	NH_4No_3	$(NH_4)_2SO_4$
T. reesei	1.6146^{b}	0.7722^{e}	1.4256^{c}	1.6958^{a}	1.2096^{d}	0.7025^{f}
T. viride	1.4742^{c}	1.5396^{b}	1.4148^{d}	1.5742^{a}	1.3662^{e}	1.3284^{f}
T. harzarium	1.3773^{e}	1.4526^{d}	1.4904^{b}	1.8554^{a}	1.4688^{c}	0.8856^{f}
T.longibrachiatum	1.3547^{d}	1.4634^{b}	1.0746^{f}	1.7014^{a}	1.4318^{c}	1.1826^{e}
T. crassum	1.7289^{b}	1.4958^{c}	1.2042^{e}	1.8608^{a}	1.3237^{d}	0.4212^{f}
T. asperellum	1.5012^{c}	0.3564^{f}	1.1349^{e}	1.7986^{a}	1.2528^{d}	1.6578^{b}

Values are means of three triplicates. Mean values in columns with different superscript letters are significantly different (P≥0.05), NG- NO GROWTH

4.0 Discussion

Microbes are an attractive topic of interest for the production of enzyme complexity and extreme habitat variability (Sarkar *et al*., 1995). In the present study, a total of 12 *Trichoderma* species were isolated from soil samples and they were able to grow and produce cellulase at different rates. The enzymes produced enable the organisms to depolymerize crystalline cellulose (Wood and Kellogg, 1988). The cellulase system comprises of endoglucanase which randomly hydrolyze 1, 4-β bonds within cellulose molecules thereby producing reducing and non-reducing ends; Exoglucanase which cleaves cellobiose units from non-reducing ends of cellulose polymer, β-glucosidase which hydrolyze cellobiose and low molecular weight cellodextrins thereby yielding glucose and filter paper activity (Coughlan and Ljundahl, 1998).

Cellulase productions by the selected *Trichoderma* species cultivated in submerged fermentation are shown in Table 3.1 It was observed that there was variation in cellulase production by the selected isolates during the fermentation period. Highest production of cellulase was recorded when the fermentation medium was agitated which is in agreement with the work of Kocher *et al*. (2008). The cellulase production ranges from 2.2172 - 4.3254 $x10^{-7}$units/ml in which *Trichoderma reesei* had the highest production for Filterpase, Endoglucanase production ranged from 0.5707 - 3.3064 $x10^{-7}$units/ml in which *Trichoderma asperellum* had the highest production and β-glucosidase production ranged from 1.1071 - 3.4668 $x10^{-7}$units/ml in which *Trichoderma reesei* had the highest production.

The profile of cellulase at different temperature levels, it was observed that 30^{o}C gave the best yield for cellulase enzyme production in submerged state fermentation which is in agreement with the work of Kocher *et al*. (2008). The production of enzyme is very sensitive to the incubation temperature as reported by Smits *et al*. (2003). Among the four pH levels tested, pH 6 supported the optimum production of FPA, Endoglucanase and β-glucosidase after 6days of incubation in which this agrees with the work of Juhasz *et al*. (2004) as they reported a high Endoglucanase, FPA (Filter paper activity) and β-glucosidase production at pH 6 after 6 days of incubation time for *Trichoderma* species.

Cellulase production was increased when Tween80 was added to their fermentation medium but when the concentration was increased to 0.15%, a substantial increase in Filterpase production resulted and is in accordance with the work of El-Halwary and Mostafa, (2001) which reported that supplement like Tween80 enhances enzymes activities by increasing availability of nutrients. The mechanism of enhancement by Tween80 at low concentration increases the permeability of the cell membrane allowing for more rapid secretion of the enzyme which in turn leads to greater enzyme synthesis which is in agreement with the work of Kishen *et al*. (1981).

Glucose, Sucrose, Fructose, Maltose, Manitol and lactose induced the production of cellulases enzymes. Glucose gave the best yield for Filterpase and β-glucosidase enzyme. This could be because glucose can be easily metabolized by the isolate which was in agreement with the work of Ikram *et al* (2006) while manitol gave the highest yield of Endoglucanase production which was not in agreement with the work of Saha (2003).

Urea as a source of nitrogen induced higher Filterpase and β-glucosidase production. This agrees with the studies about the production of extracelluar enzymes used for the bioconversion of rice straw by Khan *et al*. (2007). Casein gave the highest production of Endoglucanase enzyme. Inorganic nitrogen sources gave higher enzyme yield than organic nitrogen as reported by Kudryashova *et al.* (1976) that organic nitrogen sources do not favour cellulase synthesis in *Geotrichum candidum* although some organic sources have been reported to favour the synthesis of cellulolytic and xylanolytic enzymes by Brown *et al.* (1987).

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科学与人学纠缠看希格斯世界
---非线性希格斯粒子数学讨论（9）

申之金

摘要：质量的起源不是世界最大难题，质量希格斯场公式和小林-益川理论扩容质量公式的统一，才是世界难题。希格斯场公式 $E=M^2h^2+Ah^4$ 把物质、能量、信息不但统一了起来，落实到信息或全息上，而且希格斯 3D 打印技术是很容易让人们想象韦尔和里奇的韦尔张量与里奇张量研究的协变效应。

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关键词：希格斯场 协变 格点 自手术

《未来世界追问历史》书稿引出对“三旋理论”的再认识，涉及质量的起源这个当代粒子物理学中公认的难题。但我们现在认为，质量的起源不是世界最大难题，质量希格斯场公式和小林-益川理论扩容质量公式的统一，才是世界难题。为理清它们的关系，多年来在学习庞小峰教授的《非线性量子力学》和王放与李后强教授的《非线性人口学导论》两书中，我们获得了一些灵感，最终在对赵常德老师的《物理学基础研究文集》一书的研读中受到启示。

一、质量希格斯场公式生态推导之谜

科学说来“客观”，实际是和“人学”纠缠的。例如美国科学家格林的《宇宙的结构》一书中说：各种基本粒子的质量之所以不同,是因为不同种类的基本粒子同希格斯海的相互作用强度各不相同。如顶夸克，在希格斯海中加速非常困难，“这也是这种夸克为什么那么重的原因。如果我们将粒子的质量比作一个人的名气，那么希格斯海就可以算作是狗子队；平常的老百姓可以随意地在成群的摄影师中穿行，但是政治名人或电影明星要想过去可就得费点劲了”。把“狗子队”和质量起源联系起来，这当然只是把“人学”中的一种社会现象用作比喻，再转换用作物理模具。但这种把“人学”和“科学”纠缠起来的解读，也非常生动和具有启迪。

因为它形象地说明了，希格斯海是通过施加“阻力”而速度减少来构成基本粒子的各种实现物质的质量的。光子粒子如“平常的老百”，可以完全不受影响地穿行在希格斯海中，因而也就全无质量。另一方面，顶夸克粒子如“政治名人或电影明星”，与希格斯海的相互作用就非常的强，会有很大的质量。但研究希格斯王国不是写小说，而是做数学物理的计算和解答。希格斯正是沿着这条道路在研究电弱理论物理的数学中，发现希格斯场公式的：

$$E=M^2h^2+Ah^4$$

（1）如果把研究希格斯场公式的学问，称作“希学”。希学公式中，E 为能量密度，实际是局部宇宙总能量密度。h 为希格斯场，其实类似影响速度“阻力”的加速度、速度或重力加速度。A 为一未知的正值常数，实际是联系类似质量时空全息的度规格子或量杆。M^2 为希格斯场量子的质量平方，其实就是映射二维时空全息的度规格子的面积。M 为这种正方形格子的边长，是一种与时间分离的质量的量杆；且只在量杆的两端，有时间的信息需要时发出信号。希学纵横，联系时空度规全息的点内外翻转信息传送，英国物理学家希格斯在希学提出了一种作用力协变信息传输的希格斯格子新的质量起源模型。这里的“格子”可简化为格点，类似质点；也可以看成“质心”而无所谓质量。“质心”在点内空间，是起消除时空背景的“信息”作用，从而挖掘出牛学、爱学、薛学中的全部资源，40 多年来经受住了考验，出了不少获得诺贝尔物理学奖的成果。

那么希学和牛顿第二定律公式 F=ma 中的质量起源模型，以及和爱因斯坦相对论质能关系公式 $E=mc^2$ 中的质量起源模型，到底有什么联系和区别？它们之间是否有矛盾？现在反相反量的人士中就有说它们都错了的，这是怎么回事？

1、希格斯、牛顿和爱因斯坦之所以能被全世界主流科学家们公认为物理学大师，因为即使他们在最初写这些开创理论的论文中有什么缺陷，但由于大方向正确，才能被后来的研究者们不断完善，并经过长时间的历史和多种实验的检验后，而能形成共识的。正如中科院数学院程代展研究员说：中南大学将大三学生刘路提为研究员，刘路无疑是一个非常优秀的学生，但打死我也不相信他解决的是“世界难题”；我不是怀疑他的智力，只是没有看到关于他自学研究生课程，如拓扑学、微分流形、抽象代数、泛函分析、代数拓扑、随机过程，甚至代数几何等近代数学课程。我们也可以说，即使科

学院在国内外有过深造的人，不是怀疑他们的智力，但只要物理学中关于协变、相变、群变等方面没有形成共识研究，打死也不相信反相维相的人能解决“质量难题”。

1）中国成语有句“螳螂捕蝉，黄雀在后”的说法，这看似“残酷”，但在蝉、螳螂、黄雀之后的人类学问看来，这只是一种生态，蝉、螳螂、黄雀之间不存在谁对？谁错？把它们映射到科学领域，爱因斯坦的狭义和广义相对论，无疑是现代物理学中公认的叫得最响的一只“蝉”。电子科大赵常德先生的《物理学基础研究文集》一书，集中梳理了一批在新中国成立以来前仆后继的专家和业余科学爱好者，在辩证唯物主义的思想指导下研究相对论和量子力学，分化出的批判相对论和量子力学的主要学术成果；如黄志洵、夏衍光、马青平、杨本洛等先生的科学分析。这不能说这类成果是错误的。

但如果把这些爱科学的人比作捕“爱因斯坦蝉”的螳螂。那么相对论和量子力学中，协变性相互作用类似“排队”，它的最大秘密不在于空间（或长度）协变的排队“按时走”性，而在于时间协变的“齐步走”性。物理学中，协变、相变、群变等，已是著名科学家韦尔和里奇终生致力于的研究。彭罗斯的《皇帝新脑》等书对其有总结；他对韦尔和里奇的研究，作过一种统一的解释：

韦尔(Weyl)张量：不管平移或圆周运动，效果仍与直线距离平移运动作用一样的，即两个物体只在定域或一维路径的作用点，存在类似的潮汐或量子涨落的引力效应。韦尔曲率对应保持体积不变的形变，作用类似拉长或压扁。

里奇（Ricci）张量：不管平移或圆周运动，两个物体中当一个物体有被绕着的物体作圆周运动时，该物体整体体积有同时协变向内产生加速类似的向心力的收缩或缩并、缩约作用。即是在非定域或多维路径，存在体积减少的引力效应，对应里奇曲率。

里奇说的存在物体整体同时协变的体积减少的张量效应，能没有看到的数学推证很少，这也许是一种物理实验证明的效应，类似时间的里奇流熵效应；如我们人从出生，走向死亡，也可看成一种收缩效应。但如果人能不死亡，人口增长，成线性膨胀，就会发生类似薛定谔量子力学方程波函数的色散效应。其实，韦尔张量存在类似的潮汐或量子涨落的引力效应，也是有协变性的。

即韦尔和里奇的韦尔张量与里奇张量研究的里奇流的最终出现，类似一只“黄雀”。协变性说到底，有一种点内空间超光速现象。这就是蝉、螳螂、黄雀之间的生态驱动机制。因为关于时空的绝对性和相对性（或客观和主观）的争论，最终还是要落实在争论者之间说的“逻辑、数学、物质”等概念上。但“逻辑、数学、物质”等概念的定义都是双刃剑，因此谁都难逃自我矛盾的悖论。例如“空间”以一维的长度代换，长度以“量杆”代换，它可以和时间分离，直接进行测量。这是一种部分性，即是一种“群变”；但时间则不行。时间虽用一维并可分段，但时间是一种时间流，类似一种里奇流，是一种整体的协变，即是一种“相变”。这里可以用操练，集合排队行走的例子来类比：

2）先不说体积减少，先来看韦尔张量与里奇张量的协变特点，涉及的惯性、时间来自在哪里？因为牛学的$F=ma$公式和爱学的质能关系$E=mc^2$公式中，作用力的协变，都化简为是一方的总质点，对另一方的总质点的信息传输。这种宏观“亮孤子”思维，实践证明对计量测试是有效的。但这里协变，或协变的量子信息的隐形传输，很容易被丢掉。只因牛顿三大力学定律实际是一个整体，不可分割，类似相变；爱因斯坦的狭义和广义相对论也是一个整体，不可分割，类似相变。各自相变中的$F=ma$和$E=mc^2$公式，只是其中的一部分群变。

实际韦尔张量与里奇张量的协变化简，只能是一方的一个总质点对另一方的一批二维时空全息度规格点的信息传输，就如运动队的行军操练比赛，一个教练对三个训练小队的口哨和口头命令指挥、判定一样。这里教练为一方，运动队是另一方。这个比赛的判定是：集合排队行走，要按时集合，要齐步走，更要按时到位，再下水协同划船。但因这次训练命令没有事前具体通知何时进行，三个训练小队的队长，对其各自的队员的相同要求都是，听到集合的钟声，不管在哪里，要立即跑步到操场去排队集合。但各自又有不同，第一队的要求是，所有队员排队整齐后才开步走。第二队的要求是，到操场后不管排队整齐，只要到钟声响后 10 分钟，到时间就走。第三队的要求是，所有队员在按时到位的时间，必需排队整齐。比赛结束，早站在按时到位地址的教练判定，第三队因整齐到位，协同划船早，取胜。但第一和第二队有异议。

第一队说胜者没有齐步走；第二队说胜者没有按时走。但第三队回应说，他们也是齐步走和按时走的，不然他们怎能齐步按时到位，协同划船？奥秘是，他们按时开步走的时间提前，而齐步走要求的速度不一定整齐；但跑得慢的必须快速跟上，所以在到位时间，已排队整齐了。把这个操练集合排队行走比赛的故事，移植到有韦尔张量与里奇张量协变的希格斯场公式$E=M^2h^2+Ah^4$上来，我们如果知道M^2和 A 的数值，就能计算给定 h 场的能量密度 E。

3）但这里只先单就 h 场的能量密度 E 和 h，用作图来研究关系式的行为。

研究不管平移或圆周运动，存在协变相互作用的两方，把传递韦尔张量或里奇张量信息的一方设在原点 O，并简化为一个质点；设另一方是半径为 r 的圆球形物体，位于直角三角坐标 XYZ 中，X 坐标轴与圆球的一根半径 r 重合。从原点 O 到圆球的圆心 O_1 是一根量杆的长度 S，即 S 不用时间和速度来求长度，只需在量杆的两端有时间的信息需要时发出信号。把圆球化简为二维 XZ 平面内的圆，X 轴与圆周前后的交点分别为 A 和 B。过 O_1 作 X 轴的垂线，交圆周上下的点分别为 C 和 D。连接 OA、OB、AC、AD、BC、BD，ACBD 为内接园内的菱形放置的正方形，我们设为映射二维时空全息的度规希格斯格子，这一个大格点。

$O_1A=r$，$O_1B=r$，$O_1C=r$，$O_1D=r$；$OO_1=S$；$AB=2r$，$CD=2r$；

$OA=S-r$，$OD=S+r$，所以 OD 比 OA 远。如果协变信息传递的速度在 XZ 平面内恒为光速 c，那么用在 OA 长度上传递的时间 t_1 完成 OD 长度的传递任务，一定要超光速。这与光源无关。如果把协变信息传递的时间，定为光速在 OA 或 OB 长度上传递的时间 t_2 完成 OD 长度的传递任务，那么在三角形△BCD 内除开以 O 为圆心，以 OA 或 OB 之长为半径画圆弧切开的点外，其余剩下的所有的点，协变信息传递全部需要超光速才能完成任务。这条圆弧线与三角形△ACD 包围之内的所有的点，协变信息传递全部可以在光速或亚光速的条件下完成。

2、反相或维相的“螳螂或蝉”各自都高兴得太早，只因把牛顿的三大力学定律的相变整体或爱因斯坦的狭义和广义相对论的相变整体割裂开来了；把其部分群变作为整体相变的错误来鞭笞，以为找到了真理，哪知“黄雀在后”。当然只怪牛顿和爱因斯坦两位世界级天才，是把协变的点内空间量子隐形传输信息的作用，舍弃了的；而从实际出发，把宏观的“亮孤子”物质作为主要的考虑对象，就变得简单得多，也合符他们那个时代对物理学的认识和要求。

1）即使我们今天从希格斯海的角度来考虑协变的点内空间量子隐形传输信息的作用，也相当繁杂。例如，把二维 XZ 平面内的圆 O_1 化圆为方，作为“质量”M 看待，等于菱形放置的那个内接园内的正方形 ACBD，再把二维 XZ 平面转到与 X 轴垂直的二维 YZ 平面平行的系列平面。设正方形 ACBD 的面积为 M^2。圆球物体从原点 O 到 O_1 的移动，距离是一量杆长度 S，那么起协变作用的希格斯海的体积是 M^2S，这类似相互作用做功一样。其直观是从牛顿力学的机械能来看，这时移动的物体不再设为圆球形或圆形，而也是简化为一个质点。

设协变量子隐形传输的各格点“质心”信息，分头沿着 X 轴作水平匀速直线运动或匀加速直线运动，在时间 $t-t_0$ 内的位移为 $x-x_0$，速度 v 的定义是 $v=(x-x_0)/(t-t_0)$，可简化为 $x=vt$。从近代物理牛顿第二定律得：

$$F=ma$$

（2）F=ma 的伟大，是第一次提出了格点“质心”外在质量的可计量性；这虽不是回答质量的起源，但它提供了一种确切的质量的生态。这里出现的加速度 a 概念很重要。匀加速直线运动 $a=(v-v_0)/(t-t_0)$，可简化 $v=v_0+at$；$x=v_0t+at^2/2$。以上式子合并，$v^2=v_0^2+2ax=v_0^2+2as$。s 为位移，由（2）式得 $a=F/m$。以上式子合并即为动能 $Fs=mv^2/2-mv_0^2/2$。如果物体运动的方向和受力方向一致，功等于力乘以位移 w=Fs。重力位移决定于重力的功，在水平匀速直线运动的惯性系滑动，拉力或摩擦力和重力相等 F=p，而重力 p=mg，g 是重力加速度；机械能守恒及动能守恒和转移定律有，$mv^2/2+mgs=mv_0^2/2+mgs_0$。平动物体的动能可简化为 $E=mv^2/2$ 和 $E=mg\ s$。而爱因斯坦的相对论，已推导出来了另一种重要的质心外在质量与能量的相互联系：

$$E=mc^2 \qquad (3)$$

式中 c 为光速。爱因斯坦的质能关系式（3）使质量起源的问题复杂化了。

2）因为我们的宇宙时空中，不管量子、原子、能量、质量、力、加速度，其中速度是距离除以时间，加速度是速度除以时间。距离和时间都可以用尺子和钟表直接测量。牛顿第二定律，力是质量乘以加速度，重量是质量乘以重力加速度。由于重量可用秤直接测量，所以通过已经计算出的加速度，求出质量，由此求出力、能量、动量、功率，等等。澜源容杯，不能离开牛顿第二定律的加速度，在初、高中的物理中，都可以用初等数学的方法来演算。但到大学的物理，仍是这些概念和定律，却是可运用微积分，作数学的分析和演算，深度和广度眼界就更宽阔。而我们又知，希格斯海通过施加“阻力”而速度减少，来构成基本粒子的各种质量；光子粒子可以完全不受影响，穿行在希格斯海中，而全无质量；且光速类似匀速运动，处处相等，即带有惯性色彩。

于是爱因斯坦和牛顿，打起了时空相对和绝对的“架”；今天的弦论和圈论，打起了时空有背景与无背景的“架”；也引发了我国以夏衍光为代表的反相派的广义时空相对论认为，空间没有几何性质，无论空间是平坦的还是弯曲的，都是乱说。怎样来看待这场争论？也许牛顿早有准备，因为牛顿第二定律是与第一定律的惯性系和第三定律的作用力与反作用力必须联系。即使在水平匀速直线运动的惯性系滑动，拉力或摩擦力和重力也必须相等 $F=p$，$p=mg$。其中 g 是重力加速度，也就预示着

