California Takshila University

"Tamaso Ma Jyotirgamaya"
Lead us from darkness to light

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Entrepreneurship in Silicon Valley

Ryan Baidya

Division of Entrepreneurship and Global Business of California Takshila University participated at a small business forum organized by Mr. Mike Honda, member of US-House of Congress.

Honorable Congressman Honda encourages local organizations, institutions and academic establishments to take more active role in helping the nation sailing through the current economic hardship. He encourages in self-reliance and sustainable business development. Congressman Honda expressed optimism in what California Takshila University is doing especially it's renewable energy projects and self-reliance business development through grass-root level engagements in global scale.

A panel of business leaders and bankers were also present at the forum. They all provided views from the other side of the coin so that entrepreneurs and family business owners better prepare for the current economic and business environments. Over all it was an excellent forum for the early and experience entrepreneurs, educators and governmental professionals.

California Takshila University, Biopreneur and The Entrepreneurs Network (TEN) regularly organize forums and events at Santa Clara center, While TEN offers many high-tech related (e.g., Androids, Mobile-Apps and communication) forms, Takshila and Biopreneur focus on entrepreneurship in renewable energy and bio-business.

DOING BUSINESS IN INDIA

Ryan Baidya

Doing business in India in the 21st century is on one hand not so much different than doing business in any other emerging or industrialized country. On the other hand doing business in India is a unique undertaking if one expect optimum outcome in a reasonable time.

Why this is the case?

India is a country with a distinct philosophy, ideology and ethos. India was under outside threats from the 11th century when her trades and economy were at her peak- The best in the world. People of India lived under outside rulers for 750 years until her independence in the mid 20th century. Ironically all those influences did not affect much of her core ideology and identity. One's ideology and identity makes the character and personality of the country. Though India externally seems to be reasonably comparable with the western world, India remains an interesting and mystic society – understanding India require serious learning and dedication.

In Max Muller words:

"*If I were asked under what sky the human mind has most fully developed some of its choicest gifts, has most deeply pondered on the greatest problems of life, and has found solutions, I should point to India*."

-Max Mueller, German Scholar, 1823-1900

Successfully doing business in India requires an array of complex skills and sound understanding of the nation and its people compared to the knowledge needed to do business in most other emerging and western countries. Followings are a few key areas one might build competence in:

(1) Origins of India: Historical and Contemporary India
(2) Culture of India: Society, Spirituality, Belief-systems, Rituals and Customs
(3) Economics, Business and Politics of India
(4) India as an Emerging Market: A two Market system
    a. Commercial Center Markets (Bangalore, Chennai, Hyderabad, Mumbai, and New Delhi)
    b. Rural India- Market
(5) Work-force and human resource management in India
(6) Management Style
(7) Communication, Negotiation and Deal –sealing in India
(8) Education and Educational Institutions in India
(9) Living in India – the Infrastructure and Public Services

WHAT IS INDIA

India is not simply a geographic location. It is a concept that is continuously shedding, shaping and reshaping like an epidermis-outer layer of an organism. India is alive with both multiplicity and continuity. It is an unusual blend of cultures, religions, races and languages. The nation's identity and social structure remain protected by a rich cultural heritage that dates back at least 10,000 years, making India one of the oldest formal social-systems in the world.

Recent genome analysis: Indian is the mother of all Asians. The ancestors of the contemporary population of China, Japan and other East Asian countries migrated from India, according to a research study conducted by a team of scientists from 10 Asian countries. India, China, Japan, Indonesia, Malaysia, the Philippines, Singapore, South Korea, Taiwan and Thailand were all part of this scientific study and analysis.

ONE OF THE FASTEST GROWING MARKETS

The Indian market with its over 1.1 billion populations, presents attractive and diverse opportunities for international companies that have appropriate and suitable products, services, and commitment. India's requirements for equipments and services for major sectors such as energy, environmental, healthcare, education, research, high-tech, infrastructure, transportation, and defense will exceed tens of billions of dollars as the Indian economy further expands internally and globally. India's middle class is estimated to be as large as the entire population of the United States. India's GDP grew at the rate of 8.7% in 2007-08, and it has potential for a sustained growth of 7-10% for the next ten years.

India as an emerging Market

SOME FACTS AND FIGURES OF INDIA

Official Name: Republic of India

Independence: 15 August 1947 (from British)

Government type: Federal Republic

Capital: New Delhi, **Financial Center:** Mumbai

Legal system: Based on English common law; limited judicial review of legislative acts;

Currency: Indian Rupee (Rs)

GDP: $1.16 trillion, **Per Capita (PPP):** $4,139 (2007-08)

Geography: India has vast open ocean-fronts (east, south and the west) and on the north it has Himalayan mountain range.