光子不管静止或运动时有与无质量，它都有类似的“重力加速度”的神秘信息在支配，即这与起消除时空背景的“信息”作用的希格斯“格子”、格点的“质心”相关，不然光子的光速怎不消耗能量？而它的能量又从何加添？这使光子、光速的身份区别于维相和反相的认识。

3）空间为什么只有三维？时间从何而来？爱因斯坦也不比牛顿差，他也留有几手。一是空间的平坦与弯曲来源于他的度规格子；二是质能关系式中的光速平方如果开方，光速是负数，就分点内和点外两处空间。点内空间处处存在，例如技术储存于大脑，储存于书本，储存于计算机，储存于光盘、磁带等等；这种大脑、书本、计算机、光盘、磁带等等，就类似“点内空间”。利用这种“点内空间”，消失的技术物品可以重新复制出来，这就是“信息”在抹杀爱因斯坦和牛顿的时空相对和绝对的争论，弦论和圈论的时空背景有与无的争论，反相和维相的时空有与无几何性质的争论。因为希格斯这只“黄雀”的希格斯海，把时空的相对和绝对、时空背景的有与无，时空几何性质的有与无，完全统一到可想象的二维希格斯海切片薄面的正方形的格子的三 D 印刷技术上了。

空间之所以有量子性，正是由这些格子分割成格点的。而时间之所以有量子性，正是由这些格子像空心圆球不撕破和不跳跃粘贴，能把内表面翻转成外表面，时间信息的连续也要被这种内外翻转的三旋概率性所分割。2006 年我们发表的《宇宙开端之前无时间新解----质量超弦时间之箭初探》论文，证明霍金的《宇宙起源》报告用类比在南极的南边没有任何东西，说明在宇宙开端之前发生了甚么----没有意义的这个证明不漂亮，也不完备。因为其“地球证明”用的地球，是一个对称图形。对称破坏时间箭头，除热力学外，牛顿力学、相对论力学、量子力学中的时间箭头都是对称的，而且超弦理论也不能避免。所以彭罗斯说，如果有一种量子引力理论，能把相对论力学和量子力学统一起来，但时间箭头仍没有解决好，也不算成功。庞加莱猜想的完全证明提醒我们，出路正是在庞加莱猜想及庞加莱猜想熵上。

3、二维希格斯海切片薄面近乎一个平面，它之外，空间还只有一维，没有时间之箭的坐标，也没有虚数描述的坐标。近代科学以来物理坐标、数学坐标，其上时间轴线、虚数轴线，都是从格点的点内空间，把它们拉出来作的想象。这种权宜之计如果反相和维相的人把它们当成三维空间之真，这是受了蒙蔽。

时间之所以能回到过去，是因为我们人能回到大脑、书本、计算机、光盘、磁带等之类似的“点内空间”去回忆、翻阅、提取。翻书，也可以近似看成三旋中的一种“体旋”。里面的时间都不是点外三维空间希格斯海切片的时间。

1）之所以二维时空全息度规格子无所谓平坦、弯曲或几何性质，以及相对和绝对、时空背景的有与无，是因为它的物质表达类似 3D 打印技术。我们可以想象格子类似格点、“质心”，这像是个仓库。仓库东西的有与无，可映射时空的弯曲或平坦。东西的颜色、质料、质地等等，可以映射需要虚拟的一切实际东西的物理及化学性质。众所周知，3D 打印技术也称三维打印技术、三维印刷-3DP 工艺、三维喷涂粘接成型机、喷墨式三维打印、添加制造仪器等名称。它可对应希格斯海虚拟的希格斯海度规，拥有的希格斯格子功能相似的秘密。

二维希格斯海切片薄面有类似普通 3D 及打印机的工作原理：3D 打印技术是利用光固化和纸层叠等技术的快速成型装置，打印机内装有液体或粉末等“印材料”，与电脑连接后，通过电脑控制把“打印材料”一层层叠加起来，最终把计算机上的蓝图变成实物。人们只需要从电脑上下载设计好的 3D 图传输到机器中，然后这台机器就可以把一缕缕塑料材料加热到 200 摄氏度拍摄到机器内的平台上，一层层地制造商品，多余的塑料会通过一种化学洗剂被清洗出去。而且像“添加制造仪器”的 3D 打印机，是一种电子束无模制造器(EBF3)，制造过程中使用一种电子束，双线连接计算机系统，就可以让太空探索者随时、随地，依据意愿制造物品。这种类似量子隐形传输的 EBF3 作用有点儿像远程机械商店，拥有它，将不需要发送工具和太空飞船部件；而且避开引力，这种 3D 打印物品的紧密容限度将成为零重力环境下至关重要的因素。其次 3DP 分为三维喷涂粘接成型机和喷墨式三维打印。三维喷涂粘接原理采用粉末材料成形，如陶瓷粉末，金属粉末，所不同的是材料粉末不是通过烧结连接起来的，而是通过喷头用粘接剂(如硅胶)将零件的截面“印刷”在材料粉末上面。等等。

2）三维打印技术是上世纪 90 年代开始逐渐兴起的一项先进制造技术，所以知道的人不多。但“希学”纵横，希格斯场公式 $E=M^2h^2+Ah^4$ 把物质、能量、信息不但统一了起来，落实到信息或全息上，而且希格斯 3D 打印技术是很容易让人们想象韦尔和里奇的韦尔张量与里奇张量研究的协变效应。物质运动和相互作用力的协变效应普遍存在，却不是近代纯自然科学的经典力学的相变中的一个群变部分能描述的，例如涡旋或涡流、湍流就存在协变效应，但所有主流的涡旋或涡流、湍流的数学方程描述，因为不能像笛卡尔的三角坐标一样去分解自旋，所以至今并没有突破对涡旋或涡流、湍流的细微整体认识。

有人说：“**科学是关于蕴藏在客观世界之中的客观规律的描述，**科学精神的实质是创造性思维，**这种描述具有真理性，而不具有民族性和国家性。**可这些精神层面的讨论都是很虚幻的，过分强调这些精神其极端是唯心主义”。

但中华民族历史传统的科技积累澜源容杯，对接世界科学澜源容杯行吗？

我们认为，科学与人学纠缠，兴趣与本身历史纠缠，**科学真理具有的普适性与特殊性和特色性仍然是统一的。不懂得**韦尔张量与里奇张量研究的协变效应，就不懂得这种统一性。李后强教授把他们的《非线性人口学导论》一书送我们的时候，正是我们研究发表《物质族基本粒子质量谱计算公式》论文的时候。把“人学”聚焦到“人口学”，把人口的数理对应物质族基本粒子的质量，再映射物质运动和相互作用力的协变效应普遍存在，将是怎么一回事呢？

该书说，人口、生产率、福利和社会组织之间的相互关系，随着群体人口的增加，经济活动的规划、协调和控制变得日益困难。一个社会是由许多群体（部落、种族、生产单位、国家等）构成，而每个群体又由一定数目的家庭组成。每一对夫妻为社会提供一个劳动力，或作为劳动者的一部分；夫妻当中的另外一个劳动力则用于家庭生产和孩子的哺养等。这个群体拥有一种技术，这种技术依赖于一种对有效的生产是必需的管理和行政的基础结构。在这样的体制下，必须区分两种截然不同的投入：行政的或管理的力量 M 和劳动力 L。如果群体的夫妻的对数规模是 x，那么

$$x=M+L \quad (4)$$

这里 M 表示群体所需要的管理人员，L 表示直接从事生产活动的人员，那么方程式（4）提出了管理（M）是生产力或劳动力的问题。管理是一种协同组织的“社会契约”，英国著名唯物主义思想家霍布士甚至把国家的起源也说成“契约”的结果。即在原始群落内，个体偏好的适当限制下，以多数规则“契约”应用于一个广泛的群体决策。霍布士研讨人类为何不能像蚂蚁和蜜蜂那样协作的问题。他说，同蜂房内的蜜蜂不竞争；它们没有求荣欲；它们的协和是天然的协和，但是人类的协和只能是凭依盟约的人为协和。把这一点引申到韦尔和里奇的韦尔张量与里奇张量研究的物理协变，正对应管理（M）效应，而且是一种天然的协和。而牛学方程 $F=ma$ 和爱学方程 $E=mc^2$ 对应探讨的仅类似直接从事生产活动的人员，以此来看希格斯场公式 $E=M^2h^2+Ah^4$ 则涵盖了协变的隐形量子传输的“管理”内容，并把它衍变成希格斯场生产力“人口”公式：

$$E=M^2h^2+Ah^4=(x)=(L)+(M) \quad (5)$$

3）这又到底是怎么回事？一般说来相对直接从事生产劳动的生产力，“管理”是储藏在大脑中的“生产力”。对应 3D 打印机，直接从事生产活动的人员 L 类似三维打印喷墨或喷涂采用的颜色粉墨、陶瓷、塑料或金属粉末等“印刷”材料，而 M 表示群体所需要的管理人员类似储存计算机系统里的设计，由于它是一种“信息”，可避开重力，甚至可以远程无机械作无线传输发报，所以我们说它在“点内空间”，是希格斯海虚拟的相似“质心”功能的希格斯格子，它的一张张切片薄面，一层层叠加起来，就衍变成了我们宇宙时空的万事万物。那么我们重新来理顺希格斯场公式 $E=M^2h^2+Ah^4$，这不是做 $F=ma$ 和 $E=mc^2$ 等经典力学的计算，而是作希格斯海相变全息的格点分析。

众所周知，组成物质的基本粒子都有正和反粒子，如人类家庭组成的每一对夫妻现象。而不管平移或圆周运动的物体，我们暂假设两个相互作用的格点之间的距离是量杆长 S，与时间暂时无关，所以两者位移作功 $w=Fs=E$，把两者量杆长 S 消去，先研究 $E=F=ma$，在希格斯海中，希格斯海通过施加的“阻力”和位移物体本身的抗力 ma，适用牛顿力学作用力与反作用力相等的第三定律，那么构成希格斯海矩阵世界出动的“人口”直接从事生产活动的人员(L)，应是（ma）的平方，即 $(L)=F^2=m^2a^2$。如果我们把它对应 $E=M^2h^2+Ah^4$ 式子右边的第一项，并把 m^2 对应 M^2，可知物体的经典 m 变成了希格斯海的兑换质量 M。

反之，把 $E=M^2h^2+Ah^4$ 式子右边的第二项对应群体所需要的管理人员（M），其实由于协变“管理”是智力，是在类似计算机的“点内空间”，它不是简单的如人类社会工厂、企业、国家行政一类的管理人数，比直接从事生产活动的人员少，而且两者都必需是“活人”。但管理“智力”属于的知识创造，涉及方方面面，涉及历史积累，它是不分活人和死人，就很难说清具体的人数，因此我们设领域越大，“管理人数”越多，成平方倍增关系；取 $(L)=F^2=m^2a^2$ 的平方，以作第二项的近似，那么 $(M)=(L)^2=(F^2)^2=(m^2a^2)^2=m^4a^4=Ah^4$。

把上面两部分综合起来，为什么 $E=M^2h^2+Ah^4$ 式子右边的第一项和第二项都含有希格斯场 h，在 $(L)=F^2=m^2a^2$ 中 h^2 对应 a^2，这与在 $(M)=(m^2a^2)^2=m^4a^4=Ah^4$ 中 h^4 对应 a^4 是一致的，即类似影响速度的“阻力”类似的加速度 a 或重力加速度 g，说明希格斯场方程有一定的可信度。其次，在 $E=M^2h^2+Ah^4$ 式子右边的第一项中，物体的经典质量 m 变成了希格斯海的兑换质量 M。但在 $E=M^2h^2+Ah^4$ 式子右边的第二项中除开 h，$(M)=(m^2a^2)^2=m^4a^4=Ah^4$，然 A 被设为一未知的正值常数，而不说它等于 m^4，即含有物体的经典质量 m 及希格斯海的兑换质量 M，正是考

虑到希格斯场协变“管理”映射的二维时空全息的度规格子或量杆，这只能是正值。它反映的宇宙时空物质的亮孤子解，影响着亮孤子在出生前后的形象，对应人口经济发展模型 x＝M＋L 中的生成临界点和群体扩张的社会空间。

二、小林-益川扩容质量公式生态之谜

国内反相反量的物理学家梅晓春教授等认为希格斯场不存在，留美物理学家王令隽教授等认为里奇张量的协变效应仅是一种计算技巧，不存在物理内容。那么英国物理学家希格斯是怎样想出希格斯场公式的？它的正值常数 A 如何像生成临界点和群体扩张的社会空间？

1、我们来看 $E=M^2h^2+Ah^4$ 到底是怎样一个图像？得到什么样一些信息？

1）将 E 作竖轴，h 作横轴的平面坐标图，看看当 h 由 0 开始增加时，E 作何反应？首先当 h＝0 时，方程式右边的两项皆为 0，因此 E＝0。当 h 很小时，只要 M^2 与 A 皆为正值，E 亦为正值，因此 E 随着 h 的增加而增加，这个坐标图类似的倒置抛物线对称，说明这是一个非线性数学公式，但这不是 A 的全部。

2）但 $E=M^2h^2+Ah^4$ 中 M^2 之所以为 M^2，不为 B，是因为它通常被视为希格斯场量子即“希格斯玻色子”的质量平方。因此按 M^2 应该为正值，E 应表现为上图的倒置抛物线对称，然而希格斯玻色子是希格斯格子且存在“质心”的点内空间，即如果质量平方 M^2 为负值，希格斯场的平面坐标图如何表现呢？

首先当 h＝0 时，E＝0。当 h 不为 0 时，由于假设 M^2 为负值，希格斯方程式右边第一项永远是负值，而第二项则恒正。当 h 很小时，E 会小于 0。例如，如果 A 与 M^2 数值大小相近，则当 h＝0.1 时，h 的平方 h^2＝0.01，而 h 的 4 次方 h^4＝0.0001。如果 A 比 M^2 大许多，则 E 在 h 更小时为负。但随着 h 渐渐变大，希格斯方程式右边的第二项变得愈来愈重要，最后使 E 大于 0，坐标图表现为倒置抛物线对称的底部，又出现有一个小小隆起的抛物线的类似“山”字形的光滑曲线的对称。我们能知 E 的正确图示吗？例如它的两边凹得有多深？或在哪里变为 0 等等，这正是高能领域的点内空间和虚数点内空间所具有的特色。

3）也正是这个高能领域的点内空间和虚数点内空间所具有特色的坐标图，表现为倒置抛物线对称的底部，又出现有一个小小隆起的抛物线的类似“山”字形的光滑曲线的对称图示，与成都电子科技大学赵常德先生的《物理学基础研究文集》一书研究的非线性量子力学自由粒子所满足的非线性薛定谔方程的亮孤子解图示的相似，揭示了量子希格斯海的一些秘密。

非线性量子力学实为非线性薛定谔方程，赵常德的同事庞小峰教授，是电子科技大学高能电子学研究所的所长，他的《非线性量子力学》一书有清晰论述。庞小峰为扳倒薛定谔的量子线性方程，就另起炉灶，使之具有孤子解。庞小峰说，线性量子力学仅在非线性作用等于 0 的特殊情况下才正确，而真实的物理系统或多或少都存在非线性相互作用。非线性相互作用产生的根源和机理，首先是粒子间固有的相互作用和自相互作用的机理。其次是介质的非线性效应产生的自聚焦机理。三是粒子和背景场相互作用的自陷机理。

庞小峰说，线性波在很多媒介中都有色散特性。色散的本质是波包的振幅随传播距离的增加而衰减，使波动或微观粒子衰减和坍塌。庞小峰的非线性量子力学方程是除存在有色散动能项外，还存在非相互作用，它能抑制和抵消色散的衰减效应，从而使微观粒子变成一个稳定的和局域的孤子，而具有明显的粒子性。这恰恰包含一种协变效应，按“非线性人口学”是一种“行政的或管理的力量”。因为在庞小峰的平面波的海水水波运动观察阐述中的这种非线性作用造成的倒塌现象，可使波的色散效应受到抑制；两者的叠加可使波变成具有一个稳定的孤立波。这些结果是不以人的意志为转移的客观规律，因为从非线性薛定谔方程可知，此时的有效势是一个双阱势，它提供了两个基，可通过自相互作用力、自聚集、自聚焦及自陷等机制，使波局域为一个孤子而处于稳定状态。赵常德的自由粒子非线性薛定谔方程的亮孤子解说的也是这种图示。

4）赵常德证明的是，自由粒子可处在非线性图示中的倒置抛物线对称的底部又出现的有一个小小隆起的抛物线的类似“山”字形的光滑曲线的对称的两边凹深能量最低的状态。赵常德说：“自由粒子的有效势能将在这两个基态之间反复回荡，从而使自由粒子的能量不再弥散，实现了孤粒子能量处于最低且稳定的状态。这种状态在凝聚态物理中称为发生了二级相变。结果使线性粒子变成非线性的孤粒子”。赵常德实际说的是，任何自由粒子都跟着有类似高能领域的点内空间和虚数点内空间，就像人类有死亡一样；宏观就是亮孤子。

如果人不会死亡，那么人口学一定线性的。因为不管自然灾害、食物缺乏、人祸、车祸、矿难、战争与瘟疫等等，人都不会死亡，夫妻会生育，人口一定会增长，不会减少，就像庞小峰说线性波很有色散特性一样。但光研究活人社会，也没有错。然中华民族很早就认识到“阴阳表里”这两个基态之间的反复回荡，而且中医八纲辨证运用“阴阳表里寒热虚实”于人体看病论治达到了炉火纯青的地步。所以说中华民族对此已有至今 5000 多年的准

备，起源于远古中华民族的现代中医，与现代非量子力学、现代希格斯场公式有同工异曲之妙；当然中医始终还处在朴素辩证唯物的认识水平，没有到达数理化见长的程度。

2、但中华民族的进化并不是只这种单行道，准备到至今 50 年前，类似起源于远古中华民族中医的现代非线性量子力学，已发展出了类圈体三旋和点内空间理论；准备到至今 5 年多前，三旋与点内空间融合对庞加莱猜想外定理的空心圆球内外表面翻转熵流的证明，已点燃起第三次超弦理论的革命。现在来考察 1964 年提出希格斯场公式 $E=M^2h^2+Ah^4$ 的英国爱丁堡大学物理学家彼得•希格斯，如何从希格斯场度规格子想到“点内空间”的呢？

1）因为时空场“度规格子”从黎曼张量几何到爱因斯坦的广义相对论早已创立，度规格子用来代表任何需要的什么量子、空间子、时间子、质点、以太、太极子、炁子、旋子、细胞、原子、分子、部分子、瞬子、轴子、弦子等粒子名称的东西，都行，但从黎曼、爱因斯坦到里奇都还没有想到度规格子的破裂和有表、里。里奇张量想到协变效应可以使“格子”整体一齐变化；爱因斯坦的相对论甚至想到“格子”可以分别有尺缩、钟慢和弯曲，但都与“管理”在“点内空间”无关。第一个想到“点内空间”的，是 1918 年的青年科学家韦尔，他研究数学连续的微分和积分计算，首先提出“不可积因子”概念，建立的规范场理论才渐渐明确起来，这是一种难言的数学“自手术”现象发现。

2）而一旦度规场或规范场的“格子”缩影为格点或质点，又类似中医八纲的有“阴阳、表里、寒热、虚实”等对称的点内和点外之分，那么“格子”破裂或有表里内外面翻转熵流的涌现，“格子”自然就变成真正的类圈体。如果希格斯玻色子是“标准模型”预言的那种自旋为零的玻色子，也就并不奇怪。因为标准模型类圈体自旋分面旋、体旋、线旋三大类，和有理想自旋组合 62 种动态，这本身一开始就没有计算自旋为零的玻色子。