- Location South Asia bordering the Arabian Sea to the west and the Bay of Bengal to the east. India shares land boundaries with Bangladesh, Bhutan, Burma, China, Nepal, and Pakistan
- Area 3,287,590 sq km

Population

Total - 1,129,866,154 (July 2007), Urban population (% of total) - 28.4

Age structure:

- *0-14 years:* 34% (male 189,487,322; female 174,123,490)
- *15-59 years:56.9%* (male 303,400,561; female 282,238,162)
- *60 years and over: 7.5%* (male 37,768,327; female 38,853,994) (2001 census)

Population growth rate: 1.60% (2007 est.)

Life expectancy at birth: Total population: 68.59 years (2007)

Male: 66 years (2007), Female: 71 years (2007 est.)

Literacy (2001census): Definition of Literacy: age 15 and over can read and write

Total population: 64.8%

Male: 75.3% Female: 53.7%

Religions

Hindu 80.5%, Muslim 13.4%, Christian 2.3%, Sikh 2%, Buddhist 0.8%, Jain 0.4%, other 0.6%

Languages

India's 1.1-billion people speak more than 6,500 languages and dialects, according to the 2001 census. However, many of the spoken languages and dialects are in the verge of extinction due to low population and none or little use for livelihood.

The major official language of the India is Hindi that is the primarily used by over 300,000,000 people. Other most common regional official languages are: Bengali, Telugu, Marathi, Tamil, Gujarati, Malayalam, Kannada, Oriya, Punjabi, Assamese, Kashmiri, and Sindhi.

Though English has associate status, it is the most important language for academic, political, and business communication. English has become a "lingua franca" and is the accepted language for commerce and government works.

~~ **Ryan Baidya**, PhD, MBA

California Takshila University

Creative Royalty Structures for Life Science Companies

William Fabbri

Depending on the segment of the life science industry (e.g., pharma, medical device, diagnostic) and the stage of development (discovery, preclinical, Phase 1, Phase 2, etc.), there are generally accepted ranges for royalty rates in license or partnering agreements. Typically, the royalty is a percentage of net sales (gross sales less certain expenses such as shipping, taxes, packaging, rebate costs, etc.). However, rarely is the royalty as simple as a single percentage on all net sales. The royalty provisions of any major license or partnering transaction will include some or all of the structures described below[1]. By using many of these creative royalty structures, licensors and licensees can bridge negotiation divides and improve their respective deals terms.

Tiered Royalties

A flat royalty rate on all net sales may not make sense where there is uncertainty as to the commercial value of the licensed product or technology or where there is disagreement between the licensor and licensee as to its value. Given that licensed products or technologies are usually several years from commercialization there will be substantial uncertainty regarding the ultimate commercial value. Since a billion dollar a year drug has more value than a two hundred million a year drug, a higher royalty rate is appropriate. A tiered royalty that increases with net sales can enable the parties to reduce risk and bridge a valuation spread, aligning the royalty with success of the licensed product. Typically, the tiered royalty rate will be structured so that the increased royalty rates will apply to net sales above a specified threshold (e.g., net sales up to $250 million at 8%, net sales between $250 million and $500 million at 10% and net sales above $500 million at 12%). As discussed below, a tiered royalty will have an impact on other royalty structure variations.

Combination Products

When the licensed technology may be sold as one component of a product, the license or partnering agreement usually will provide that royalties are payable only on the percentage of net sales of the product that are attributable to the licensed technology. If the components of the product are also sold on a stand-alone basis, this calculation is simple (i.e., the stand-alone price of the product based on the licensed technology divided by the aggregate stand-alone prices of all the components). If each of the components is not or cannot be sold individually, the method of calculation is open for negotiation (e.g., the relative cost of manufacture

[1] There are a number of royalty issues that are not discussed in this article such as how to calculate net sales, whether to apply any offsets to royalties due, how to determine royalties where payments include non-cash consideration and the effect of foreign currency fluctuations on royalty payments, among others.

of the components, the increase in net sales of the new combined product, etc.). Where the licensed technology is combined with a product that is not patented, the licensor may seek to have the royalty percentage paid on the combined product (i.e., no reduction in the net sales subject to the royalty). In some cases where the licensed technology is likely only to be commercialized as a component of a product, it may make sense not to attempt to calculate the relative values of the components but simply have the royalty rate apply to net sales of the combined product at a reduced rate to that of a similar standalone product.

Sublicensing

Frequently a licensee will sublicense the technology to a larger pharmaceutical or biotech company as part of a partnership or collaboration. In such cases where the original licensee will not be commercializing the licensed technology, a royalty on the licensee's net sales will result in no payments to licensor. Therefore, provisions dealing with payments due to the licensor in such context are necessary. Typically, such provisions will either grant the licensor a royalty on the net sales of the sublicensee or grant the licensor a fixed rate of the payments received by the licensee from the sublicensee. In either case, the rate received by the licensor may vary based on the size of the royalty or other payments received by the licensee from the sublicensee (e.g., the rate increases if the sublicensee royalty obligation is over 12%). This enables the parties to taken into account that a partnering deal done at a later stage will result in larger payments to the licensee from the sublicensee than an early stage deal.

Multiple Sublicenses

license it to different parties in different territories (e.g., U.S. rights, European rights, Asia rights, etc.). Therefore, a license with tiered royalties should take into account that the licensee may sublicense products to multiple parties under different terms. The licensor will want a mechanism to adjust the net sales amounts at which the royalty rate adjusts based on the percentages of net sales that are and are not subject to a sublicensing arrangement compared to the total net sales. The licensee will want no adjustment mechanism, resulting in lower royalty rates.

Know-How Royalty/ Patent Misuse

Royalty payments are often tied explicitly to patent protection, in which case the term during which royalty payments are due is limited to the term where patent protection still exists in a particular jurisdiction. However, from the licensor's perspective there may be reasons it feels justify the payment of royalties beyond the patent term, such as the licensee benefiting from the market share built up during the patent term even after patent expiration[2].

However, under the doctrine of patent misuse it may be deemed an anti-trust violation for a royalty to be payable beyond the term of the applicable patent. Where significant know-how has been transferred from the licensor to the licensee, the licensor can argue that the royalty term should extend beyond

[2] This is particularly relevant where the licensed product is a biologic, where there are still significant regulatory barriers for competitor products, even in an age of biosimilars.

the patent's expiration because the know-how can still provide the licensee an edge against generic competitors. Licenses providing for royalty payments beyond the term of the licensed patents, typically structure the royalties to be payable for the longer of a period of time following first commercial sale of the licensed product (e.g., 15 years) or the expiration of the patent coverage. Following the patent expiration or generic competition entering the market, there will be a step-down (reduction) in the royalty rate and the post-expiration royalties will be in consideration for the know-how license.

In the event it contains both a know-how or step-down royalty and tiered royalties, the licensor may consider a mechanism similar to that described in the Multiple Sublicenses section above to adjust the net sales amounts at which the royalty rate adjusts based on the percentage of net sales that are in jurisdictions with patent protection and the percentage of net sales that are in jurisdictions that are only subject to the know-how royalty compared to total net sales.

Anti-Stacking

It is not unusual for a licensee in the course of developing a licensed product to license additional intellectual property from a third party, either because such intellectual property is required to commercialize the product or it will improve the product. Therefore, licensees will typically request anti-stacking provisions, which reduce the royalty percentage payable to the licensor by the percentage of the royalty being paid to the third-party licensor. Typically, the licensor will seek a maximum percentage (e.g., 50%) that the royalty rate may be reduced regardless of the total third-party royalty obligations of the licensee. A licensor may also want to distinguish between a license from a third party with a dominant patent position (i.e., a license necessary to effectively use the licensor's technology) and a license from a third party that the licensee desires to improve some aspect of the product better, granting a reduction in the former but not the latter situation.

In the event it contains an anti-stacking provision and tiered royalties, the licensor may seek a mechanism similar to that described in the Multiple Sublicenses section above to adjust the net sales amounts at which the royalty rate adjusts based on the percentage of net sales that are in jurisdictions were a third-party royalty is also due and the percentage of net sales that are in jurisdictions that are not subject to any third-party royalty compared to total net sales.

Licensors and licensees enter start negotiations having different expectations, goals and valuations of the licensed technology. The use of a single, flat royalty rate is a very blunt tool to bridge these differences. By using many of these creative royalty structures, licensors and licensees can bridge negotiation divides and improve their respective deals terms.[3]

William Fabbri is the founding member of Fabbri Law, LLC. Mr. Fabbri provides a broad range of corporate legal services to life science companies. He works with clients on a number of transactional and contractual matters including business development transactions such as licensing, collaborations and distribution agreements, core industry agreements such as sponsored research, manufacturing, clinical trial and CRO agreements, financings, corporate governance and Board matters and employment and consulting agreements. Mr. Fabbri can be reached at wfabbri@comcast.net or 617-875-7190.