其次，类圈体标准模型自旋的排列组合编码，除开理想组合的 62 种动态外，还有冗余码，这正是暗物质和暗能量的编码。所以“标准模型”预言了 62 种基本粒子的存在，以及有暗物质和暗能量的存在，在类似起源于远古中华民族中医的现代非量子力学、现代希学看来，就没有什么不可理解。物理大师希格斯精通广义相对论和黎曼张量几何，也就精通度规格子。但希格斯不是从爱因斯坦出发，而是遵从韦尔的规范场“不可积因子”点内空间作用产生质心，假设希格斯玻色子是物质的质量之源，其他粒子在希格斯玻色子构成的“海洋”中游弋，受其作用最终才有了质量。这类似“空穴”灵感的背后，不难看出希格斯场公式 $E=M^2h^2+Ah^4$ 与狄拉克相对论性电子方程（6）相似，即共有生态支撑：

$$E^2=p^2c^2+m^2c^4 \quad (6)$$

3）上式（6）中，E 是粒子的能量，p 是它的动量，m 是质量，c 是光速。众所周知，狄拉克不但预言了正电子的存在，而且也提供了一个类似我们称的“点内空间”的具象。因为按照电荷守恒定律和能量守恒定律的要求，这里负能状态的空穴应该表现为一个带电荷为+e 的粒子，即这个粒子的运动行为是一个带正电荷的“电子”，即正电子。然而狄拉克方程又来源于薛定谔方程。以 V 表示动能，K 表示势能，薛定谔方程则来源于经典力学方程：

$$E=K+V \quad (7)$$

即总能量＝动能+势能。这与生产力“人口”公式（4）和（5）有类似。在能量守恒公式中，动量＝质量×速度，以 υ 表示速度，p＝m× υ =m υ 。根据牛顿定理有：$K=p^2/(2m)$，代入（7）式即是 $E=p^2/(2m)+V$。此式表达的是总能量、动量和势能之间的关系，这与电子和薛定谔方程的联系是什么呢？电子带有负电，会被正电荷吸引。在这种情况下，相关的势能不是由引力引起的，而是由电势能引起，像 $E=p^2/(2m)+V$ 一样，只是这时的 $E=p^2/(2m)+V$ 式的 V 是电势能。薛定谔正是根据这个方程，利用德布罗意的动量与波长的关系，猜出量子物体在势能中运动的波动方程：

$$E\psi=-(\hbar^2/2m)(d^2\psi/dx^2)+V \quad (8)$$

（8）式中 ψ 是几率幅，表示一种约定；m 是粒子的质量，ħ是普朗克常数除以 2π。以上方程单从遵守质量守恒定律来说，都是线性的，即物质从一种形式转换为另一种形式，反应前后各自的质量是可以叠加，并且是相等的。但希格斯场方程（1）不一定是线性的。希格斯能猜想到他的方程质量发生破缺的“超对称”的关键，是因为相对论性狄拉克方程方程 $E^2=p^2c^2+m^2c^4$ 引出的对称和超对称图像，早在提示其中质量 m 为平方，会引出的负质量和虚数质量；光速 c 分别为平方和四次方，也会引出的负实数和虚数。

3、1996 年我们发表了《物质族基本粒子质量谱计算公式》：

$$M=Gtgn\theta+H \quad (9\text{-}1)$$

$$m_{上}=BH\cos\theta/(\cos\theta+1) \quad (9\text{-}2)$$

$$m_{下}=B-m_{上}(或\ B=m_{上}+m_{下}) \quad (9\text{-}3)$$

$$B=K-Q(或\ K=Q+B) \quad (9\text{-}4)$$

在物质族基本粒子质量谱计算这组公式中，主要的是（9-1）式，M 可分别计算夸克 K 和轻子 Q

的质量。包括（9-2）式，才涉及类似精细结构常数的 14 个自由参数。那么物质族基本粒子质量谱计算公式和希格斯场公式（1）能不能相通？怎样相通？物质族基本粒子质量谱计算公式是怎样推导来的？一直以来是个秘密，追问的人很多，但希格斯粒子实验没眉目很难回答；现予以说明。

1）希格斯场公式的基础是希格斯海“度规格子”，物质族基本粒子质量谱计算公式的基础是“船闸”模型。希格斯海“度规格子”，和类似长江三峡大坝的“船闸格子”或巴拿马运河的“船闸格子”是可以相通的。但描述分割希格斯海的“度规格子”的薄片，已不能简单看成是一张平面。由于它的每个“格子”或格点有类似中医八纲“阴阳、表里、寒热、虚实”式的点内空间性，“格子”相通“船闸”类似仓库，类似矿井，那么这些横摆的“船闸”或竖摆的“矿井”里，也有会被分割成的段落或格子。也许就像中国式的宝塔一样，是棱锥梯台或圆锥梯台；而这正是计算公式摆布基本粒子质量谱图示的特色。

2）物质族基本粒子质量谱计算公式能够具体计算出夸克 K、轻子 Q 和规范玻色子 B 的质量，但希格斯场公式还只能作质量来源的定性分析，这是它们的区别。或者说前者是后者的补充，后者是前者的开路先锋。例如“希格斯机制”假设的希格斯玻色子为弱力与电磁力的统一，以及为除引力外的另外三种力的相互作用统一于“标准模型”之下，构筑了基础。但在标准模型，存在 28 个基本常量。这是一个非常大的数字。因为基本常量是一个出现在自然定律中而且无法被计算的量，只能通过实验来测定。所以一直有不少人试图减少基本常量的数目，但迄今为止没有取得任何成功。物质族基本粒子质量谱计算公式就是为减少基本常量的数目而作的一种探索，因为 28 个基本常量中包括有电子、u 夸克和 d 夸克等稳定粒子的质量，和不稳定粒子由 w 和 z 玻色子，μ 和 τ 轻子、3 个中微子，4 个重夸克 s、c、b、t 等的质量以及携带的类似精细结构常数的自由参数、混合角和相位参量等，要给出。

但物质族基本粒子质量谱计算公式（9-1）、（9-2）运用“船闸”模型落差顺次模数、顺次基角、顺次参数等 14 个主要新参量来计算总共 61 种的夸克、轻子和规范玻色子的质量，虽然它们需要实验测量或设定，但这 14 个新参量的数目比 28 个基本常量中包括的稳定与不稳定夸克、轻子和规范玻色子的质量以及它们携带带的类似精细结构常数的自由参数、混合角和相位参量等的总数目少点，也就减少了 28 这个数字的总量。所以它是希格斯场公式的细化和补充。

3）为什么我们能计算出夸克 K、轻子 Q 和规范玻色子 B 的质量？根据了希格斯场“度规格子”什么样的分布？使用了什么思路？物质族基本粒子质量谱计算公式可以和门捷列夫的化学元素周期表媲美，是因为前者可以根据已实验测定的一些夸克、轻子和规范玻色子的质量数据，反推出那 14 个自由参数；这实际也就是对那 14 个自由参数的实验测定。而知道这 14 个自由参数，也就可计算知道除希格斯粒子外的所有 61 种物质族基本粒子的质量，这是实验能验证的。这种质量谱分布规律，正如 1869 年俄国门捷列夫在编制化学元素周期表之前，因已知 63 种元素原子的测定质量，就能在前人工作的基础上，得出元素原子量的大小有周期性的依赖规律一样。

A、两者不同的，前者是定量，后者是定性。即门捷列夫只分析了所有类元素的简单性质及其化合物的性质形式和性质。这也了不起。例如现在是 118 种元素，所以他当时不但能正确地留下很多空格，应由尚未发现的元素来填满；而且他能还正确地指出了当时测定某些元素的相对原子质量数值有错误，若干年后也都得到证实。正是有他的基础，1913 年英国物理学家莫塞莱在研究各种元素的伦琴射线波长与原子序数的关系，才推进了周期律的基础，不是原子量而是原子序数的认识，即原子序数等于核内阳电荷数。

B、1996 年发表的《物质族基本粒子质量谱计算公式》，虽是定量的计算公式，不是日本小林诚和益川敏英基于卡比博的一次“分代”思想，提出在强相互作用中存在三次“分代”的思想，但因有这种定性“周期”才让我们能扩容。其次，我们也要特别感谢川大物理系李后强教授的鼎力支持和推荐，《物质族基本粒子质量谱计算公式》论文 1996 年才得以发表。

C、如“小林-益川理论”认为如果质量是起源宇宙大爆炸，那么夸克的反应衰变速率不同，由此预言存在 6 种夸克；1995 年 6 种夸克都被发现证实。所以在 1996 年前我们也已经知道大部分夸克、轻子和规范玻色子的实验测定质量。我们坚持根据“小林-益川理论”研究物质族基本粒子质量谱进行分族，排出各种不同的一张张基本粒子质量谱“船闸”分类表。基本粒子质量谱计算公式是一种不同于“小林-益川理论”的三代分类表。具体说到物质族基本粒子质量谱计算的主要公式 $M=Gtgn\theta+H$，主要有三个自变量是模数 G、基角 θ 和参数 H，如何选择？我们在大学读书时是机械专业的，对《材料力学》曾下过功夫。把“小林-益川的三分表”按粒子质量大小排序作成图像，都像材料拉伸断裂应力图的曲线。这不像正弦或余弦的波形曲线，而像正切或余切的断裂曲线。

D、从材料纯剪切应力状态的研究知道，在纯剪切应力状态下的单元体内，与前后两平面垂直的任一斜面上的应力，其正应力和剪应力的计算公式要涉及三角函数和基角 θ。在芝诺坐标系中，物质与真空，思维与存在，作成平面坐标图，自然界、宇宙、相对论真空等一切的正物质，只占 360^0 坐标图的 1/4，即第一象限的 90^0。物质族基本粒子质量谱计算公式主要针对的是正物质，所以公式涉及夸克、轻子和规范玻色子的三角函数的基角，只能在第一象限来近似三等分 90^0。这类道理，也许可借鉴《非线性人口学导论》书中城市增长形态与土地开发研究等学者的思路来阐明。

4）例如，帕雷托分布的典型的随机模型，针对城镇人口的分布模式以及描述实际生活中一些不平等分配现象，就假设对每一个资源占有者来说，获得稀有资源的概率是相等的。但接着帕雷托分布模型又强调，资源是有限的；资源的占有者对资源的掠夺或占有是有先后顺序的。因此，掠夺资源的机会并不均等，而是有极大的不平等性。例如早期殖民主义者在非洲，先到达的都比后到达的所获得资源多。早期的土地占有者所拥有的土地面积并不是基本相等的，土地分配的不均衡性在一开始就存在，而不是由于以后的土地再划分而产生的。

A、这可以在几何上进行模拟，也可以形象化来解读希格斯海度规格子，对夸克、轻子和规范玻色子的质量描述。因为帕雷托分布模型很容易转换为受限扩散凝聚模型(DLA)和电介质击穿模型(DBM)，而且 DLA 和 DBM 也是用格子点阵在描述。但 DLA 和 DBM 是从城市土地利用与开发的视角，研究城市演化动力学过程的表现特征、基本模型的不同变换。而我们的借鉴，是用来研究物质的起源。虽然在受限扩散凝聚模型中，随机行走在的方形点阵的格子，很容易形象化夸克、轻子和规范玻色子等粒子，是希格斯海度规格子的受限扩散凝聚产生的。但电介质击穿模型也许较之受限扩散凝聚模型更为优越，它可以针对基本粒子质量谱计算公式如质量是起源宇宙大爆炸、夸克的反应衰变速率不同等，来解读除 θ 外的另两个主要自变量，即落差顺次模数 G 和落差顺次参数 H。

B、因为模数 G 在 M=Gtgnθ+H 公式中，类似决定质量圆或质量轨道圆的大小。如果把大大小小的城镇及其土地边界，比喻为夸克、轻子和规范玻色子等粒子凝聚集团增长及边界条件，受限扩散凝聚模型认为在凝聚集团的边缘与小方格的分界处，当“质心微粒”作随机行走的方形点阵上，一旦某格点被随机行走的质心微粒占据了，则其它所有的质心微粒都不可能再占据该格点。即在远离种子质心微粒的质心微粒释放点，质心微粒到达的概率为 1，正类似接近量子质量圆或质量轨道圆。这里如果把质量是起源宇宙大爆炸变换简化为相关的“电介质击穿模型(DBM)”，就近乎空心圆球内外表面翻转的“手术”，也容易等价对比理解希格斯场“受限扩散凝聚模型”（DLA）。

C、因为电介质击穿模型(DBM)图像有一个类似圆形边界的电势场，反过来把 DLA 模型的概率场理解为电势场，DLA 模型的中心种子质心微粒的位置就变为电场中放电点，在该点电势等于 0。电介质击穿向着电场中电势最高的方向，在电势最高处电势等于 1，这正是在电势场圆形的边界处，而这个电势场圆形的半径长正对应模数 G 决定质量圆或质量轨道圆的大小。在 DLA 中，是把与已经形成的放电模型相邻的格点，称为“候选格点”。任何“候选格点”将形成另一个放电点的概率，通过解拉普拉斯方程便可解解 DBM 模型。当然同样需要满足边界条件，即在树枝状的电介质击穿模型和电场的交界处电势等于 0；而在距离 r 处，即电势场圆形边界半径电势最高处，电势等于 1。

D、这里，圆形边界半径是距离临界值，等价于 M=Gtgnθ+H 公式中的落差顺次模数 G,圆心是中心放电点坐标代表。如果 M=Gtgnθ+H 公式中的顺次参数 H 是由放电概率来控制的，则意味着有不同的放电形态。在定义了电势后，在放电模型和电场的分界处的增长概率，也可表达等价为质量圆或质量轨道圆顺次参数 H。这类似行星原子模型中，电子绕核运行有不同的层级距离和量子能级一样。有人把 DLA 模型和 DBM 模型与真实的城市区域的扩散过程进行比较，在 DBM 中的电势在城市扩散模型中变成了反映在某地点的邻近可获得空间的函数。和电介质击穿模型穿向着电势最高处的方向放电一样，城市的发展也是通过找到与已形成的城市区域相邻，且具有最大发展空间的地区，而得以实现的。一旦某个地点，被城市占据了，它的空间势便为 0 了，这样就保证了城市发展过程的不可逆性。同理，物质族基本粒子质量的稳定，也有不可逆性。

用基本粒子质量谱计算公式（9-1、2、3、4）所给出的 DBM 的形式，可以产生一系列的夸克、轻子、玻色子如城市形态随着扩散过程的控制参数改变，所形成的城市形态也有所不同一样，公式 M=Gtgnθ+H 决定了在增长集团边界的格点被选择来增长的 G、H、θ、n 的自变量。即凝聚集团增长空间的形状变化，也会影响到凝聚集团的空间结构。

E、如果将凝聚集团的延伸方向从约 $90^0\theta$ 逐步压缩，每次压缩约 $30^0\theta$，即从接近 $90^0\theta$ 压缩到接近 $60^0\theta$，再压缩到接近 $30^0\theta$，进行测量和模拟，可求出 61 种夸克、轻子、玻色子等基本粒子的质量。最后压缩到 $0^0\theta$，这种没有发展空间的情况，

是用“船闸模型”来求证计算希格斯玻色子的质量的。

这种情况也意味着类似受限扩散凝聚模型的有许多单独的土地占有者，在争夺土地市场；惯性力的起源就出于此。因为从基本粒子质量谱计算公式的整个图像，类似没有塔尖的锥台看，说明惯性力类似塔尖，是伸出希格斯海平面的部分。或者希格斯玻色子类似一些大的土地占有者、地王联合在一起经营土地一样，在“经营”希格斯海与船闸。

5）受限扩散凝聚模型(DLA)是类似在二维表面上的运动，设它为纵横向；电介质击穿模型(DBM)是类似空心圆球内外表面翻转的运动，设它为竖穿向。两者似乎难结合。但有人用细胞自动机方法研究城市形态，模拟城市土地利用图式的时空演化，认为实际上 DLA 模型和 DBM 模型是一种广义的细胞模型。

如果类似魔方有格子和魔环有孔洞，即二状态细胞空间模型的细胞，有各种离子通道，广义可类似“船闸”，又可类似“眼睛”。物质族基本粒子质量谱计算公式联系长江三峡修大坝与建闸门，把长江这根“弦”看作“泰勒桶”，那么闸门自然能联系泰勒桶内的那个小桶而看作“闸门”，而且可加进“小林-益川”的有三级段的关与放的闸门模式。这正是一种统一球面的不开和环面的可开的“模具”。即“船闸”模型，使长江既相通又不相通。试看来自长江三峡大坝上游的轮船，进入船闸的第一级段后，先关闭轮船的后面的闸门，使长江三峡大坝上游不再与下游相通。然后再放开轮船前面的闸门，使在放水的“自发对称破缺”中，轮船开进船闸的第二级段，类此逐步进入三峡大坝下游区。反之，亦然。

其次，“眼睛”也是可联系的另一种统一球面的不开和环面的可开模具。如瞳孔能够传递外界光的信息，直通眼球后的感光细胞，再传递到大脑指挥中心，这是一种圈态。而眼球又真真实实是球体。由此也可把地球看成“眼睛”，它的“瞳孔”就是北极出南极进的磁力线通道。三旋理论正是把物质看成宇宙的“眼睛”。类比有些动物的眼睛是复眼，这也类似在时空二维面上作的度规格子。从物质族质量谱公式可以看出，宇宙大爆炸在同一段时间、同一点，不是只发生了一次大爆炸，而是一先一后、一大一小发生了两次大爆炸；并且每次大爆炸是响了三声。这是因为在大爆炸开始的宇宙暴胀与时空撕裂后的时空缝合期中，经历的物质相变有三次的不同产生的。这对应我们的宇宙，是六只眼睛，或者说我们宇宙是两只一大一小的复眼，这每只复眼包含有三只小眼睛。

同时眼睛近似球形的叠加结构，基本粒子质量谱公式（9-3、4）推导的对应代夸克的质量 K，等于对应代的两种规范玻色子的质量的和 B，再加上对应代的轻子的质量 Q。即物质族质量谱结构也类似一个叠加结构模型。

三、科学与人学纠缠解答统一生态之谜

1、自组织自手术时代

1）为什么会有宇宙大爆炸？我们说，这是一种宇宙“自手术”现象，因此很自然。这里首先要说，须把前面的受限扩散凝聚模型(DLA)，变换改说为“自组织”模型；把电介质击穿模型(DBM)，变换改说为“自手术”模型。人类把宇宙的起源，最先看成是神创。科学的出现，把“神创”的这种“他组织”，改为是自然的“自组织”现象，推动了人类社会与建设的文明。这里牛学、麦学、爱学、薛学等虽功不可没，但都难以解释质量的起源。$E=M^2h^2+Ah^4$ 希学，把它解释为类似直接从事生产的劳动力加上管理人员的生产力，得以统一。

按理说，“管理”也是一种组织。但与时俱进，希学类似与计算机联系，把“管理”深化为“点内空间”，再与类似空心圆球内外表面翻转熵流的庞加莱猜想外定理的数学联系起来。但丘成桐先生在《世纪的数学展望》一文中说，单靠程序和计算的数学即使有短暂的生长力量，但不会有深远的影响。在微分方程或微分几何遇到奇异点或在研究渐近分析时，炸开（blowing up）分析是一个很重要的工具，而这种炸开的工具亦是代数几何中最有效的工具。因此理想的应用数学家，应有数学家的根基，有物理学家和工程学家的眼光和触角。

数学概念的“炸开”等价于类似“手术（surgery）”的数学概念。

在里奇张量协变效应的演化过程中会经常性地出现奇点、需要预测奇点、手工解决问题。在拓扑学中，当想象中的手干预物体在想象中的转换时，这种干预就称之为手术。佩雷尔曼证明庞加莱猜想的第一篇论文，整篇讨论的都是里奇（Ricci）流；Ricci 流是哈密顿创立的。第二篇论文讨论的是手术后的 Ricci 流，也是哈密顿原创的。在佩雷尔曼的这些处理中，他将手术后的 Ricci 流和亚历山德罗夫空间以及他与格罗莫夫、布拉戈所做的工作融合在了一起。

葛森的书《完美的证明》中讲，灵魂猜想来自研究发现一个非紧非负曲率的黎曼流形的拓扑，所有的拓扑信息都包含在一个紧集合上，这个集合被取名为 soul（灵魂）。对“灵魂”更直白的定义是：“针对某类特定的数学对象，可从这类数学对象的一些小区域将性质推广到整体。这些小区域称之为数学对象的灵魂”。前苏联从其著名数学家亚历山德罗夫的亚历山德罗夫空间的研究，也引出过“灵魂定理和灵魂猜想”。但按汉语“灵魂”是迷信。然而在上世纪 50 年代开始，我国却到处都在讲“政

治是灵魂，政治是统帅”的论断，这是怎么回事？这是一场科学的“暗战”。说白了，从科学的优势和发展的观点看，科学就是政治，是灵魂，是统帅。1953 年毛泽东主席就谈：“墨子在公元前 5 世纪，就提出‘端’是组成物质的最小成分，比外国人提得早。”他还反复提及《庄子》一书中“一尺之棰，日取其半，万世不竭”这句话。