[3] Because of the generality of this article, the information provided herein may not be applicable in all situations and should not be acted upon without specific legal advice based on particular situations.

Startup and Founder

Akio Sakamoto

Introduction

My name is Akio Sakamoto, Iam originally from Japan and has been living in USA since 1987.After graduating from school; I joined NEC Corporation in Japan as a software engineer. From a software engineer I went ahead in my work career and became a CPU hardware designer and later got promoted as the Engineering Manager.

I moved from Japan to USA to start Internet Protocol Network business where I founded and managed IP (Internet Protocol) network division of NEC, America, as the General Manager. After my resignation from NEC Corporation in 1996, I started up Holon Tech Corporation in San Jose. Holon Tech developed world's first “Server Load Balancer", which had worldwide market and sales.

In 2001, IP (Intellectual Property) was sold and closed business after the IT bubble crash.

Coincidentally, NEC spun out a laboratory team at Silicon Valley where I was hired as the CEO, of a new company called Auraline, Inc. Auraline, Inc was a Internet Marketing Service Provider. After one year, I came up with a new idea of Database Security and I founded a new company, IP Locks, Inc, on February 2002 in San Jose. In 2008, IP Locks INC was sold to Fortinet Inc.

Currently, Iam trying to raise fund, approximately $3M to start a new company related to Biometric Authentication. To startup, I have about 40 patents including Processors, VoIP, Database Security, etc.

Startup

Iam 64 years old and I can retire at anytime. However, I still want to work and contribute myself to our society. I believe that human being was created to contribute what they possibly can to their society and have satisfaction in their contribution. Everyone has a choice on what they can contribute, whether you start your own company or work for a company that already exists.

I want to start a new company again as a Founder and CEO, with new product ideas. Below are the other various reasons why i would like to start my own business.

1. I want to be the first in the world with my new product idea in market segment. I like the challenge to lead the world with my new product and make a contribution to the society for healthy growth and development.

2. I would like to have an exciting team, which includes sales and distribution and the end users of my new product. This process is a great challenge and equally exciting for me.

The excitement for me, is not the result of the process but would be generated from step by step process approach, to the set goal or dream.

3. I do not like to be instructed by anyone to achieve my goal or job. I want to plan, implement and review the target/ goal by myself and would like to be the final decision maker.

I do no mind if the company goal or target is set by the company board as long as Iam part of decision making.

When I started my first company, Holon Tech, the startup offer came from my immediate boss of NEC. He asked if I was willing to resign NEC and form a new company, of Internet related products while we were in the same flight from San Jose to New York.

He said if I agree, he would convince NEC upper management to invest some fund for the new company. I immediately said "Yes", my boss convinced NEC president and VP level within few months.

I started Holon Tech with $3M fund from NEC, the total amount invested by NEC was $10M and received $30M from other investors. When I started IP Locks, Database Security Software Company, a banker introduced me to CFO, who was confident to raise funds for IP locks which I could use whenever I needed for the company.

The total amount raised was $27M. Startup for me, would mean, I must have some investors who could raise fund until the business becomes the world leader and profitable. A business could be started without million dollars depending on how good and efficient the product is. However, eventually hundreds of thousands and millions of dollars are needed for expansion phase.

Founder

Founder, for me, means a team consisting of several members until the startup company can hire salary based employees.

The Founder or Founder's work for the business plan, product Research and Development, product Marketing & Sales and G&A (General and Administration) without any payment at their own expense.

In return the company pays them founders stock.

Currently, I am trying to raise $3M for startup, eventually the company would need $10M to $20M within 3 years.

As the Founder, I have myself as the CEO, VP Finance, VP Sales & Marketing, Software Development team leader and part of board advisor.

We issue the founders stock with 4 year vesting schedule similar to employee stock option. I have also a few fund raising consultants with success, based on compensation.

Generally speaking, fund raising compensation is 3% - 7% of the fund raised. If you could raise $1M, we would pay you, for the instance $1M x 6% =$60K.

Whether you can raise the fund or not depends on your product idea and the founding team members. How to find or create a new product idea will be written in the next paper if Iam given the opportunity.

My Fiji

Sonika Samy

Fiji, my home, my identity and nationality. It is an archipelago in the South Pacific Ocean blessed with 333 beautiful islands of which around 100 are inhabited with total area of 18376 square km of land. The four largest islands of Fiji are Viti Levu, Vanua Levu, Taveuni and Kadavu. It is surrounded by beautiful coral reefs, mountains and dense rainforest located in the central region of each island which covers large portion of the land. It is one of the first places in the world to see the first sunrise, as the 180 degree meridian - also known as the International Date Line runs right through the middle of Taveuni.

Coming from Fiji with an ethnic Indian features make a lot of people question about my background.

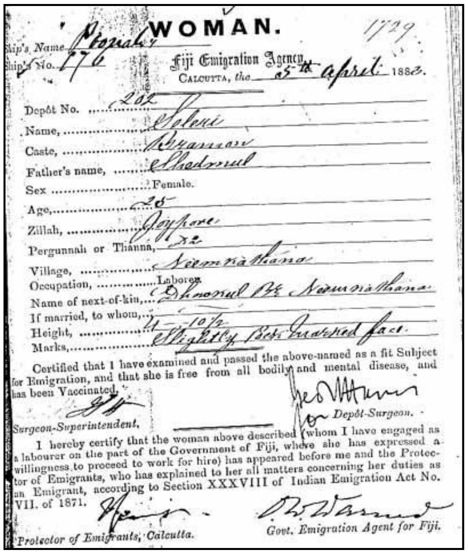
Let me briefly begin from the ancient history of Fiji. In 1643, Dutch explorer Abel Tasman accidentally discovered Fiji Islands. British Captain James Cook explored Fiji in 1774 and Captain Bligh of the famous mutiny on the bounty tale navigated it in 1789. The first European to land in Fiji was shipwrecked sailors and runaway convicts from British penal colonies in Australia, sandalwood traders and Christian missionaries.

During these times the native Fijians were powerful warriors and cannibals, mostly engaged in tribal warfare's. They were known to be the finest builders of sailing vessels in the Pacific but not great sailors. In 1854 the paramount chief Ratu Seru Cakobau converted to Christianity followed by other indigenous Fijians. The tribal warfare and cannibalism ceased after adapting Christianity. In 1871 Ratu Seru Cakobau was pronounced King and a national government was formed, which created many problems therefore in 1874 Fiji was ceded to British Government.

Fijian Warriors

Sir Arthur Gordon

The first substantive governor Sir Arthur Gordon in 1874, instituted plantation system, in order to promote economic development. The indigenous Fijians were not culturally ready to work and the plantation owners refused to employ them, also the cost of hiring Polynesians was high. Since Sir Arthur Gordon had previous plantation experience in Trinidad and Mauritius with Indians, the British Government looked into Crown Colony of India for cheap labor.



WOMAN. 1729

Ship's Name Poonah

Ship's No. 176

Fiji Emigration Agency,
CALCUTTA, the 5th April 1883.

Depôt No. 202

Name, Solone

Caste, Braman

Father's name, Shadrul

Sex Female.

Age, 25

Zillah, Joyfore

Pergunnah or Thanna, [illegible]

Village, Neemnathana

Occupation, Laborer

Name of next-of-kin, Dhnorul Bt Neemnathana

If married, to whom,

Height, 4 – 10½

Marks, Slightly Pock marked face.

Certified that I have examined and passed the above-named as a fit Subject for Emigration, and that she is free from all bodily and mental disease, and has been Vaccinated.

Surgeon-Superintendent.

Depôt-Surgeon.

I hereby certify that the woman above described (whom I have engaged as a labourer on the part of the Government of Fiji, where she has expressed a willingness to proceed to work for hire) has appeared before me and the Protector of Emigrants, who has explained to her all matters concerning her duties as an Emigrant, according to Section XXXVIII of Indian Emigration Act No. VII. of 1871.

Protector of Emigrants, Calcutta.

Govt. Emigration Agent for Fiji.

Agreement (Girmit)

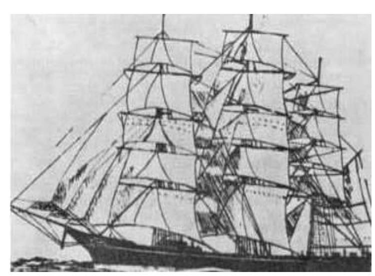
This is where the story of my ancestors and my existence in Fiji begins. GIRMIT is the story of my ancestors; the story of Indians in Fiji. Girmit is a mispronounced word of agreement by the Indians who did not understand English. It means the agreement, under which Indians came to Fiji as indentured laborers; they signed a five year contract with Colonial Sugar Refinery (CSR).