其实这里在两千多年中华民族的先贤，讲的物质无限可分就是对物质结构的“手术”。然而这道“手术”难题太难。例如墨子和庄子两者结合已经指向“奇点”，现代对奇点有两层理解，一是奇点表达的环面与球面不同伦，即环面自旋范围是虚与实两种空间共存，环面的实体部分对应实数，是无限可分的，这近乎“万世不竭”的意思；而微分几何、拓扑学的“连通”也是判别环面与球面不同伦的根据。二是反其意，环面实体以外包围的中心虚空部分，对应自然数 0，不是无限可分的。即无限可分的还是等于 0。这类似一个不可穿透的球，所以把离开环面的中心虚空部分，也可等价看成“奇点”。即它是不容易分割下去的东西，这近乎墨子的“端”的意思。这种奇点来源于环又不说是环的智慧，微分几何、拓扑学没有讲，也没有定义。但霍金、彭罗斯说的裸黑洞、黑洞裸点，就关联这类“奇点”。如果说古代墨子弦学的奇点是包含旋转运动的环面，或类似实数的无限可分的环面部分和有一个相连的不可穿透的球面的智慧，还是隐蔽的，那么中国古代的阴阳，五行、天人合一，其环圈及循环运动的智慧，则是明显的。这与古西方的四元素说相比更突显，即阴阳五行是相生相克自转循环无边的环圈论，是中国古代的“奇点”说。

这里的“阴阳”也包含了环圈旋转，以及类似实部是无限可分的环面和有一个相连的不可穿透的虚球面等意思。但是无论无限不可分“端”的奇点还是“阴阳五行”的奇点论，都毕竟不是现代版的“奇点”论。自旋有一种整体的协变效应，把自旋看成是里奇张量的灵魂，那么灵魂是一种整体的协变效应，也是一种“自手术”现象。在两千多年后的 1958 年大跃进“向科学进军”的年代，聪明的四川大学的数学家们把这道“手术”难题，推进到改编为一道数学难题：“不撕破和不跳跃粘贴，能把空心圆球内表面翻转成外表面”。这是一个了不起数学成就，它推进了三旋理论的成长。

因为证明川大“空心圆球内表面翻转成外表面”的难题，属于丘成桐、哈密顿、佩雷尔曼等领军研究类似卡拉比-丘空间、Ricci 流“手术”的空心圆球内外表面翻转熵流庞加莱猜想外定理。由此在中国点燃了第三次超弦革命，也助推了中国的世界科学工厂、世界科学工业。即使川大的数学死了，它已放射出光芒。例如著名科学家特霍夫特的全息原理，就与类此的庞加莱猜想翻转问题联系，萨斯坎德已写入《黑洞战争》书中：信息守恒、维数守恒、能量守恒等不变量和量子绝热，要求把持球跑进通道的视界推到一维的极端普朗克尺度时，所有的信息都用普朗克比特精确地编码；跟一般的全息图的情况一样，通过一维电线联结电脑，以通过来回类似庞加莱猜想的翻转，在远处的边界上编码的信息，也就是这里多维原始物体的信息“持球跑进”的表示。《求衡论---庞加莱猜想应用》一书已能证明，其转点交换就是三旋化的量子模型机制。

A、自组织（Self-organization）理论是 20 世纪 60 年代末期才出现的。我们说宇宙大爆炸是一种宇宙的“自手术”现象，不是从爱因斯坦的广义相对论推导来的。当然，如果把牛顿力学 F＝ma 到爱因斯坦相对论 $E=mc^2$ 等大科学，看成类似受限扩散凝聚模型(DLA)在二维表面上的纵横向组织运动，那这类自组织理论已经统治了我们科学 300 多年。而且从系统论到混沌学也是把电介质击穿模型(DBM)和 DLA 模型一起当成自组织理论，采用分形、分维的方法在使用。但我们仅是取电介质击穿，类似空心圆球内外表面翻转的竖穿向，来比喻手术的。与时俱进，这里我们要说自组织理论的不足之处。

自组织被说成是宇宙演化，从轻元素到重元素，从分子到生物大分子和生命现象，其基础自然科学研究的分支，反映的都是它在各个层次过程的不同侧面。因此“自组织”是现代非线性科学和非平衡态热力学的最令人惊异的系统演化理论发现之一。自组织囊括了耗散结构理论、协同学、突变论、超循环理论、混沌理论和分形理论等成果。李曙华教授说，自组织理论重点解决的是系统诞“生”的问题，参考系可以从“以有观有”转到“以无观有”，其突出成就在对随机多重分形中，如 DLA 和 DBM 模型揭示的“空隙”对于生长的重要性，它向科学敞开了一个全新的“无”，即潜在存在和潜在发展的世界，这超越了科学仅限于“实”、“有”的眼界。如 DLA 巨集团生长实际包括两大区域：已经生成的部分和分形生长的空隙。后者是孕育分形生长的生命源泉，是充满生机、信息、可能，对未来开发的空间区域。

多重分形揭示空隙与正在生长的物体是不可分割的统一体，这与牛顿力学大异其趣。即使爱因斯坦的相对论揭示空间与物质不可分，但物质仍是基本的，时空的弯曲是派生的、静态的。空隙对这些以往科学而言不过是“无”，但对于生长，它更基本、更重要，因为类似“无”的空集与负维数，富含信息的潜在的存在似乎一切新生源源不断从“空”中涌出。然而李曙华教授的解读，在批评“无”被以往科学忽视时，也揭示出自组织自身对空隙与

空穴、空隙与空穴和点内空间的区别不清。众所周知，植物的生长，有明显的点外的生长；但也有类似种子的“点内”生长，就像未出生的婴儿在妈妈肚子的孕育一样。类此，空隙一般指点外空着的地方；空穴一般指洞穴，与点内空间较接近，但也是点外能发现的地方。点内却完全不占点外。如正、反粒子对撞湮灭到点内空间，量子波函数塌缩到点内空间。

但狄拉克对 $E^2=p^2c^2+m^2c^4$ 方程负值能的解释，为反粒子的正电子，是负能态海洋留下的空穴，是可见的，有空空为实，真空乃无限之有的空之意。其次，量子力学波动方程虽有虚、实两部分组成，虚数进入了量子力学，但由于没有“自手术”模型的“点内空间”概念，与自然数、实数和虚数及复数的对应，也仅能表现在想象的点外坐标的图像上。古言“大盈若冲”，也没有“自手术”意识。“空集和负维数”并不代表点内空间。普里高津的耗散结构理论类似贝纳德对流，有内外翻转之像，也没有联系庞加莱猜想外定理。艾根的超循环理论虽有“信息空间”的概念，也没有联想到会有不占实数时空的点内空间。

B、手术传统是指医学上外科的主要治疗方法，俗称“开刀”；指医生用医疗器械在病人的身体上进行的切除、缝合等治疗。动手术，有大手术、小手术。

随着外科学的发展，手术领域不断扩大，应用的器械也不断更新，有的手术操作也不一定要进行切割来破坏组织，如经各种内窥镜取出胆道、尿路或胃肠道内的结石或异物；用激光使闭塞的血管再通等，因此手术也有更广泛的含义。

把“手术”概念与“组织”概念并立或对立，意思也明显。组织是指系统内的有序结构或这种有序结构的形成过程；“组织”可分为两类：他组织和自组织。类此我们也把“手术”分为两类：他手术和自手术。

但这就怪了。把一个系统靠外部指令而形成组织，叫他组织；不存在外部指令，系统按照相互默契的某种规则，各尽其责而又协调地自动地形成有序结构，叫自组织，这容易理解。其次说西医分内科和外科，中医也可分内科和外科，这也容易理解。但说西医、中医外科的大手术都类似他组织、他手术，难道病人自己能在自己身体上进行开腔、开颅等大的开刀切除、缝合等手术治疗吗？这当然没有。但像任何一种“组织”都必须具备自组织的这个基本要素，否则就失去了存在的基础和发展的动力一样，自组织无论在自然界还是人类社会中都普遍存在。同理自手术现象无论在自然界还是人类社会中也是普遍存在的，否则也会失去存在的基础和发展的动力。

例如，在旧社会有穷人家的妇女生娃娃时无人在身旁，就自己用剪刀或牙齿把脐带弄断，自己接生，这类似一种自手术现象。类似的在战争中，也有肠子被打出来还没有死的人，在无人救护时自己把肠子装回肚里，作简单包扎后等待或爬行去找人的情况。其次人体里的细胞、基因，也有部分自修复功能。这都可以看成部分自手术的例子。再说科学的发展，有先是限制手术，后又放开手术的典型，例子就是拓扑学。拓扑学被称为橡皮薄膜的几何学，即拓扑性质可以想象成在橡皮薄膜的塑性形变下仍然保持不变的性质。比如有一个洞的一块橡皮薄膜，可以任意改变它的形状，只要不把它剪开或者把它的两点粘在一起，这块橡皮薄膜有一个洞的性质不会改变。因此“洞”是一种典型的拓扑性质的区别。其次在橡皮薄膜的塑性形变下，通常熟悉的距离、朝向、大小等性质会改变，但它们都不是拓扑性质而是局部性质。

这就是说允许橡皮泥X在不允许隔断的情况下可以捏成Y，这种形变可以非常剧烈，足使几何图形的所有度量以及射影性质全部消失，但仍能保持原先的性质；这形变的光怪陆离、引人入胜、丰富多彩，就像自组织囊括的耗散结构理论、协同学、突变论、超循环理论、混沌理论和分形理论等成果一样。但拓扑学后来还是发展出“轨形拓扑”。这类似把两个喇叭小的一端的对接，再翻转到两个喇叭大的一端的对接的内部成一个环面一样。这种几何操作，称为轨形拓扑。轨形拓扑包含拓扑学的手术和自手术。说白了，自组织理论之外之所以需要“自手术理论”，因为像西医、中医分内科和外科一样，耗散结构理论、协同学、突变论、超循环理论、混沌理论和分形理论等自组织理论只能等价对应于类似西医、中医的内科。可以说基础自然科学从轻元素到重元素，从分子到生物大分子和生命现象在各个层次过程的不同侧面的研究，直到第一、第二次超弦革命，都还处在类似西医、中医的内科的手法层次。

C、而类似西医、中医的外科的手法层次的分水岭，出现在 1958 年大跃进时期川大的数学精英制定对拓扑难题“空心圆不撕破和不跳跃粘贴，球内表面可翻转成外表面”的攻题战略。中美俄暗战直到 21 世纪初，丘成桐、田刚、哈密顿、佩雷尔曼等一批属于顶尖科学精英手拉手使庞加莱猜想得证，川大挑起的暗战终于有了在中国点燃起第三次超弦革命的回报，由此自手术理论也才被正式地确立起来。反之第三次超弦革命的标志，就是自手术理论。由此来看希格斯场公式 $E=M^2h^2+Ah^4$，右边第一项类似自组织，第二项就类似自手术。

从“自手术理论”来解读卡拉比-丘流形微分拓扑的尖端收缩“炸开”理论，一般我们肉眼看上去的现实物体图形，都是固定形状的静态图像。这些看上去固定的图形，如果是规则的，我们用的是几何，有的用拓扑矩阵等。除了固定静态图形，其他的有立体图像，还有动态的图像，例如水流、爆炸等等形状。实际上这些动态已经被应用到了现代宇宙学当中，用在了解释超弦中的问题。就是说，现实当中的物质有规则的，也有不规则图形的；有动态变化的,有相对静止的。所以图像也有相应的静止状态,也有变化中的动态图像。如果条件允许，可以通过放大物质，获得物质不同尺度的图像可进行对比；或者通过跟踪动态变化过程，进行对比，来发现事实的真相。弦论走到了丘成桐的卡-丘空间和炸开理论，以自手术理论垫底的三旋理论，已经把“轨形拓扑”运用得有声有色，如三旋理论已能结合霍金的黑洞辐射和希格斯的希格斯粒子生成思路。

2）为什么会有波粒二象性？为什么对单个粒子也能同时观察到的波粒二象性？原理就包括自手术在起作用。关于由来已久的光是粒子还是波的争论，今天仍因有人不了解“自组织自手术理论”，也就还不能理解。

量子力学的奥秘是，在对微小粒子如原子和光子的行为预测上，具有惊人的准确性。然而，这些预测非常违反直觉。比如，量子理论认为类似光子的粒子可以同时在不同的地方出现，甚至是同时在无穷多的地方出现，就像波的行为一样。这种被称为“波粒二象性”的概念，也适用于所有的亚原子粒子。

A、众所周知，光既可以表现出粒子的形式，也可以呈现波动的特征，这取决于光子实验测定时的方法。最早提出这种经典实验思想的是惠勒，他实际是希望有人去做证明量子力学奥秘的类似自手术的实验。此观察证明现已首告成立。新方法围绕是最终决定光子的行为是像粒子还是像波的设计，实验使用了一项新颖的量子光子芯片技术；这种芯片具有可重构性，它可以根据不同的电子环路来进行编程和操控。以同时观测光的粒子性和波动性，利用光分离器使一个光子纠缠另一个光子，通过对第二个光子的测定，来决定对第一个光子的测定方法。即一个光子通过干涉仪被探测到，使研究者能够测定第二个光子的状态，是像波的形式还是粒子形式，或者是二者之间？实验实现了光子从波的形式向粒子状态的连续转变。

B、在我们看来，这一实验“手术”其实是使研究者得以探索光从波的形式向粒子态自手术转变的过程。但中科院力学所吴中祥研究员认为，实验没有，也不可能，观察到光的波粒二象性。吴中祥反驳的理由是：所谓“波粒二象性”是指单个粒子也有“波动”和“粒子”两种特性。但能量和质量集中于其内的单个粒子，怎能同时又是能量和质量在时空分布、传播的波呢？因为，所有的波如水波、振动波都是大量粒子的集体表现，或如光波是时空统计结果。由此吴中祥说他能具体证明：任何单个粒子都不可能是波；只有大量粒子的集体表现和统计结果才是波！而以上的“自手术”实验，是利用量子力学的纠缠光子对，而量子力学及其场论都是大量粒子的统计力学及其场论，因而实测都只能是大量粒子的统计的结果，并非单个粒子的表现！

C、吴中祥的反驳有个误区，是把球量子和环量子当成同一种拓扑类型，以赵国求教授为代表的不少科学家也这样；这是一错。之所以分球量子和环量子，这是自组织自手术的一种自然现象，是客观的，不是人为设定的。单个环量子自旋有三种不同的量子圈态，共 62 个量子自旋态。可证明这种单个环量子是波粒二象性的。一是三旋是概率波；二是自旋周期分岔释放量子能荷，能量和质量集中于其内的单个粒子也能在自组织自手术中，把量子信息、能量全息于外。

吴中祥二错是不能对单光子穿过干涉仪时的情景，作自组织自手术演示想象图的思维。该图示是，干涉仪的输出端装有的量子分光镜，这正是一个捕捉单光子自手术后华丽转身的分界面。所以在图中一面可以看到正弦振荡的波形，表示的是单光子干涉，是一种波动现象。而在图片的另一面却观察不到振荡，说明只表现出粒子的特性。这不是单光子的自手术是什么？

自手术使波粒二象性既能处在两种极端之间，也能使单光子的行为连续不断地从波的形式向粒子形式转变，实验图示中证明自手术显示的就是这两种状态的重叠。这类对应自手术的艺术图，早已有之。实验者已声明正是受之启发，实验中才用以检测波粒二象性的量子光子芯片。单光子通过光纤进入环路，在输出端被极其敏感的探测器已检测到。

3）为什么会有自旋？因为宇宙对自然界的运动指挥，需要在量子水平用不能多也不能少的统一物理量，进行类似人大脑的思维认知和记忆的编码功能。

首先要说明，“自旋”是指真正内禀的自旋。粒子自旋不能理解为它环绕某一本征轴的旋转运动，只能说自旋粒子的表现与陀螺相似。因为宏观世界的物体，例如陀螺或汽车，不具有自旋的性质。虽然这些物体也可以环绕本征轴旋转，但是这种旋转不是它们的必不可少的性质；特别是，我们能够加强它们的旋转运动，也能停止它们的旋转运动。

而量子水平的自旋，既不能加强，也不可以减弱。如果宏观物体也有自旋，岂不也有其他量子效应，这是不可能的。

A、把宇宙比作一个大脑，它是如何来指挥物质族基本粒子工作的呢？我们来看大脑是怎样在细胞水平为思维认知和记忆编码的？通过研究猴子行为的实验证据显示，不同的神经元集群代表了不同的信息。那么这些集群是什么样子或怎样形成的；神经元集群怎样形成思维，并为思想的灵活变化提供支持呢？

神经元集群是通过彼此同步振动的方式来给某个行为规则编码，即表明意识的本质属性是有节律的。这也正是思维本身的真正性质。大脑是怎样做到当交谈时，各种想法在头脑中不断浮现又消失，各种神经元集群在不断形成，组成一种形式，再改成其他形式的呢？实验发现神经元电流以节律性振动的形式产生了脑波。当猴子以方向为判断准则时，某些神经元以高频振荡，产生了β频率波动；以颜色为准则时，另一组神经元产生了β波。有些神经元会重叠，多组集群都会用到它们，但每组集群都有自己的组合方式。而且，当以颜色为准则时，曾经的“方向组”神经元之间出现了低频α波。

α波与脑活动抑制有关，能帮助那些“方向组”的神经元安静下来。如果方向准则占优势，颜色准则相对较弱。大脑对方向组发出了一阵α波，让它们平息下来，这样猴子才能使用较弱的神经组。这些波动解释了为何意识容量是有限的。即意识最基本的特征是它的容量有限，能在头脑里并存的思想非常少。当一个动物同时思考两件事时，需要两组不同的集群以β频率振动，它们互相干扰了相位。适合一个波动周期的信息数量是有限的，破坏这些振动可能导致神经紊乱，如精神分裂症。研究就显示，精神分裂症患者的β振动减少。

物理学研究表明，所谓的同步振动或电流以节律性振动的形式产生脑波、高频振荡、频率波动、低频波等，在量子水平都可等价变换为自旋规则编码的描述。这表明从宇宙到大脑的工作方法都是全息一致的。宇宙是如何来指挥物质族基本粒子工作？实际各类物理性质就类似大脑是怎样在细胞水平为思维认知和记忆编码的。如果说大脑神经元集群是通过彼此同步振动的方式来给某个行为规则编码，类此，那么宇宙在最基本的量子弦圈集群阶段上，是指挥量子弦圈通过三大类自旋方式面旋、体旋和线旋的某个规则编码，来给自己的“思维”行为作认知和记忆的。因为在所有物理性质中，能自然分解成容量有限的因子又是对称、有序、混沌三者统一的，并能做“思维”规则编码的，且能在一维路径上作来住信息量子的碰头既可间断又连续交流的，非环量子三旋莫属。

例如，从量子能级跃迁到生物学，联系光谱是光子能级跃迁的这一事实，基于环量子有面旋、体旋、线旋等三种自旋及其排列组合的变化，正是由能级跃迁体现出来的。这可以联系上大脑神经元集群的化学递质，因为一个类圈体就有 62 种自旋状态编码可供选择，它的不同排列组合体现为能级跃迁，体现为光谱线，也体现为不同分子前线轨道的化学结构，那么人体要造成化学递质，只需改变递质圈态的前线轨道就足够了。这种机制，跟今天研制的用光的颜色编码的光纤电话很类似。联系原子外层时空的类似人体接收外界信息，80%是从眼睛传递进去的；就是说，人体里接收的 80%的信息是通过光学语言向体内自然发报的。而光是一组光谱线，不同的信息是一组不同的光谱线，人体接收了这组光谱线文字，立即被人体这部圈态密码机，编制成密码，即变化圈态自旋的排列组合----产生能级跃迁----出现不同的化学递质及浓度和分布位置的变化；而这仅仅是圈态前线自旋轨道的变化，这种圈态前线轨道自旋的涨落，一般不影响人体生理的大方向，但却是人群的不同行为反映的依据。这种人体圈态前线自旋轨道的涨落，一般不为本人和旁人所感觉。

B、如果说自旋起源于编码，编码又依赖于拓扑，那么就会遇到大难题。因为 30 年多前年，我们在用量子环弦圈自旋态作量子色动力学的编码时，深感自旋要区别相变与群变。面旋、体旋和线旋是自旋的相变，是整体的。但物理学的自旋运用只是群变，是它的一部分自旋。是整体先于部分，还是部分先于整体？或者说，是少数组成多数，还是多数分出少数？就成为编码选择的障碍。