Girmit represents the struggles, opportunities and the voyage of Indian men, women and their children to Fiji. It depicts the people that were separated from their family, their homeland and people that died during the indenture period.

There were numerous reasons why Indians came to Fiji, they were in search of better lifestyle, better paid jobs and some were tricked into coming which is referred to as “black birding”. Some Indians were told that Fiji is an island near to India and that they will be provided with good paid job and a good place to live, my great grandfather also came to Fiji under this false information given by the British, many pundits and other people with authority in society who were trusted by people. They were the ones who lead or tricked them to the depot, once people entered the depot there was no escape due to high security. Upon signing the contract, they became slaves. The journey from their homeland to Fiji was full of stress, pain, terror and injustice. Most new recruits suffered injustice by agents at the depot in India, by force pairing men and women. Upon disagreeing on accepting their partners they were severely punished. These forced pairing turned out to be social disaster in most cases and few turned out to be a blessing for those who could share their sorrows.

Laborers at the ship

The Indians were indentured to Fiji from 1879 to 1916 with approximately 60,000 laborers. During their long journey to Fiji the laborers had to deal with diseases such as cholera and smallpox, many died before reaching Fiji. The estimated trip for sailing to Fiji was seventy three days.



Leonidas first ship to Fiji

Indentured women

When the laborers' arrived in Fiji, they were not openly welcomed by the plantation owners. It was hard work on the sugarcane plantation and the living condition was miserable, full of filth, degrading and brutal, often regarded as squalid condition. Getting up early at 4 am, daily task would be allocated, if the task was not completed satisfactorily, they were beaten with whip, fist, kicks and stick. They had to tolerate physical and verbal abuse daily. Women were molested by European overseers and Girmitiya men who managed the plantations. Suicide rate increased mostly amongst women who could not tolerate such abuses and injustice. At that time there was no institution where complaints could be lodged.

The indentured system was abolished in 1916. The story of the treatment two indentured women to Fiji "Kunti and Naraini" acted as a large part in movement to abolish the indenture system. Kunti was allocated in an isolated area of the plantation by the European overseer with the intention of sexually molesting her, to protect herself from being overtaken, she jumped into a river, however she was saved by a boy, Jaidev, this story was published in Bharat Mitra and became widely known.

Naraini was asked to get back to work after three days of giving birth to a dead child, Naraini refused arguing women should not practice hard labor atleast three months after giving birth.

Upon Naraini's refusal she was beaten severely by the European overseer, and she ended up in hospital. The overseer was arrested and case was came before supreme court of Fiji, where the overseer was not found guilty, Naraini later lost her sense and spent rest of her life insane.

The news of molestation and degrading of women attracted widest public support than any other movement in Indian history even more than the movement for independence. The government of India then abolished indenture system in 1916. After a further five years of contract expired, the laborers were free, they were given a choice to return to India at their own expense or stay in Fiji. Some people went back and many stayed because they were settled and had a family or they could not afford to go back due to personal reasons.

Although the indenture system brought many pain and suffering to Indians, it ended giving them a new land of opportunity and their freedom. Some families leased land from Fijians and got into sugarcane and cattle farming. Others went into commercial area. The other positive output of indenture system was end of caste system and emergence of Fiji Indian identity and language. This new language was named Fiji Hindi which is formed by different dialects of India enriched by inclusion of many Fijian and English words.

The next generations grew up and were introduced to a better lifestyle some went into farming, some went to school and chose other profession. By the time my parents were born new lifestyle and culture had already shaped up, for example acceptance of each other's food and kava drinking. Kava drinking is one of the few traditions of Fiji, which has become an important part of both Fijian and Indians community. Kava also known as Yaqona or grog is served in all Fijian and most Indian ceremonies and most political and social gathering. This drink is regarded as goodwill and holds great respect amongst people and maintains peace.


Prince Charles on Fiji Independence day

Fiji gained independence from Britain on October 10 1970 with the Queen as head of state; the independence was given by Prince Charles. More important events took place in Fiji's history including the two military coups in 1987, the civilian-led coup in 2000 and the third military coup in 2006. Despite all the coups and political upheavals, people of Fiji have learnt to live and work together to develop the country.