此时还是不知名的中国学者陈霖先生，用大脑神经元集群的视觉系统实验，判断了知觉过程是由大范围性质到局部性质，首先知觉的是“洞”等大范围拓扑性质。这个拓扑性质知觉理论是支持系统拓扑自组织自手术理论的，我们深受鼓舞。视觉编码过程是从哪里开始的？物理常识认为，物体由部分构成，局部先于整体，由此认为视觉过程是从局部到整体。但这只是根据直觉经验，判定圆、三角形和正方形是有很大区别的，然而根据拓扑学的观点，它们是等价的。但圆和环在拓扑学的意义上是不同的，因此即使区分圆与三角形或正方形不可能时，区分圆与环仍是可能的。陈霖实验证明的视知觉，区分圆与环仍是可能的：不仅是在人，就是神经细胞个数只有人大脑的百万分之一的蜜蜂，也是一样的。

这说明自手术在生物进化链中，分辨拓扑性质的自手术能力已进化成是各种生物视觉系统具

有的共同功能，自手术拓扑性质的确是视知觉的基本单元。目前陈霖院士等人的系统实验强有力地证实，即使蜜蜂的简单视觉系统不能分辨简单几何图形，但却能够分辨大范围拓扑性质。据报道，蜜蜂不仅能够学会分辨拓扑性质不同的环型(有一个洞)和 S 形(没有洞),而且在学会分辨环型和 S 形之后，不需要进一步学习就直接能分辨其它拓扑性质不同的图形，比如空心的菱形(有一个洞)和十字型(没有洞)。更有意思的是，蜜蜂分辨拓扑性质的能力像是先天具有的。奥秘在蜜蜂的视觉不是死的，静止的，它加进了自旋“管理”式的自手术熵“流”。这是一种相变，是类似希格斯场方程的体现。

C、那么自旋到底能不能作为基本粒子结构性质的量子色动力学的编码？21 世纪国内出版社正式出版的专著《三旋理论初探》和《求衡论》已有详述，这里只简要谈三旋坐标创新弦膜圈说自旋，解答了夸克颜色和费曼折线图。

类似圈洞态的拓扑客体，我们定义为类圈体。在自手术的黎曼切口轨形拓扑和真空撕裂船闸模型的操作下，为什么类圈体既能将半整数自旋的粒子和整数自旋的粒子分开，其原因是自旋的三旋坐标的解构或建构，必然要涉及三旋的手征判定。这里如果设旋转围绕的轴线或圆心，分别称转轴或转点，现定义：（1）自旋：在转轴或转点两边存在同时对称的动点，且轨迹是重叠的圆圈并能同时组织起旋转面的旋转。（2）自转：在转轴或转点的两边可以有或没有同时对称的动点，但其轨迹都不是重叠的圆圈也不能同时组织起旋转面的旋转。（3）转动：可以有或没有转轴或转点，没有同时存在对称的动点，也不能同时组织起旋转面，但动点轨迹是封闭的曲线的旋转。根据上述自旋的定义，那么类圈体应存在三种自旋，现定义：

（A）面旋：指类圈体绕垂直于圈面中心的轴线作旋转。如车轮绕轴的旋转。（B）体旋：指类圈体绕圈面内的轴线作旋转。如拨浪鼓绕手柄的旋转。（C）线旋：指类圈体绕圈体内中心圈线作旋转。如地球磁场北极出南极进的磁力线转动。线旋还要分平凡线旋和不平凡线旋。平凡线旋是常见的圈翻转。不平凡线旋是指绕线旋轴圈至少存在一个环绕数的涡线旋转，如麦比乌斯体或麦比乌斯带形状。同时不平凡线旋还要分左斜、右斜。因此不平凡线旋和平凡线旋又统称不分明自旋。反之，面旋和体旋称为分明自旋。这样看来，涡旋仅是自旋中的线旋，或线旋与面旋的组合；而物理学上一般说的自旋是面旋或体旋。

三旋规范标准动力学，是符号编码标记的。单动态共 10 个；双动态共 28 个；多动态共 24 个。用三旋性质处理量子色动力学，夸克的颜色可以看成是由圈态的三种自旋的不同排列组合引起的，从而能建立一套夸克立方周期表。其次也能解答标准模型费曼“折线图”的疑难。而标准模型是以球面处理，不能作大范围拓扑性质的编码，这是它的死结。陈霖院士等人走出了这类死结。

2、中医复兴量子时代

徐道一先生 1956 年毕业于北京地质学院,1963 年获前苏联莫斯科大学副博士学位。他说得对：学无古今，唯求真实。真是反映客观真实，实是要有实际效果。这实际是爱因斯坦对包括古今的科学定义：形式逻辑体系以及通过系统实验发现有可能找出的因果关系。这个定义很到位,它否定了只把“生产力水平低下”作为唯一标准来衡量一切古代科技或结果的方法本身的不科学，也不符合当前已知的许多实事。这可联系希格斯场方程研究提出的“点内空间”及“自手术”问题，证明古今方法不单是“法自然”、“取象、运数和比类”。

1）徐道一先生说，中国古代科学技术在明末清初以前，在许多方面显著地超过了当时世界各国，居遥遥领先地位，而且经久强盛不衰。如中医等学科至今仍然保持完整的理论体系。我们想证明起源于远古中华民族的现代中医，与现代非线性量子力学、现代希格斯场公式有“点内空间”及“自手术”的同工异曲之妙。如把中医八纲的“阴阳、表里、寒热、虚实”覆盖在所谓的量子、空间子、时间子、质点、以太、太极子、炁子、旋子、细胞、原子、分子、部分子、瞬子、轴子、弦子等各类名称粒子的东西之上，怎么呢？可以说就能深化为“中医量子力学、中医基本粒子物理学、中医希格斯物理学”等新学。

这不是讲中医学，而是中医复兴的量子学。因为从有“阴阳表里”，这些过去没想的各类名称粒子的东西也许能找出“点内空间”。有点内空间，因有表里内外，当然可分寒热、虚实，但主要还在“自手术”的内外翻转问题。那么起源于远古的中医有“手术”思想吗？有！在《黄帝内经》中占治疗的重要举例，这就是针灸。针灸不是大手术，自手术，但它确实在引诱类似“不撕破和不跳跃粘贴，把空心圆球内表面翻转成外表面”功能的攻克健康难题，或排毒的治疗难题。但中医及针灸后来很少像理化和西医学科那样去想，去证伪。针灸一根银针，刺的是什么？徐道一称为的“天然探测器”，我们称为“旋束态”或三旋量子。如刺的物质是宇宙的眼睛，眼睛是一种旋束态，人也是。

2）为什么起源于远古中华民族的中医又那么深刻，那么持久？为什么又会滞后？它如何复习？有没有隐秘的困境？现已是可解密的时候。以针灸为例，它联接了人体表里、内外，并依赖于经络路线也有贯通脏腑的路线，这似乎回答了“点内空间”及“自手术”难题，但其实是有错的。因为人体及

脏腑等各器，也有类似的韦尔张量和里奇张量的协变效应，那么也就有韦尔说的“不可积因子”；这如魔方的转座子旋转，像人在地上走，鱼在水中游，其连续是不离开实体的，一个魔方的转座子不能跳到另一个上去。中医针灸经络把脏腑各器之间的隔断空档，看成不存在“不可积因子”，这是错的；但量子论却好说。当然中医、针灸、经络，也有用“气”来对答。但这是循环论证，不能和量子论等量齐观。例如人在地上走，鱼在水中游，隔断类似鸟在空中飞。即鸟是靠空气解决地与天的隔断空档，但空气在地天之间普遍存在，空气并不等于鸟。

徐道一先生说远古“法自然”讲易经，但这里有失落。“法自然”就是自然全息，是由此及彼的思维联想和自然联想的印迹。自然全息“鸟”，有孵抱期和迁徙期，由此也有由合到分，由分到合的大范围拓扑性质集群社会现象。为什么有这种现象？这是自然气候的“自手术”造就的。但春夏秋冬这把“手术刀”仅是温柔分割了候鸟的孵抱期和迁徙期，而大冰期这把“手术刀”可就厉害了，它已分割到了我们人类起源及文明的孵抱期和迁徙期。如人类文明多地起源说就被冰川地质学家韩同林先生，用气候“自手术”的第四次大冰期的“手术刀”分割，解答了非洲及中东孵抱期和迁徙期起源说。但韩同林和徐道一两位先生虽都是地质学家，却没有想到超强大地震、大火山、陨石、海啸、台风、龙卷风、暴雨、泥石流等造成的山崩地裂天翻地覆，不以人存不以人亡，也是一种地质自手术现象，无所谓好与坏。

地质“自手术”现象不但解答了人类文明起源于非洲及中东孵抱期和迁徙期起源，还解答了继之后在另一处的东方孵抱期和迁徙期地，是从海洋文明过渡到农耕文明的中华民族的起源及中医的起源。具体地说勤劳勇敢的中华民族，是从灾难兴邦的盘古文明过渡到实干兴邦的炎黄文明的。

光说中华文明上下五千年是含糊的，因有两种了理解，一是从上到下才五千年，二是上下各有五千年。从科学上是后者，因为那个海洋文明是属于山海山寨城邦式的盆塞海、堰塞湖型的海洋文明。在上个五千年经历了迁徙聚集交汇，在西南远古盆塞海经历了海洋文明的操练，也经历了超强大地震、大火山、陨石、海啸、台风、龙卷风、暴雨、泥石流等造成的山崩地裂天翻地覆的地质“自手术”现象的磨练。中华民族形成了以“多数”原则的大社会族群“汗族”：即汗牛充栋的多与实干出汗之意的盘古文明。但这个文明失落了。直到秦始皇打下重新统一中国的基础，汉初才第一次开始复兴中华古史的历程。

原因是汉朝刘邦与项羽争天下，初年被项羽赶到原古西南四川盆塞海之地立足。刘邦-盘古-汗族-汉族才联系起来。原因是上下各五千年之间期，古的地质“自手术”现象使远古四川盆塞海干涸了。中华民族大多数的少数民族其实那时是“多数”原则的“实权派”，掌管着海洋山寨城邦的“会议厅”和“金库”，但地质“自手术”的干涸现象，把他们与“汗族”的多数分割了。现在很多人以为“汉族”起源于汉朝，一个理由是“盘古”这个传说中的先祖，是汉族才出现的，不可信。其实科学是政治，是灵魂。神话传说在上古，本身就是突出政治。一是神话夸张的想象力，具有吸引聚集人心的效果；二是神话的神奇，才具有传播久远的功效。如果没有神话的科学运用，人类传说能够传承是不可能的。但政治是“中心”原则，盘古文明的失落也是政治。汉朝捡回盘古，是刘邦政治短暂的需要和开放。但终因盆塞海干涸，中华民族的重心移到了中原和东部地区，突出炎黄文明是巩固“中心”的政治纪律或新闻纪律。

若说远古盆塞海时期诞生的中医，具有如同神话一般的想象力，这同那时长期此起彼伏的大地震、大火山、大海啸等地质自手术现象，以及自然全息观察分不开。但延伸到中原时期的农耕文明，就淡定得多了。中华文化构建一体，原因如有人说：“科研误国，工程兴邦”；如果科研都成了“骑马舞”，当然要误国。所以中医进入“工程”与“科研”结合，融入谈“道”的社会工程。

3）但中医毕竟还是发展了，特别在这个过程中总结出完整的八纲“阴阳、表里、寒热、虚实”的中医理论体系。其次，即使针灸只想到“气”的取象比类，没有加进“鸟”的取象比类，但作为一种科学“生态”，对创建中医量子力学、中医基本粒子物理学、中医希格斯物理学，它已经足够了。而要完成这个“鸟”的取象比类任务，恰恰是交给“量子力学中医学”、“基本粒子中医学”、“希格斯中医学”应反哺的工作。即两者是一家，中医是纲，是相变；量子是目，是群变。例如说，自旋是量子的一种内禀性质，中医的“气”也可以说成是一种自旋态，那么中医取象比类的“鸟”，能不能也有自旋的功效？

有。三旋仿圈生态是大自然本身早就给予量子论和中医学的共同创造。我们可以用日本学者槌田敦的资源物理飞鸟生态学模型来说明。生态学本质是一种系统内部不对称性的“旋束态”循环，而且可分为自然和强制两种。在自然界，物体通常朝着由上至下的、活动趋于终止的方向发生变化。所以，在高处物资趋于贫乏，在低处物资趋于过剩，如果不把物质从低处搬运到高处，就不可能产生循环。从这个意义上说，在生态循环中重要的是鸟类。除鸟类以外几乎所有的生物总是把物质从高处搬运到低处，但是鸟类以粪便的形式将物质、树种从低

处搬运到高处树林，结果就可形成生物循环。这是靠鸟类形成的“强制循环”。所以，可以说有很多鸟类的生态系是富饶的生态系。鸟类是生态系的原动力，鸟类是线旋转座子。人通常被说成是自然的破坏者，但是人象鸟类一样也具有向上搬运物质的能力。因此也就可能靠人的力量形成富饶的生态系。

反过来说，把这类鸟或人都可以看成“旋束器”。但那为什么自然生态和物质生境，都离不开“旋束态”？因为在任何需类似“不撕破和不跳跃粘贴要能把空心圆球内表面翻转成外表面”的地方，都离不开它。针灸治病就是其中的一类。为什么它能，我们可以用“羊过河”的寓言故事来比喻。河上有座独木桥，一只白羊和一只黑羊分别从桥两头同时走上桥，走到桥中间要过河，打起来白羊和黑羊都要掉到河里。互不相让如何办？把这个图案化在空心圆球的内外表面，分别取一点，作连线，搭成类似“羊过河”的一维的“桥”，这是一个解答 1 维和 0 维结合的三旋抽象数学。因为两只羊在桥中间碰头的“转点”，如果有类圈体三旋式的自旋，就能化解矛盾。这类似改成“人过河”，走到桥中间的两个人，不用打架，也不用互让，只需一个人抱着另一个人，旋转半圈，或一个人拉着另一个人，相互半转身，脚交叉，就过去了。

在三旋理论中，类圈体（如环圈）内禀自旋有三种：面旋、体旋和线旋。类圈体的面旋、体旋和线旋还可两两组合，或三三组合，合计的标志值个数就是 62。空心圆球内表面翻转成外表面，用管道及珠子代表推理，在普朗克尺度，只在一维的沿着管线内壁移动。内外各自持球（代表信息）跑进的珠子相遇，在转点的普朗克尺度上，由于还可以各占一半合成一个球体，作体旋翻转后，各自再分开走，恢复原来各自的形态。此前，“转点”的“庞加莱猜想球”自旋，如果是作纯面旋，那么从内向外或从外向内的交流就会被阻塞；不堵塞只能作纯体旋和四类组合旋。只不过纯体旋的转轴方向，与管柱壁的管长方向的中心线垂直。空心圆球内表面翻转成外表面，在庞加莱猜想球式的“转点”自旋这里，存在量子论类似的“间断”性。原因是，其一，即使球体的纯体旋不阻塞从内向外或从外向内的交流，但由于“转点”外的交流是在同一段线上运动，根据广义泡利不相容原理，它们必须“间断”交换才能进行。其二，如果是四类组合旋有一个被选择，本身也产生“间断”，原因是它有旋到纯面旋位置的时候，这种阻塞即使时间是短暂的，因双方运动的速度或频率差，也要用普朗克尺度来截止可能涉及小数点后面的无理数或有理数的位数计算。

4）由此看，量子力学中医学、基本粒子中医学、希格斯中医学就是要寻找类似基因组学、蛋白质组学的“旋束器”。这样中医看待西医的现代生物化学与分子生物学技术，西医看待中医的八纲“阴阳、表里、寒热、虚实”的理论体系，目标是一致的。例如，蜈蚣是中医的一味传统的重要动物药材，从可作药效“旋束器”的层次看，只分解揭秘到具有祛风止痉、通络止痛、攻毒散结的功效，和可用于惊风、癫痫、痉挛抽搐、中风口歪、半身不遂、破伤风、风湿顽痹、偏头痛和毒物咬伤等的治疗。由此用蜈蚣配成的中成药和处方，虽然达到百余种以上，但缺乏系统全面的对蜈蚣药效基因组学、蛋白质组学的“旋束器”群的识别和相应的药理学活性解析的描述。攻破这个瓶颈，量子力学中医学类似要描述蜈蚣肽类生物活性物质的“旋束器”。从这个方向攻坚，已经发现许多蜈蚣肽类生物活性物质可作用于不同的细胞膜离子通道，包括钠、钾、钙离子通道等。即这些蜈蚣生态活性物质“鸟”，是与细胞层次的“旋束器”纠缠的。而一大批结构新颖的离子通道调节剂“旋束器”的发现，也可为基于蜈蚣药效“旋束器”成分的现代创新药物研发打下基础。

3、反相维相骑马舞时代

中科大李文秀教授在《狭义相对论批判随笔》中说，爱因斯坦是人不是神，把他的物理理论叫做流氓理论或者无赖理论最为贴切，他根本给不出什么叫“观察者”的定义。北京相对论研究联谊会的王飞先生说，现代物理采用高能粒子对撞机是误区；将粒子打碎了解物质更深层的结构，这类似把瓦片敲碎发现原子一样困难。实物粒子是以太波的缠绕体，敲击只能得到各种缠绕波碎片。

中医八纲“阴阳、表里、寒热、虚实”和针灸隐藏的“点内空间及自手术”思想，直接衔接物质四种相互作用力统一的能标、希格斯场公式、量子论、相对论、宇宙大爆炸论及暴涨论到弦论及量子引力论等研究的方向。现代反相维相还达不到起源于远古中华民族中医的这种高度和深度。科学是一把“双刃剑”，作为一个自给的系统既然有“他手术”，也应有“自手术”；没有“点内空间”，反相维相就只能在表层奔驰，起着我国科学“暗战”的掩护作用。

1）我们说反相维相类似骑马舞，是借用骑马可以四下奔腾，寓意反相维相各顾各，有循环论证散乱的欢快；而不是指发端于韩国而迅速走红的酷似人骑马时的动作的骑马舞。反相维相上世纪发端于德国，有类似韩国骑马舞的欢快和吸引大量人群围观过瘾的魔力。现代反相维相骑马舞如果说有什么集中点，就是如夏衍光先生讲的“不可能用数学方法或形式逻辑来加以证明，而只能用辩证逻辑去

加以说明”。但所谓“辩证逻辑”，万变不离其中主要是给予对方的“他手术”。我们就从赵常德先生推崇的《广义时空相对论与现有时空理论的对比》，来看夏衍光先生的骑马舞和骑马舞教材，以窥反相维相的韬光养晦。

问题的提出是中华民族要复兴。夏衍光说：现代物理学相对论、宇宙大爆炸、黑洞、虫洞、更高维等是随心所欲的主观臆造，导致了双生子佯谬、超光速佯谬、EPR 佯谬……。夏衍光乐道的“科学良知”是黑格尔的辩证逻辑：“就其为相关的事物的同一而言，是相等；就其为相关的事物的不同而言，是不相等”。黑格尔的话是是而非。请看夏衍光具体联系狭义相对论的解读：他批评爱因斯坦偏离黑格尔，认为“具有不同的时空起点和不同的时空终点的运动事件，并不是对同一个事件的不同观测”，所以爱因斯坦才得出即使是对于同一个客观事件，处在不同位置上的观测者将会得出不同的观测结果；爱因斯坦也由此得出时空观同时性是相对的，类似一把刚性的尺子，会因运动而收缩；一个标准时钟的走时率，会因为运动而变慢，这种类似康德与马赫的相对主义时空观。爱因斯坦有错，他夏衍光就要坚持客观性原理，创立广义时空相对论。

2）所谓客观性原理，可看夏衍光把自己与爱因斯坦的坐标变换对比。在他们两者讨论的问题中，位于 0′ 点的运动观测者，可把间隔平方写成

$ds'^2=C^2dt'^2-dr'^2=0$ （10-1）

而位于 0 点的静止观测者，可以把间隔平方写成

$ds'^2=C^2dt^2-dr^2=0$ （10-2）

式中，$dr'^2=dx'^2+dy'^2+dz'^2$，$dr^2=dx^2+dy^2+dz^2$

A．他说爱因斯坦认为：dr′ 是运动观测者用笛卡儿坐标表示的运动事件相对于起点（0′）的空间距离；dr 是静止观测者用笛卡儿坐标表示的运动事件相对于起点（0）的空间距离，dr≠dr′，dt≠dt′，但 $ds^2=ds'^2$，由此

$r=r'/\{\surd[(1-(V/C)^2]\}$ (10-3)

$t=t'/\{\surd[(1-(V/C)^2]\}$ (10-4)

$V=V'$ (10-5)

式中，V 是运动观测者对于静止观测者的相对速度（即运动系 K′ 对于静止系 K 的相对速度），V′ 是静止系对于运动系的相对速度。夏衍光说爱因斯坦狭义的错误就在于：把 r 和 r′、t 和 t′、V′ 和 V′ 这些具有不同时空起点和终点的坐标变量直接地加以比较。殊不知，具有不同基点的运动事件并非是同一个事件，建立在不同基点上的坐标变换的相互比较，已经违背了相互比较时所必须遵循黑格尔的辩证逻辑。但（10-3）和（10-4）式是编造强加给爱因斯坦的，dr≠ds，dr′ ≠ds′；可见这里的“唱红打黑”也可夹带“唱黑打红”。

B．爱学把 r 和 r′，dr 和 ds，dr′ 和 ds′ 是说清楚后才相互比较的，用的洛伦兹变换式也是正常人的思维。而广义时空相对论的辩证思维认为：dr′ 是运动观测者表示的运动事件从起点（0）移动到终点（0′）的空间距离（应用量杆）；dr 是静止观测者对同一个空间距离的描述（应用量杆），显然

$dr=dr'$ （10-6）

夏衍光说，基于相互作用传播速度的有限性，应有

$t=t'+\Delta t$ （10-7）

其中，$\Delta t=r/C$ 代表 0 点处的观测者收到同一运动信息所需的时间过程，显然 dt≠dt′。对于同一个运动事件，静止观测者得出的相对速度为 $V=r/t$

$V=r/(t'+\Delta t)$ （10-8）

而运动观测者得出的绝对速度为 $v=r'/t'$。因为 dr＝dr′，所以

$V\neq v$ （10-9）

尽管 $ds\neq ds'$ （10-10）

夏衍光说，这种不相等乃是由于观测位置的不同所造成的，这完全是主观原因。所以在客观性原理的基础上，夏衍光说才令

$ds=ds'$ （10-11）

夏衍光从而实现了自己广义时空相对论的坐标变换，即

$r=r'$ (10-12)

$t=t'/\{\surd[(1-(V/C)^2]\}$ (10-13)

$V=Cv/[\surd(C^2-v^2)]$ (10-14)

夏衍光说这里的时间坐标变换式（10-13）与爱因斯坦的形式相同。这是不真实的。上面的式子一些需要商榷。如（10-6）和（10-11），如果 dr 和 dr′ 是事先用量杆测量过距离，与时间无关，那么 dr＝dr′ 成立，但 ds＝ds′ 就不能成立和约定。因为 ds 和 ds′ 是用速度测算的距离。同理，因为其中 Δt 无法测量，（10-7）和（10-8）式不能成立，导致（10-9）式不能成立。$\Delta t=r/C$ 式的 r 也不能代表 dr 和 dr′ 已被量杆测量过。加之按夏衍光的操作原理离不开光速的传输约定，（10-12、13、14）式也不能成立。广义时空相对论为诈。

3）约定原理是与非。著名反相维相专家杨本洛教授终生梳理自然科学体系，最后得出结论要反对“约定论”。他说所谓的约定，是缺失实体化支撑。这是自欺欺人。众所周知，只要是在人类间作信息交换造成交换信息的，必然要约定。例如他的物质第一性原理和逻辑审查，难道不需要事先约定

物质、实体和逻辑等概念。约定不是决定实验结果，而是实验证明需用的形式逻辑或先导。

A、光速与光源无关，是类似声速与声源无关、原子钟走时率与人源无关，放飞的鸟速与车速无关一样，不是伽利略坐标变换式能解释的。但夏衍光却把伽利略变换硬扯到要与什么绝对的以太物质联系，类玩物理魔术约定绝对性。

B、光速测定办法也要靠约定。如设在量杆的一端是光源和计时器，在另一端是一面反光镜。以光子往返的时间除量杆长，求得光速。这类实验被爱因斯坦约定为真空不能超光速的基础。反相维相骑马舞，主要跳的是实数超光速。谭暑生教授跳往返光速不等的实超光速；有的则拿量杆沿地球要弯曲不是直线，或量杆不是在真空说事，作伴舞。夏衍光坚决维护爱因斯坦的光速不能超；但爱因斯坦的广义相对论实际还考虑有韦尔张量和里奇张量的协变效应，这样光速的实验就增加了一个“点内空间”层次；因为真空并不等价于点内空间。

特别是时空大尺度结构，如太阳、地球和月球构成的物体系统，就有引力潮汐现象的协变效应。夏衍光就曾约定说：如果站在太阳上的观测者用太阳上的钟（记做 t），站在地球上的观测者用地球上的钟（记做 t′），要能绝对同步地给出月球相对于它们的 $t=t_2-t_1$ 和 $t'=t_2'-t_1'$ 的时间坐标，那么地球上的时钟 t′ 与太阳的时钟 t 就必定具有绝对同时性，即 $t=t'$。但夏衍光把这种约定，只是寄托在伽利略变换之中。实际是不可能的。但他说，关键是凭借思维来辩证认定，如承认相互作用的传递速度是无穷大等价于同时性是绝对的，就对了。如牛顿事先就是这种假定，是思维与逻辑一致的。他认可。但爱因斯坦则不然，爱的逻辑是从实验事实出发，即相互作用的传播速度在点外真空等于光速，同时性是相对的。他不认可。但牛顿和爱因斯坦真矛盾吗？

C、夏衍光说，爱因斯坦理解的“相对”有错：他把站在运动系（K′）上的观测者与站在静止系（K）上的观测者，分别对于第三个物体系统（即运动事件或质点）做相对运动时，所经历的时间过程 $t'=t_2'-t_1'$ 与 $t=t_2-t_1$ 作相互比较，以及所形成的空间距离 t′ 与 r 作相互比较，这就有坐标变换问题。而牛学虽与爱学一样，都是把运动的钟与运动观测者锁定在相对运动坐标系（K′）的坐标原点（O′）上，把静止的钟与静止观测者锁定在相对静止坐标系（K）的坐标原点（O）上，然后再去确定一个事件在运动中所历经的时间过程（即时间坐标）与空间距离（即空间坐标）；但牛顿是对光速不管实验不实验，无论静止观测者还是运动观测者，只认两个物体系统之间的相对运动。这是站在超越一切时空范围的立场上的辩证逻辑，夏衍光反批评爱因斯坦，是借助自己的主观思维来认定一个运动事件的时间坐标和空间坐标，而不是实际测量过程。这导致把两个物体系统之间的相对运动，演变成三个物体系统之间的相对运动。

我们要问：牛顿做过绝对同时性的超光速实际测量了吗？夏衍光做过伽利略变换以太物质绝对性实验了吗？爱因斯坦是个类似摸着石头过河的人，因当时还没有量子隐形传输实验，没有贝尔不等式判别实验，所以不愿承认有点内空间，并舍弃虚数超光速，才提出 EPR 佯谬的。爱因斯坦约定：一个物体系统是运动事件（或质点），另外两个物体系统分别是运动系与运动观测者、静止系与静止观测者，何罪之有？即用（1）运动事件相对于静止系坐标原点；（2）运动事件相对于运动系坐标原点；（3）运动系坐标原点相对于静止系坐标原点等三种情形，来应付有协变效应相对运动的实际测量，是无可非议的。

3）协变与量杆的统一。夏衍光先生有一点是说对了：相对运动如果协变是客观的，那么刚性尺子和标准时钟作为国际上科学约定的计量标准也是客观的；这把刚性尺子，不会因某运动而标准收缩；这里标准时钟的走时率，也不会因某运动而标准变慢。夏衍光说，这是客体具有不依赖于主体的客观内容的客观性原理。对此也能说明爱因斯坦对三种情形划分的实际测量，是准确的。

以大尺度结构运动为例，里奇张量协变使星体圆周多点的潮汐形变有差异。但事情简单可简单，复杂也能复杂。简单是不考虑协变，就只设静止系只一个静止观测者，运动系只带一个运动观测者；或动与静两方只各取一个质点也行。但对运动有协变，随其运动的观测者只取一个，要同时观测报告运动协变在圆周多点潮汐的形变差异，实为强人所难。那广义时空相对论怎跳骑马舞？

广义时空相对论对此情形，夏衍光也反过来作过调整。即他在静止系不像爱学只设一个观测质点，而是设 n 个独立的旁观者进行观测。除开 n 个旁观者的观测误差，由于相互作用传播速度有限，加之运动东西的各处的协变点随其运动变化，在同时里反馈给不同位置的观测者有概率的不同，信息的不同，能处理好 n 个独立的旁观者的数据，也可求得运动协变星体的整体形变差异。即夏衍光的反弹琵琶一箭双雕，也许能给爱学相对论中的“钟慢尺缩效应”被认为是谬误说以解脱。因为爱学中的“钟慢尺缩效应”不是指科学约定的刚性尺子和标准时钟，爱学对运动的这一方，类似分成运动个体本身和随其运动的观测者两部分的；而运动这一方的协变效应，是集中反映在随其运动的观测者的计量工具代表的客观数据上。

夏衍光和赵常德两位先生对量杆长度和原子钟是客观制定的标准度量，不会因主观使用和移动而让标准度量改变，理解准确，这还可举即使作为量杆的原子钟虽也有频率变化，但其具体原因只有地球上发射电磁辐射存在的最低界线值约束磁压的变化，才造成原子钟频率的变化，并非是尺缩钟慢效应。反之爱因斯坦说的是运动过程的钟慢尺缩，也不是指量杆和原子钟的标准度量。可见广义时空相对论的纠缠，对普及科学也有独到的意义。

科学对全体，对国家、对民族、对未来等，是生产力。但科学也有“负负得正”；如在历史上已有很多对科学做过贡献的人，也许当时对这些个人并没有什么回报；对其个人来说也许是“负生产力”。就是现代，一些后来成功的科学，在未取得公认以前，也许这些个人也没有收到回报。但正如数学中有“负负得正”，除开计划中的科研在养人和预支经费外，科学也在大量运用“负负得正”。在与赵常德先生交谈时，我们双方心里都明白，分歧不管有多大，都是谈定的。赵常德等一批老科学家为掩护中华民族的复兴，贡献了一辈子，应该让他们继续走完下去。正如我们给他的书写的《序》中说，分歧也许来源“模具”不同。科学多模具和而不同，且安知不是“负负得正”。

12/2/2012

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Histological Changes In The Adrenal Gland Of Indian Female Mongoose, *Herpestes edwardsii edwardsii* (Geoffroy) During Estrus And Pregnancy

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Abstract: Present histological study was conduct to correlate changes which occurs in adrenal gland during the estrus and gestation in female Indian mongoose *Herpestes edwardsii edwardsiii*. During the gestation, diameter of three zones of adrenal cortex and medulla increases and variation in cellular structure relates with the histological synthesis of hormones for matching the environment to support foetal growth and also to maintain maternal and foetal homeastasis.

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Key words: Adrenal gland, Herpestes, Cortex, Medulla.

INTRODUCTION

Adrenal gland is a key for hibernation. and It plays an important role towards metabolism and homeostasis of mammal's .The life saver and life protecting hormones secreted by adrenal gland helps to withstand the stress and trauma during pregnancy. Mammalian adrenal gland is unique among the vertebrate where the steroidogenesis and chromaffin secreting cells are separated as cortex and medulla respectively. Gross morphology and weight characteristics for adrenal gland in population of small Indian mongoose , *Herpestes auropunctatus* are anatomically similar to those in cat, dog and typical in those carnivore .The minor adrenal response to seasonal fecundity, environmental characteristic and variation in population density may be a characteristic of carnivora quite in contrast observed in highly sensitive rodent (Tomich,P,1965)**.**However in order carnivora, environmental stress and seasonal variations induced pathological alterations in the adrenal gland which was observed in common seals, *Phoca vitulina vitulina* and in Mink respectively (Bragulla, H,*et,al* ,2004; Ramos, A. S *et,al* 1972).

Distinct trizonations of the adrenal cortex are zona glomerulosa, zona fasciculata and zona reticularis which are well marked in seals *Phoca vitulina (Richard*) (Sucheston, M.E.*et.al*,1980), bottlenose dolphin and striped dolphin of Atlantic sea(Vukovi,S, *et.al,*1961). However the cytological structure of adrenal cortex and medulla was studied in ferret *Mustela putoris* [Holmes, R. L,1961] and Indian grey mongoose *Herpestes edwardsii edwardsii* (Raju, P.V.P *et.al*, 1982) and ultrasonographic visualization in ferret (Kuijten,A.M,*et.al*, 2007). As per the available data the knowledge of the carnivore mammals is merge in this paper and attempt has been made to show the histotological changes in adrenal gland of female mongoose *Herpestes edwardsii edwardsii* (Geoffroy) which occur during estrus and pregnancy.

MATERIAL AND METHOD

For the present study the animals were captured alive as per breeding cycle [**8**] from rice field and nearby areas in Bramhapuri, District Chandrapur (Maharashtra),in a cage type traps which were baited with fish as a food and acclimatized to the laboratory conditions for a period prior to their use and animals maintained on diet containing fish and chicken pieces with ample of water .After a period of acclimatization adrenal gland was immediately dissected out and fixed for 24 hrs in alcoholic Bouin's fixative. After fixation adrenals were and dehydrated in different grades of alcohol, cleared in xylene and embedded in paraffin wax. Sections were cut at 5-6 µm thickness and stained with haematoxylene and eosin for routine histological observation.

RESULTS

HISTOLOGICAL OBSERVATION OF ADRENAL GLAND DURING ESTRUS

During the estrus period distinct trizonations of the adrenal cortex such as zona glomerulosa, zona fasciculata and zona reticularis as well as medulla is well marked. The cellular structure of zona glomerulosa has delineated from the capsule on the outer side fallowed by zona fasciculate and zona reticularis from the inner side. In zona glomerulosa the cells are spherical, compactly arranged and appeared as acinus like group ,each one with single nucleus with marked nucleolus (Fig.1)**.**The zona fasciculate is the major portion of the cortex with cuboidal cells, some columnar as well as polygonal in shape which are arranged in radiating columns. The

cytoplasm is homogeneous and the nucleus is spherical and centrally situated. The size of the nuclei increases progressivity towards the medullary part. The cells and their nuclei are larger than those of zona glomerulosa. The cells usually displays a single nucleus with a nucleolus (Fig.2). While zona reticularis is in the form of anastomosing cords of cells, which merges with zona fasciculate above and medulla below and having varing degree of shape and size. Blood spaces are also observed in the network of cell cords (Fig. 3).

During estrus the medullary zone is small and made up of small cells. Both the cell types are encircled by the blood vessels. The appeared cluster of cells, which are in the form of acini, shows small nucleus. The cytoplasm is granular, eosinophillic with few vacuolations (Fig. 4).

HISTOLOGICAL OBSERVATION OF ADRENAL GLAND DURING PREGNANCY

During pregnancy the diameter of all there zones increases and acinar structure of zona glomerulosa exhibits hypertrophy as compaired to estrus . The cells are elongated and cytoplasm is more vacuolated. The nucleus is rounded and some with darkly stained nucleolus (Fig.5).In zona fasciculata cells are large spherical to polygonal. The cytoplasm is more vacuolated and foamy while nucleus is pushed to one side which shows "Ballooning" effect. It is faintly stained, and contains darkly stained eccentric nucleolus (Fig.6). However zona reticularis is hypertrophied and cells are large with less foamy cytoplasm. The faintly stained nucleus is centrally situated and shows prominent nucleolus. Blood vessels are seen in the zona reticularis (Fig.7).

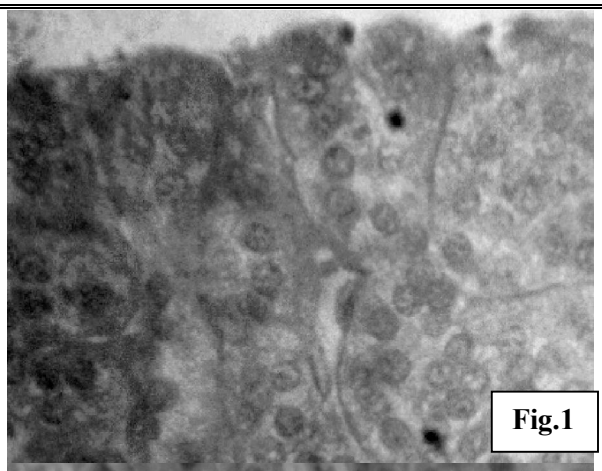
However during early and mid pregnancy the medullary zone is enlarged and very well developed with an increase in the cell dimension. The compactly arranged groups of cells are darkly stained in estrus and are seen scattered during mid pregnancy. The prominent feature during pregnancy is an increase blood supply to the medullary region (Fig. 8).

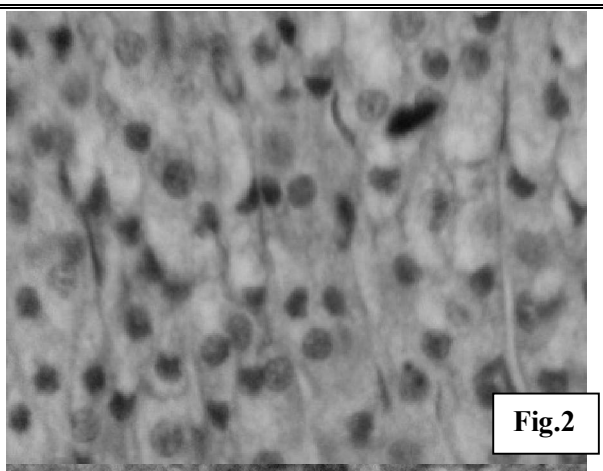
DISCUSSION

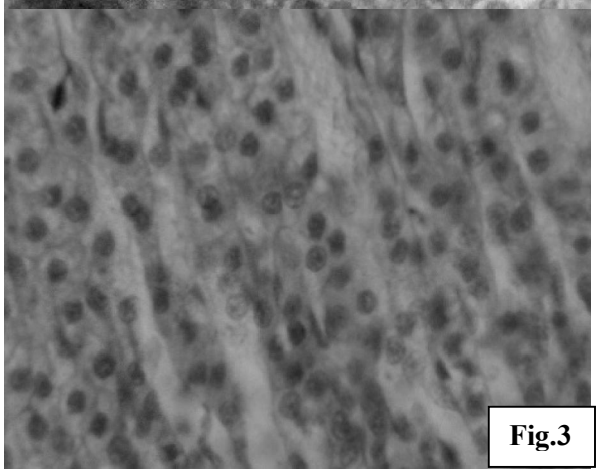
The adrenal cortex in this species differentiated in to three zones viz., zona glomerulosa, and zona fasciculata and zona reticularis. A distinct zonation of the cortex is observed in *M. schreibersii* (Panel, 1961), *V.pipistrellus* (Saidapur and Nadkarni, 1976), *M. lyra lyra* (Sonwane, 2010), *Taphozous kachhensis* (Chavhan *et.al* 2011). While in female bat *Taphozous longimanus* (Nerkar, 2009) has reported that the cortex is differentiated into two zone viz., zona glomerulosa, and zona fasciculata. Zona reticularis is absent.

Adrenal cortex during reproductive phases shows some remarkable features in respect to zone dimension, cell dimension and vacuolations of cytoplasm. Adrenal gland during estrus and pregnancy shows significant differences at structural level in respect to cortical cell. During pregnancy the zone dimension and vacuolation in zona glomerulosa, zona fasciculata and zona reticularis increases as compared to estrus. However, zona fasciculate is more hypertrophied than the other two zones. The ballooning effect is more prominent due to the large number of lipid droplets and the nucleus becomes eccentric. The hypertrophy of cortical cells seems to suggest that steroid secretion and elaboration from them must be involved with at least some aspects of gestation (Shetty, J, *et.al* 1965). The hyperactivity of adrenal during pregnancy in *Herpestes edwardsii* correlates with the findings of Wood and Barrnett, 1964.They observed an increase in maternal cortisol secretion during pregnancy in many species including man and it is assumed that increased that increased adrenal activity in *Herpestes edwardsii* may be for maintaining stress and environment to support the foetal growth and development as in other species. Because the insufficiency of which results in disturbances in the maternal and foetal homeostasis (Fadhil Al-lami, 1969). The above observations clearly show the normal synthesis of hormones in the medullary cells, which help the animal to cope up with the stress during the different reproductive period. As the stress during pregnancy is more, the cellular organelles are much more developed than the other periods of reproductive cycle.