Today Fiji is famously known as 'Paradise on Earth' and 'Soft Coral Capital of the World'. It has miles of its pristine white sand beaches with azure lagoon and rich tropical surroundings. It is enriched with diverse culture with significant indigenous Fijian, Indian, Chinese, Polynesian and European communities occupying the nation and maintaining their ancestral cultures. Apart from cultural diversity there is great diversity of religions such as Christianity, Hinduism and Islam, some of the annual festivals commonly celebrated are Christmas, Diwali, Eid, Holi, Easter, Chinese New Year and English New Year. It's always hard to believe that Fiji being such a small island has such rich history and culture filled with intrigue, tyranny and triumph.

The current economy of Fiji is mainly based on industry sectors such as Tourism Industry, Agriculture Industry, Fisheries, Forestry, Mineral and Ground Water Industry. The Tourism Industry has been an important and largest source of investment and foreign exchange earner, this industry has grown over decades providing large number of employment and business opportunities.

Agriculture Industry has grown potentially with diverse production and export of various products. Sugar Industry contributes largely in agribusiness of Fiji providing huge number of jobs. Other agricultural products in demand are ginger, kava, taro, coconut, root crops, other fruits and vegetables**.** Fisheries industry has exclusive and diverse species for export like tuna, marlin, swordfish, mahi-mahi, snapper, sea-bream, trevally, groupers, coral trout and rock cods the aquaculture products include prawn, seaweed, giant clam and tilapia farming. Forest industry mainly exports pine timbers, mahogany and coconut timbers. This industry also provides larger number of employment opportunities. Mineral and Ground Water industry exports gold, copper, manganese, lead and zinc, gravel/aggregates and underground processed water (bottled water). One product already popular all around the world, is Fiji Water. Other industry sectors that contribute to development of Fiji's economy are Manufacturing and Information, Communication and Technology (ICT).




There is a huge potential of business opportunity in Fiji, as it is the center of trading in south pacific as well as regional and global hub for communication and transportation - shipping and air travels. The Government supports local and foreign investment by providing tax and other incentives. It has well developed infrastructure with reliable domestic and international telecommunication links and other services such as insurance, financial institute, transportation, real estate and medical facilities. Fiji has been attracting investors from all over the world and most of them have re-invested in multiple projects and still operating in Fiji. The following sector profile has investment opportunities with government incentives for each sector.

- Agriculture
- Audio Visual industry
- Fisheries and Forestry
- Information Communication Technology
- Manufacturing
- Mineral & Groundwater
- Tourism.
- Renewable Energy Projects and Power Cogeneration
- Bio – Fuel Production
- Education
- Shipping and Aviation

Apart from a rich history, culture and developing economy Fiji has many other interesting legends which can still be seen and has become part of tourist attraction.




Red Prawn of Vatulele
Vatulele's cliffs are filled with bright red prawns. There is a legend behind this red prawns, where this cooked prawns later come to live. These prawns are called urabuta (cooked prawns). It is considered sacred by people of Vatulele. It is believed that if anyone harms them will surely be shipwrecked and no one is allowed to catch or eat them.

Sacred Turtles of Kadavu
The women of Namuana village in Kadavu preserve a strange ritual of calling turtles from the sea. All the maidens of the village assemble on the rocks above the water and sing a melodious chant. Slowly, giant turtles rise to lie on the surface in order to listen to the strange chanting. In this village turtle hunting is forbidden.

Fire walking on Beqa Island
People of Beqa Island have the ability to walk and dance barefoot upon hot rocks and not getting burnt. According to the legend the people of this Island has a special gift and blessings from their ancient god of not getting burnt on hot stones.

Tagimoucia Flower of Taveuni
In the high mountain of Taveuni, has a beautiful lake, has flowering plant called Tagimoucia. It is only found on the shores of this lake and any attempt to transplant this flower elsewhere has failed.

There are many more amazing facts and legends in Fiji that still leave explorers wondering such as Shark swimmers of Kadavu, the magical caves of Yasawa island, the restricted reef of Totoya island and so forth.