Wood, J. C, *et.al*, 1964, have reported that the medullary zone takes part in the stress management in Syrian hamster. The medulla has more norepinephric cells during the cold stress and the depletion of the norepinephric cell occurred after the stress is over and exocytosis seem to be the mechanism involved in the released of catecholamines. Similar observations are also reported in mouse by Erannko, O, in 1955. The adrenalin and noradrenalin secretion of medulla play an important role in carbohydrate and fat metabolism. It keeps the glucose level high during stress by glucogenolysis in the liver and muscls cells so in addition to corticosteroid these hormones also assist in keeping control over the metabolic rate in the animal. Our results on medulla of *Herpestes edwardsii* are in conformity with other animals. As the stress of pregnancy increases further, the medullary cells also show further development.







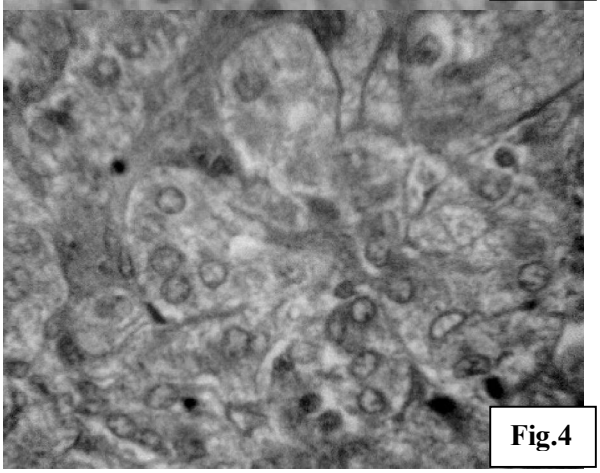
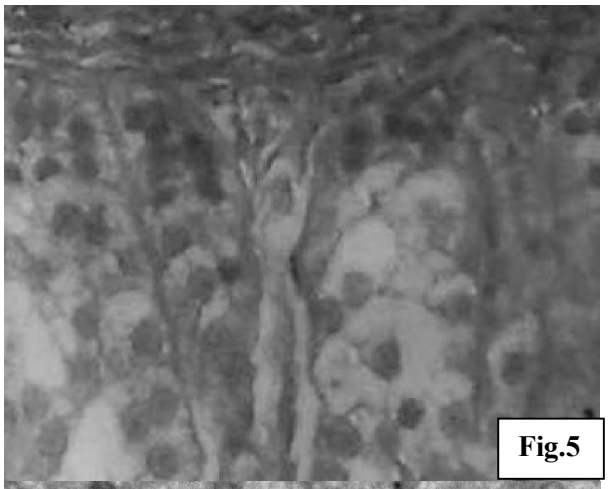


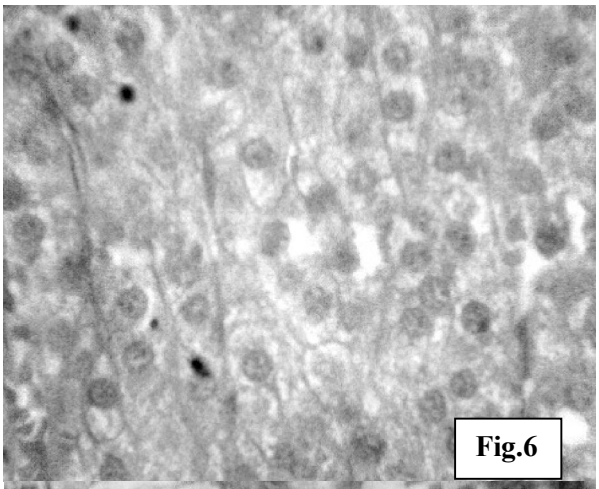
Fig 1. : Transfers section of adrenal gland during estrus period showing vacuolated cells of zona glomerulosa with darkly stained nuclei X 400.

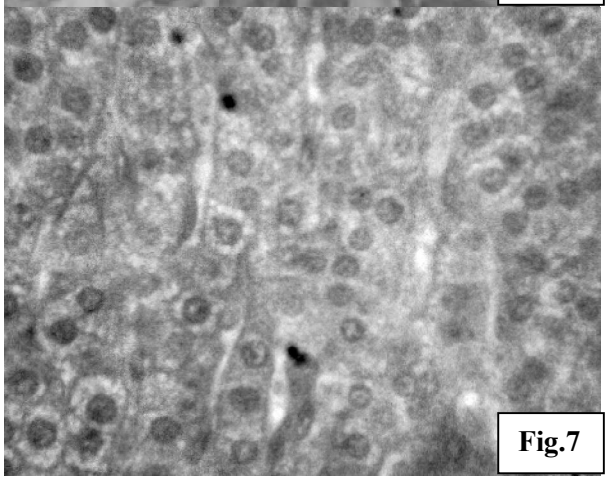
Fig 2. : Transfers section of adrenal gland during estrus period showing elongated cell cords of zona fasciculata (ZF) with vacuolated cell cytoplasm X 400.

Fig 3. : Transfers section of adrenal gland during estrus period showing zona reticularis (ZR) are in the form of anastomosing cords and having varing degree of shape and size. Each cell has eosinophilic cytoplasm with basicular nucleus blood spaces are observe in the network of cell cord of zona reticularis X 400.

Fig 4.: Transfers section of adrenal gland during estrus period showing medulla (MD) consist of cell arrange in irregular stands or acinus type surrounded by blood capillaries content darkly stained nucleus. Cytoplasm of cell is basophilic and granular in some cells ,vaculation is observed X400.







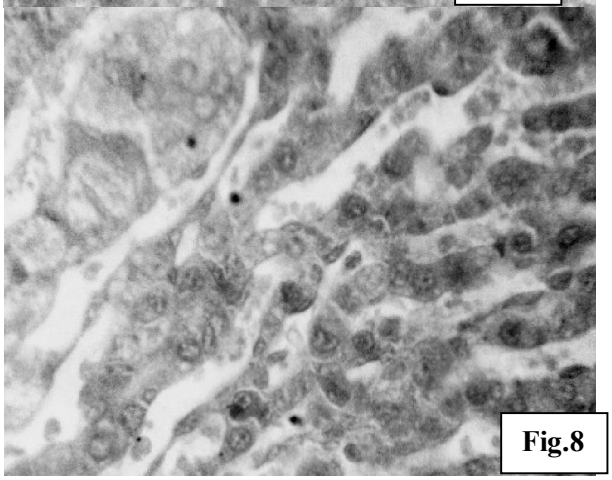


Fig 5. : Transfers section of adrenal gland during pregnancy showing elongated cells of zona glomerulosa (zg) with darkly stained spherical elongated nuclei X 400.

Fig 6. : Transfers section of adrenal gland during pregnancy showing elongated cell cords of zona faciculata (ZF) with cytoplasm is more vacuolated and foamy and nucleus is pushed to one side which shows "Ballooning" effect. X 400.

Fig 7. : Transfers section of adrenal gland during pregnancy showing zona reticularist (ZR) spherical shape of nucleus with prominant nucleoli X 400.

Fig 8. : Transfers section of adrenal gland during pregnancy showing medulla (MD) cells are scattered and surrounded by blood capillaries X 400.

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A Comparative Study Of Adjustment Of Male And Female Secondary School Teachers

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Abstract: The present study is an attempt to compare study Adjustment of Male and Female Secondary school teachers. (1) To study the comparative adjustment of male and female secondary school teachers. (2) To compare male and female secondary school teachers on various dimensions of adjustment. (1) Male and female secondary school teachers differ significantly on various dimensions of adjustment. The present study was conducted upon 60 secondary school teachers of different secondary schools of zone Hajin in district Bandipora Kashmir. For the selection of the sample normal random procedure was adopted. The age range of the subjects was from 30-50 years. The investigator collected the response of all the subjects and scoring was done according to the instructions given in the manual. (1) Female Secondary school teachers have more home problems than male. (2) Female Secondary school teachers have more health problems than male. (3) Male Secondary school teachers have more social problems than female. (4) Female Secondary school teachers have more emotional problems than male. (5) Both male and female secondary school teachers have similar occupational problems.
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Key words: Adjustment, Male, Female, Secondary school and Teachers

Introduction

Adjustment implies the process by which a person changes his behavior to achieve a harmonious relationship between himself and his environment. Life may be looked as a long series of adjustment which the individual is constantly adjusting himself to demands of external environment as well as both needs of his physiological and mental constitutions. The adjustment that he makes are not always healthy, sound or effective from the point of view of his lifelong welfare, but they are made as they seem at the moment to satisfy some of the needs. Thus the process by which the individual maintains a level of psychological and physiological balance between his needs and the circumstances that influence the satisfaction may be termed as adjustment.

Some psychological regard adjustment as behavior directed towards the reduction of tension. This means it is a matter of interaction between the individual and his environment. Hence a well adjusted individual is one who has reached harmony in his relation with his environment, but the adjustment is not a static condition. It is relative and temporary. The individual is for ever facing problems and devising ways and means to meet them. His needs and environment keeps changing and he is forever seeking adjustment, and if he is trained to face reality and meet his problems directly, he may be expected to do so in future as well. The adjustment thus means that characteristics way in which individual perceives, reacts to and satisfies the major needs of his life or solves the main problems of his life.

Adjustment is as old as human race on earth. Systematic convergence of this concept starts from Darwin. In those days the concept was purely biological and he used the term adaptation. The adaptability to environment hazards goes on increasing as we proceed on phylogenetic scale from lower extreme to the higher extreme of life. Man among the living beings has the highest capacities to adapt to physical demands but he also adjusts to social pressures in the society. Thus, we see that adjustment means reaction to the demands and pressures in the society. Thus, we see that adjustment means reaction to the demands may be external or internal to whom the individual. The demands may be external to whom the individual has to react.

Psychologists have interpreted adjustment from two important points of view: on adjustment and another adjustment and another adjustment as process.

Adjustment as achievement means how efficiently an individual can perform his duties in different circumstances. Business, military education and other social activities need efficient and we adjustment achievement, then we will have to set the criteria to judge the quality of adjustment. Four criteria have been evolved by psychologists to judge the adequacy of adjustment. They are: physical, psychological comfort, work efficiency, social acceptance.

Adjustment as a process is of major importance for psychologists, teachers and parents. To analyze the process we should develop an individual longitudinally from his birth onwards.

Maslow (1954) looks at adjustment as a process of planned satisfaction of hierarchy of needs from warm and caring relationship to others.

Allport (1961) looks at adjustment as continued action of the "proprium development", in terms of socio-psychological conditions.

May (1950) thinks of a truly well adjusted individual as one who shows more spiritual courage, to one who makes his own decisions, takes responsibility for the way he lives, pursues his own uniqueness and therefore finds meaning in his existence.

Dashiell (1937) Adjustment is a process that covers the individual's life span operating within a complex environment field. The process is goal directed behavior instituted by a need which may rise at any level within the hierarchy of needs ranging from elementary psychological issue through the most complicated psychological symbolization."

Scheider (1965) believe the adjustment stoves to cope with inner needs, tension, frustration and conflicts and to bring harmony between his inner demands and imposed upon him by the world in which he lives.

Significance of the study:

Since adjustment has a profound effect on the overall behavior of an individual whether male or female, it was decided to study the adjustment problems of the male and female teachers of Kashmir University. Adjustment here has a special connotation representing its four aspects viz. home, health, social, emotional conditions as given in the Bell's Adjustment Inventory.

The purpose of the study was to compare two groups of secondary schools teachers of different secondary schools on Adjustment.

Objectives:

1. To study the comparative adjustment of male and female secondary school teachers.
2. To compare male and female secondary school teachers on various dimensions of adjustment.

Hypotheses:

1. Male and female secondary school teachers differ significantly on various dimensions of adjustment.
2.

Delimitation of the problem

The present study is limited in its extent to the following:

1. The sample was drawn from the various secondary schools of education Zone Hajin Sonawari.
2. Research scholars were not included in the samples because of their meager number.
3. Sample was collected from different secondary schools of education block Hajin.

Operational definition of term and variables

Adjustment

For the purpose of present, adjustment is operationally defined as the scores, the investigator derived by the administration of Bell's Adjustment Inventory which has four related to home, social, educational and emotional.

Description of sample:

The present study was conducted upon 60 secondary school teachers of different secondary schools of zone Hajin in district Bandipora Kashmir. For the selection of the sample normal random procedure was adopted. The age range of the subjects was from 30-50 years. The investigator collected the response of all the subjects and scoring was done according to the instructions given in the manual.

Table 1 Showing the significance of mean difference between the secondary school male and female teachers on home dimension of adjustment.

Group	N	Mean/S.D.	t-value	Levels of significance
Male	30	6.23/1.34	1.26	Insignificant
Female	30	6.63/1.23		

The Table 1 shows the mean comparison of male and female secondary school teachers on home adjustment. The table shows that the calculated (t) value 1.29 is less than tabulated (t) value 0.05, which means that male and female school teachers do not differ on home dimension adjustment so the results are insignificant. The table further indicates that male and female secondary school teachers have similar home adjustment.

Table 2 Showing the significance of mean difference between the secondary school male and female teachers on health dimension of adjustment

Group	N	Mean/S.D.	t-value	Levels of significance
Male	30	5.13/1.24	2.66	Significant at 0.01 level
Female	30	5.93/1.14		

The Table 2 the mean comparison of male and female secondary school teachers on health adjustment. The table shows that the calculated (t) value 2.66 is more than tabulated (t) value 0.01, which means that male and female school teachers differ significantly on health dimension adjustment so the results are significant. The table further indicates that female secondary school teachers have more health problems than male secondary school teachers.

Table 3 Showing the significance of mean difference between the secondary school male and female teachers on social dimension of adjustment.

Group	N	Mean/S.D.	t-value	Levels of significance
Male	30	6.00/1.46	2.35	Significant at 0.05 level
Female	30	6.80/1.21		

The Table 3 shows the mean comparison of male and female secondary school teachers on health adjustment. The table reveals that the calculated (t) value 2.35 is more than tabulated (t) value 0.05, which means that male and female school teachers differ significantly on social dimension adjustment so the results are significant at 0.05 level. The table further indicates that female secondary school teachers have more social problems than male secondary school teachers.

Table 4 Showing the significance of mean difference between the secondary school male and female teachers on Emotional dimension of adjustment.

Group	N	Mean/S.D.	t-value	Levels of significance
Male	30	5.8/1.21	1.75	Insignificant
Female	30	6.3/1.22		

The Table 4 shows the mean comparison of male and female secondary school teachers on emotional adjustment. The table reveals that the calculated (t) value 1.72 is less than tabulated (t) value 1.96 level, which means that male and female school teachers do not differ on Emotional dimension adjustment so the results are insignificant. The table further indicates that male and female secondary school teachers have similar emotional adjustment problems.

Table 5 Showing the significance of mean difference between the secondary school male and female teachers on Occupational dimension of adjustment.

Group	N	Mean/S.D.	t-value	Levels of significance
Male	30	6.6/1.23	0.58	Insignificant
Female	30	6.6/1.32		

The Table 5 shows the mean comparison of male and female secondary school teachers on occupational adjustment. The table further reveals that the calculated (t) value 0.58 is less than tabulated (t) value 1.96, which means that male and female school teachers do not differ significantly on occupational dimension adjustment so the results are insignificant. The table further indicates that male and female secondary school teachers have similar occupational adjustment.

CONCLUSION AND SUGGESTIONS

A number of interesting and worthwhile inferences have been deducted in detail in present study. These inferences have drawn the attention of the present investigator to some conclusions and suggestions listed below:

Major Findings:

1. Female Secondary school teachers have more home problems than male.
2. Female Secondary school teachers have more health problems than male.

3. Male Secondary school teachers have more social problems than female.
4. Female Secondary school teachers have more emotional problems than male.
5. Both male and female secondary school teachers have similar occupational problems.
1. different zones of Kashmir.

EDUCATIONAL IMPLICATIONS

1. Adjustment has very important role in the life of secondary school teachers. Researchers have revealed that adjustment has a significant role in the academic achievement of secondary school teachers.
2. The present study has focused on the home, health, occupational, social and emotional dimensions of adjustment of male female secondary school teachers. The can be used as inputs for deriving intervention strategies so that male female are better adjusted to their environment.
3. The results of this study will equip the education department to study the psychology of adjustment of male female secondary school teachers.
4. It will lead to the deeper probing of the various research questions like why females are more adjusted than males or what the case may be. It will need the restricting/realigning of the factors responsible for maladjustment.
5. By studying the dimensions of the adjustment in its totality, one can make a holistic view of adjustment.
6. The study has helped the investigator to study the various parameters of adjustment like home, health, occupational, social and emotional areas in an objective and scientific way.

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Assessing characteristics of Online Education and comparing of Traditional Education

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Abstract: Distance education dictates changes in behavior for both the teacher and the learner. The successful student develops persistence and skills in self-directing work. The successful distance education teacher becomes conversant with new technology and develops new instructional styles, moving from creating instruction to managing resources and students and disseminating views. Administrative and faculty support for distance education are critical to the success of this instructional method. Administrators should take note that the implementation of a distance education program may allow access to a greater number of students. However, the time and work associated with teaching at a distance exceeds the normal requirements of campus-based instruction. Students in distance education settings perform as well or better on assignments, class activities, and exams when compared to campus-based students .Nevertheless, students must maintain persistence and a clear focus to succeed in a distance learning situation. Self-direction, a passion for learning, and strong individual responsibility are important influences on achievement. There are indications that distance education works best for more mature, motivated, well-organized, and already accomplished learners.
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Keywords: Online Education, Traditional Education

Introduction:

When the standardization and the requirements for training by the third millennium will be talking, unconscious form, design and construction to provide context and use tools and indicators to teaching the principles of community-based knowledge to the mind is centered. . No doubt these requirements and identify the correct tools and proper utilization of their functions according to accelerate the development expected in the knowledge-based information society will be effective. Such concerns and problems that any country in its development plans in motion to the information becoming a knowledge based society means a society would be faced with the centrality of knowledge, Dealing with existing tools and how these tools are used.

Led the way when dealing with those massive training programs available to speak to the technological tools that we expect to occur that planners and decision makers that planners and decision makers of large structures, especially university education according to the image Access to the development of community information are available on these tools are selected and used.

Massive wave of data produced in today's world it nicknamed the "information age" has all day and through various means of communication in the world will move on its size are added. Other hand, as we're not the world witnessed the development of the role of information communication devices transporting feedback fast and absorb the information around the world, we forget.

Therefore, information and communication as the main lever or two important moves in developing wings, we learn. Meanwhile, proper utilization of the capacities of these two valuable and effective indexes in the general development concept for any society and the principles of a critical need is considered. With a view to clarifying this issue can be paid in the best way to create a platform for developing data standards and access to a knowledge based society, what really can be. To achieve a clear and practical answer in this area before all the existing definitions and indicators mentioned placed.

What is Distance Education?

Distance education is education designed for learners who live at a distance from the teaching institution or education provider. It is the enrollment and study with an educational institution that provides organized, formal learning opportunities for students. Presented in a sequential and logical order, the instruction is offered wholly or primarily by distance study, through virtually any media. Historically, its predominant medium of instruction has been printed materials, although non-print media is becoming more and more popular. It may also incorporate or make use of videotapes, CD or DVD

ROM's, audio recordings, facsimiles, telephone communications, and the Internet through e-mail and Web-based delivery systems. When each lesson or segment is completed, the student makes available to the school the assigned work for correction, grading, comment, and subject matter guidance by qualified instructors. Corrected assignments are returned to the student. This exchange fosters a personalized student-instructor relationship, which is the hallmark of distance education instruction.

Historically, most distance education courses were vocational in nature, but today courses are offered for academic, professional, and avocational purposes for students of all ages. There are numerous specialized programs, such as those for blind persons and for parents of small children with hearing impairments. Distance education is available in practically any field, from accounting to zoology. Courses are offered in gemology, high school diploma, journalism, locksmithing, child day care management, yacht design, and many fascinating subjects.

Distance education courses also vary greatly in scope, level, and length. Some have a few assignments and require only a few months to complete, while others have a hundred or more lesson assignments requiring three or four years of conscientious study. Since 1890, more than 130 million Americans have studied at DETC member institutions, including Franklin D. Roosevelt, Walter P. Chrysler, Walter Cronkite, Barry Goldwater, Charles Schulz, and many other distinguished alumni of DETC members.

Unlike most distance education courses offered by traditional colleges and universities that are semester and classroom oriented, with courses offered by most of the DETC-accredited institutions you can study any time and anywhere. Distance education is especially suited for busy people who wish to increase their knowledge and skills without giving up their jobs, leaving home, or losing income. You learn while you earn. Many courses provide complete vocational training; others prepare you for upgrading in your present job, without losing wages, experience or seniority. You receive individual attention, and you work at your own pace.

In recent years, technology has played a significant role in transforming the traditional distance education school into a dynamic, interactive distance learning method using toll-free telephone lines, as well as a diverse array of personal computers, video devices, CD and DVD ROMs, online courses over the Internet, interactive devices, and other modern technological innovations. The future for distance study promises to be exciting!

Benefits of Distance Learning:

Benefits and opportunities that distance education provides, include:

- training a wide range of audiences.
- meet the needs of students and students who can not attend in place.
- Possible connection between students and students with cultures, beliefs and experiences are different.
- Benefiting from coaches and speakers who do not live in the country.

Educational methods in distance learning:

Today, under the new system replaced the traditional systems of learning and learning week (ie tutoring methods, lectures) are:

- **Multimedia courses:**

These courses and widely used elements of image, communication, graphics and simulated components, animation and communication elements for guidance and tips, and talk back on course and curriculum issues are held.

- **Enhanced communication mechanisms:**

The mechanism of any texts simultaneously, and asynchronous audio-visual communications to protect you. This case allows students to practice on topics learned will give.

- **Written test:**

thus, question and test via a distributed communication network, are corrected and returned. These exams through video conferencing support and runs**.**

-Virtual Seminar:

thereby different groups of students in different geographical environments linked together makes.

- **Collaborative virtual laboratories:**

the laboratory of the Group's activities are supported. Workshops such as software engineering.

-Smart academic factors:

academic factors that inform intelligent, support and guidance students pay.

Remote educational tool:

distance learning tools and supplies various uses. These tools in four main courses are:

A - Audio Tools:

Audio tools include training such as two-way interactive telephone, video conference, shortwave radio and a strain of tools such as audio tape and radio.

B - Image tools:

including slides, films, video tapes and video conferences.

C - Data:
computers as electronic data are sent and received. Because the data word description for a wide range of educational tools is used.
Computer applications for distance education are varied and include the following:
1- Training to Computer Management.
2 - Computer Assisted Instruction.
3 - through PCs.
4 - e-mail, telegraph, computer conference and the World Wide Web simultaneously.

D - Print:
The main element of distance education programs, particularly in the exchange and delivery system information tools are considered.

Pros and Cons of Online Education

Nowadays it is possible to do almost anything online.Many different types of diplomas, certifications, and academic degrees are available from online learning institutions.

This article discusses both the advantages and the disadvantages of online education.

The Internet has enhanced and changed every aspect of our life, and now it is making inroads into the world of education.

Online education and classes are not just a buzz; they are a new technology that is making a difference for teachers as well as students.

Online Education Pros

Of the many advantages and new possibilities of online education, here are some of the Strengths:

1. Greater flexibility

Online students have more freedom in choosing their programs and schedules. This allows many busy adults to adapt online courses to their already established everyday life of work and family. For many, this is simply the only way they can study for that degree which will take them farther in their career and life.

2. Saves Time and Money

Online education saves an enormous amount of time and money which in traditional education is wasted on commuting. Commuting is also very tiring, while online education means you can study from home, in a comfortable environment with everything you need close at hand.

Tuition also costs less for most online institutions.

3. Logistics

Traditional education is restricted due to logistical issues; there is only this amount of students who can be in a place at a given time, whereas in online classes, there is no question of paucity of space. As long as the online classes have the necessary bandwidth, an unlimited number of students can study, all over the globe.

Then again, traditional classes would turn up expensive to maintain, because the educational institution needs to maintain a place and its facilities.

When it comes to online education, all they need to do is to set up E-learning tools, an Internet connection and a website where people can learn. While this is not cheap too, but it is definitely cost less as compared to the costs of a place to carry on.

Online Education Cons:

To balance our view of online education, let's consider some of the disadvantages/Weaknesses:

1. Requires Self Discipline

The greater freedom of online classes requires greater self disciplines, but not everybody has it. The comfort of studying from home may also reflect negatively on your motivation to do your best.

Depending on your personality, home can provide as many distractions as traditional campus facilities (designed especially for studying).

2. How well have you learned

With online education, the students have a greater hold on the education process, and that is not always a good sign. For example, in online education, though the teachers set up the audio and video clips with the same dedication, it remains to be seen whether the students study it with the same dedication that they would in a classroom.

3. No Campus Life

Many people remember the college/university as the best time of their lives.

Part of it is the campus life – During and after classes. One of the disadvantages of taking online education rather than traditional one, is that in online education you will not have the atmosphere of campus lawns, corridors and classrooms, huge libraries with real books you can hold. There will be no campus buddies and no campus culture.

4. Internet Connection

Another negative point of online education is that it entirely depends on the internet connection. Though many countries have a robust Internet connection and others are getting it soon, there are still countries, and areas in countries that do not have

access to Internet and other enhanced technologies. It would be difficult to get online education in countries that have a limited online presence.

These are just some of the distinguishing points between online classes and traditional classes.

Online Education VS Traditional Education

This article reviews the differences and the pros and cons of online VS traditional education.

Gone is the world where only traditional, campus-based education existed and you only had to choose the university or college you wanted to study in.

Someday, probably in the near future, Online Education will replace traditional institutions. At least, many degree programs will combine the on campus courses as well as online classes as a standard educational approach.

But for now, the future student has to decide first whether he/she wants to study online or on a campus degree.

Here are some points to consider the pros and cons of online and traditional institutions:

Differences between Online and Traditional Education; Comparison

1. Convenience

One of the most striking, innovative, and unprecedented features of online education is their convenience for almost anyone. Persons busy with careers or families will be able to compose their schedules so that they fit their individual time constraints. This is possible because courses are delivered in the form of electronic-based modules online.

It is also convenient because it requires no commuting, saving a great deal of time and money.

It allows to study from home, with the only requirement being the possession of an adequate computer and internet connection. Basic computer skills only are required to acquire higher education online.

2. Expenses

Tuition costs less for most online institutions. Online education also eliminates the additional expenses usually entailed by traditional "campus life", commuting, and the purchase of study materials.

3. Feedback

Feedback is somewhat better in traditional education. Students can interact directly face to face with both classmates and teachers, which makes feedback easier to understand and faster to get.

Some online institutions do offer chat rooms and video/audio meetings.

4. Accreditation

The credit of online education depends on its purpose and context. If you only have online degree(s) and are just trying to find work, employers may prefer traditionally educated candidates.

If you are already an employed and valuable professional, online learning will be seen favorable as a way to improve your skills, expand your professional knowledge, and thus contribute more at work.

5. Ecology

Online education has obvious positive effect on the environment.

It may not be measurable now, but if online education largely replaces traditional institutions in the near future it will mean that less paper will be used for books and writing material and fewer campuses will be built while the number of students and employed teachers will only increase radically.

Disadvantages of Online Education: Drawbacks to Consider

This article reviews the main disadvantages of the online education.

As online services in general are revolutionizing Internet activity and the business industry – Online Education is becoming increasingly popular.

It is not merely a new trend – for many people it is the only convenient way to acquire education. Online education already provides unique new opportunities which hadn't exist before.

The distance/online Education has not come to replace Traditional Education yet. The number of online universities and colleges is still relatively small and their services are not as well established as the services of traditional institutions.

Online Education – Disadvantages

The following are its 4 main drawbacks one would want to consider.

1. Human Interaction

Online classes means there is not live, face-to-face classroom and office interaction between students and teachers. For many this is highly significant. Consulting lecturers in person and being able to discuss matters in groups, in and outside the class is, for many, an important motivational activity and learning strategy. Moreover, for many programs interpersonal communication is crucial, but it is not easy to seriously practice online. Many people also

prefer traditional campus-based education simply for the on-campus atmosphere and the opportunity to meet many people there face-to-face between and during class, conferences, campus parties, concerts, fairs, and various cultural events.

2. Study Materials

Online institutions provide all or much of their material online, which may be convenient, since you have to buy and photocopy less. But while online information in general is, of course, extensive, approved and trusted scholarly academic material is not easily to be found online.

The resources of online universities and colleges are not yet as extensive as those of traditional institutions with their on-campus libraries (and the private libraries of generous lecturers who will always lend you that hard-to-find book you absolutely must have for your paper).

3. No Lab Sessions

Degrees science, especially the natural sciences, require lab hours. Online education as yet cannot provide a substitute for actual hands-on experience that students find in the labs on campus.

Such experience is crucial in general, and it is often noted in particular by employees. One reason why graduates from traditional institutions are preferred is that they have extensive and relevant lab experience.

4. Difficulties of Self-Discipline

For many a significant advantage of traditional education is that it leaves little room for procrastination. You have to show up on campus and be in class, and for many this is a great motivational aspect and the reason for their eventual success. With online education the student has much more freedom. This can be both an advantage and a disadvantage. For many it is a disadvantage because it encourages procrastination. This leads either to unnecessarily prolonged studies or even failure to fulfill requirements, simply because there was too much freedom.

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Distance Learning: definitions and applications

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Abstract: Historically, most distance education courses were vocational in nature, but today courses are offered for academic, professional, and avocational purposes for students of all ages. There are numerous specialized programs, such as those for blind persons and for parents of small children with hearing impairments. Distance education is available in practically any field, from accounting to zoology. Courses are offered in gemology, high school diploma, journalism, lock smiting, child day care management, yacht design, and many fascinating subjects. Distance education courses also vary greatly in scope, level, and length. Some have a few assignments and require only a few months to complete, while others have a hundred or more lesson assignments requiring three or four years of conscientious study.
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Keywords: Distance Learning, Distance education

Introduction:

Enjoying and giving publicity to any of technological tools with the aim to facilitate and accelerate the training process, as well as increase the quality and quantity of knowledge quality and knowledge of a serious intelligence community needs to integrate and standardize the educational system society is.

Hence, considering the position and role of education in the third millennium on the basis of ICT is also a serious approach to the topic with the knowledge community centered on learning and general trends of technological tools to enjoy much of the information and Find the appropriate place in the information society Third Millennium That actually can be a global community and is without limit is undeniable-and-run. Guidance and therefore move in the direction of society should be education and technology for comprehensive pandemic done. Considering the above definitions and with the knowledge and attitudes towards the third millennium and the desirability and some weaknesses in the achievement of certain standards and dynamic structures in order to achieve a knowledge based society, there is. In the present circumstances to provide our information infrastructure development and integration inevitably link the elements and tools that they are as indicators of technology education and technology education will be remembered. In the new context of combining these two indicators comes to training facilities and a variety of tools that will provide guidance and development in information will be very effective.

While the effect of these two indices of body functions and its other fields (favorable to foster new ideas provides. Technologies training web-based technology as one of the most effective learning tools in educational issues have been identified and a total of E-learning as it is referred. . But if the scientific and cultural infrastructure with this technology's Day is not coordinated development of information will be obtained. This weakness caused by lack of growth and development of training required for pandemic knowledge of existing technology is. In many systems of scientific tools and capabilities needed to provide hardware and commissioning are still technological problems resulting from lack of knowledge of poverty and poor education in these centers to be seen.

In other words, the country still in the feasibility assessment and appropriate to make public the necessary training for operation and application of scientific principles and technological tools is has been done and why certain movements and sometimes non-normative point will not be able node an unlock.

The conditions and according to the capacity of developing countries and training facilities required a knowledge-based society feels is felt. If all processes in technology education and technology optimization and standardization of the Hungarian education should go, and appropriate channels that the best option in this area could benefit from state universities is capabilities.

According to the information in the development of any society should take half of the world to progress until the necessary coordination

and synchronization global developments so as to accept the design structure of a knowledge-based society have a special place for the University and respect the role of education and technology was In designing a model with global standards of dynamism and flexibility at first be necessary to select a sample that the facilities and communications needed for this purpose provide action and then determine optimal cognitive deficiencies than Hammett and weaknesses push.

No doubt the experiences of implementing these standards and to develop troubleshooting information using technological tools would be much more economical. That if we develop a range of information from a city university level and conduct more successful we'll be more acceptable was. Because the utilization and application tools and step up the information they've been successful. Therefore the most important first step needed to coordinate and synchronize technology education and educational technology standards and capability in the high user acceptability of the world is also enjoyed.

Definition of distance learning:

In distance education teachers often are separate and comprehensive. Preparation of educational materials, supporting learners under the supervision of a training center takes place almost never do as a group are not**.** For services to education and electronic learning aids such as printed materials, computers and the Internet rely on.

Another look at the educational system of a new e-business and artistic and is a comprehensive solution to the institutions that want to move in the direction that technology and change their teaching methods and environments are possible to achieve the new educational approach provides**.**

Benefits of Distance Learning:

Benefits and opportunities that distance education provides, include:

- training a wide range of audiences.
- meet the needs of students and students who can not attend in place.
- Possible connection between students and students with cultures, beliefs and experiences are different.
- Benefiting from coaches and speakers who do not live in the country.

Educational methods in distance learning:

Today, under the new system replaced the traditional systems of learning and learning week (ie tutoring methods, lectures) are:

- **Multimedia courses:**

These courses and widely used elements of image, communication, graphics and simulated components, animation and communication elements for guidance and tips, and talk back on course and curriculum issues are held.

- **Enhanced communication mechanisms:**

The mechanism of any texts simultaneously, and asynchronous audio-visual communications to protect you. This case allows students to practice on topics learned will give.

- **Written test:**

thus, question and test via a distributed communication network, are corrected and returned. These exams through video conferencing support and runs**.**

-Virtual Seminar:

thereby different groups of students in different geographical environments linked together makes.

- **Collaborative virtual laboratories:**

the laboratory of the Group's activities are supported. Workshops such as software engineering.

-Smart academic factors:

academic factors that inform intelligent, support and guidance students pay.

Remote educational tool:

distance learning tools and supplies various uses. These tools in four main courses are:

A - Audio Tools:

Audio tools include training such as two-way interactive telephone, video conference, shortwave radio and a strain of tools such as audio tape and radio.

B - Image tools:

including slides, films, video tapes and video conferences.

C - Data:

computers as electronic data are sent and received. Because the data word description for a wide range of educational tools is used.

Computer applications for distance education are varied and include the following:

1- Training to Computer Management.

2 - Computer Assisted Instruction.

3 - through PCs.

4 - e-mail, telegraph, computer conference and the World Wide Web simultaneously.

D - Print:

The main element of distance education programs, particularly in the exchange and delivery system information tools are considered.

Key factors in the process of distance education:

the process of remote training, the following factors contribute:

- Students:

Regardless of educational content, role and main element in the learning process students are responsible.

- Coaches and Teachers:

Success depends on a lot of educational activities the ability, skills and knowledge are the coaches and professors.

- Facilitators of communication:

Facilitator bases, as the bridge between students and mentors are. Must base expectations of teachers and educational needs of students and service coordination and communication to create.

- Support staff:

One of the important pillars of any development of distance education programs, by development group finds. Operational support staff such as student registration, copy and distribute their resources, order textbooks, security and copyright, and are responsible for the report.

- Management:

The group decision makers, builders and judges are considered to be educational and should be considered among the factors above, establish the correct relationship formation.

What is Distance Education?

Distance education is education designed for learners who live at a distance from the teaching institution or education provider. It is the enrollment and study with an educational institution that provides organized, formal learning opportunities for students. Presented in a sequential and logical order, the instruction is offered wholly or primarily by distance study, through virtually any media. Historically, its predominant medium of instruction has been printed materials, although non-print media is becoming more and more popular. It may also incorporate or make use of videotapes, CD or DVD ROM's, audio recordings, facsimiles, telephone communications, and the Internet through e-mail and Web-based delivery systems. When each lesson or segment is completed, the student makes available to the school the assigned work for correction, grading, comment, and subject matter guidance by qualified instructors. Corrected assignments are returned to the student. This exchange fosters a personalized student-instructor relationship, which is the hallmark of distance education instruction.

Historically, most distance education courses were vocational in nature, but today courses are offered for academic, professional, and avocational purposes for students of all ages. There are numerous specialized programs, such as those for blind persons and for parents of small children with hearing impairments. Distance education is available in practically any field, from accounting to zoology. Courses are offered in gemology, high school diploma, journalism, lock smiting, child day care management, yacht design, and many fascinating subjects.

Distance education courses also vary greatly in scope, level, and length. Some have a few assignments and require only a few months to complete, while others have a hundred or more lesson assignments requiring three or four years of conscientious study. Since 1890, more than 130 million Americans have studied at DETC member institutions, including Franklin D. Roosevelt, Walter P. Chrysler, Walter Cronkite, Barry Goldwater, Charles Schulz, and many other distinguished alumni of DETC members. Unlike most distance education courses offered by traditional colleges and universities that are semester and classroom oriented, with courses offered by most of the DETC-accredited institutions you can study any time and anywhere. Distance education is especially suited for busy people who wish to increase their knowledge and skills without giving up their jobs, leaving home, or losing income. You learn while you earn. Many courses provide complete vocational training; others prepare you for upgrading in your present job, without losing wages, experience or seniority.

What is Distance Learning: Definition of Distance Learning?

Distance education or distance learning is a mode or education which provides its service online, via specially designed Internet applications (called e-Learning software application), to individual students who study from home or any other convenient place of their choice, as long as it has an Internet connection. It is called distance learning, because students can learn "at a distance", i.e. without the need to commute to remote campuses and be present during classes in person – Distance students study from home, via computers.

The Distance Learning Main Aspects

Let us define and consider some features it provides:

1. No Physical attendance: The traditional model of education requires regular physical attendance in classes in a specific geographically located campus. This has always been both a source of interest and a source of difficulties for many students. It requires strict attendance during the day only and entails travel expenses and time spent commuting instead of studying.

The distance learning model eliminates physical campuses, eliminating the need to waste time and money on travel. It allows students to take courses during individually scheduled hours in any time of day or night. It means, furthermore, than now

it is possible to attend any institution, regardless of how "where" it is located geographically – all online institutions are located online and admit students from any country, no matter how remote. It should be noted that some online education programs do require occasional physical attendance on specially designed sites, most often for the purpose of taking an exam.

2. High-Quality Education: A very important point to be aware of is that Distance Learning becomes increasingly recognized as high-quality education. That is, it is not simply a poor substitute to the traditional model, but very valid option for anyone to take.

3. Human interactions: Distance Learning is often criticized for its lack of real human interactions, but more and more courses are offered using real-time live video lectures, in addition to email, chat, message boards, and forums for communication.

4. Multimedia: In addition, online courses allow uses of multimedia which are impossible in traditional classes.

5. Continues Education – Or adult Education: The segments of society currently most enthusiastic about online education are primarily adults who work full time and parents. Tuition are either a little lower or compatible for those for traditional education.

Conclusion:

In general, new methods of educational systems to countries around the world as a necessity and need for learning and training opportunities to study in areas with different climatic features and conditions of learning and education according to their gender and cultures, has been. Each method is mentioned with regard to changes in features and creates an education system, and evaluation is used. Judgement of distance education in an educational way, first as a necessity to eliminate barriers to educational climate and geographical areas, age and gender restrictions learners began their work And more in a death education system, especially in the philosophy and goals based on theories of learning theories have evolved to find and promote professional growth. Approach to distance education with regard to the necessity of education in countries formed.

Emergence and development of information societies is the consequences of industrialization. Despite the diversity of information in various forms of media in local, national and international, access, exchange and use of various information easier than last time is. Information society, a member of your buddies know that open information system in terms of geographical location and the last 25 years, organizational development, are limited. Distance learning faster than other forms of training has been. Growth factor in the economic interests of this type of educational approach, flexibility and remove the distance can be named. The methods of distance education, required for building physical education is not providing services. Teachers and trainers in this method - compared with traditional methods - and have more opportunities to more people than are being trained. In this type of teaching style of each person in each academic field, and each job can be arbitrary in time and space, trained without having to leave the house for work or business is education. This method requires that students are dispersed over long distances provides. Distance learning advantages of distance education in comparison with traditional education, the need for physical locations and training programs limited to no specific time period. In this type of teaching style, learning for life without possibility of spatial and temporal constraints for each individual there. In distance education, problems related to lack of qualified teachers and appropriate educational environment - as it posed in the traditional method of M is - is resolved. In this way the use of advanced features in digital libraries and search the various sites during the study, time and cost savings are.

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