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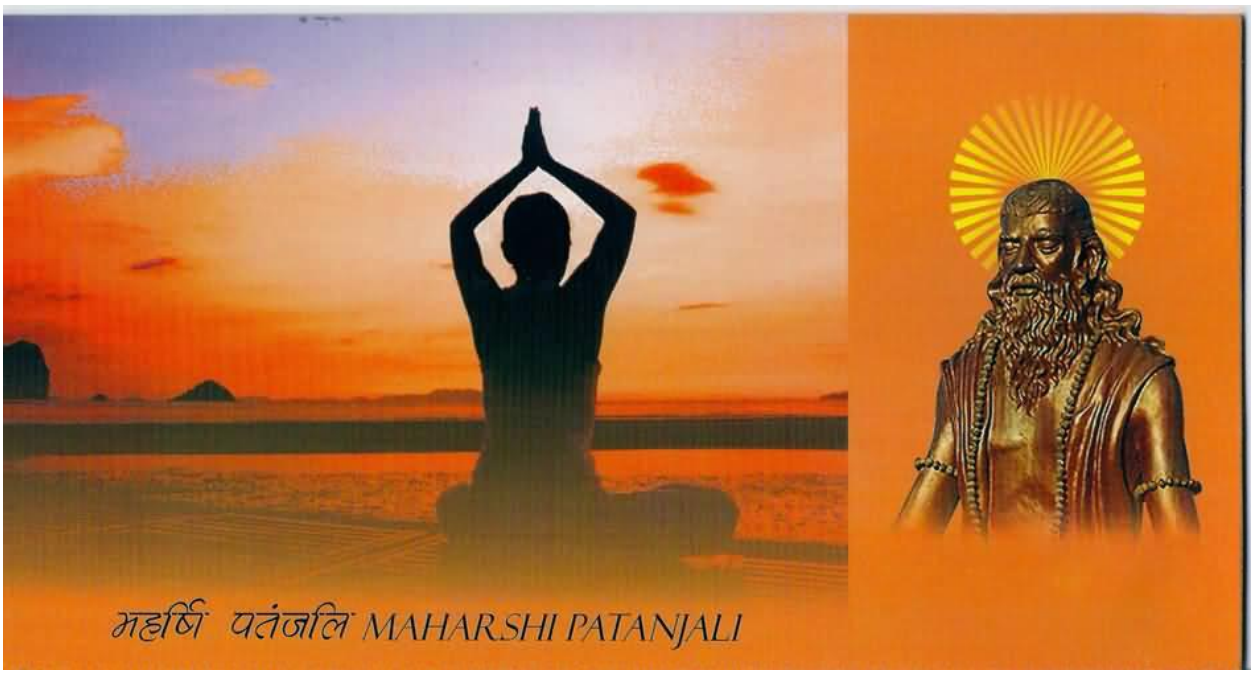
PATANJALOGY

Ryan Baidya



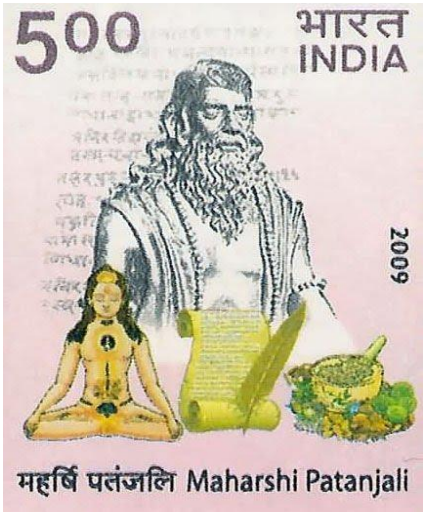
After the time of Buddha, around 300 BCE Patanjali presented to the world the timeless knowledge for reducing mental pain and anxieties. That common issue that Patanjali addressed is the same issue that humankind struggles with today.

Patanjali aggregated and codified the sutras or knowledge and wisdom that existed before him into a simplistic format to be used by the scholars and monks. Patanjali's classic text was used for centuries in the leading universities, such as Nalanda and Nagaarjuna.

Little is known about Patanjali because these ancient universities and royal libraries where his works were kept were destroyed by invaders of India around 12th century AD. Thereafter the yoga sutra text and his wisdom survived among only the small number of scholars and monks who managed to survive the mass slaughter. Scholars and monks were forbidden to openly teach until mid 18th century.

Patanjali's sutras and teaching that we come to know are the result of the passing of knowledge one generation to the next in close circles scholars. Much of such knowledge was lost and much of information on Patanjali became myth.

Patanjali has been described with many characteristics to emphasize his vast knowledge and wisdom. Such super intelligent human beings appear in the world seldom. Albert Einstein is such an individual of our time. Einstein could become a mythic-character in thousand years, if we were to lose our all information systems including printing and digital today.



Though we have little tangible information about Patanjali, his original yoga sutra remained intact along with the commentators of later scholars. Essence of his works in yoga is so vivid that Government of India recognized Patanjali as a great sage, and they have commemorated a stamp in honor of him.

Like Einstein, Patanjali worked on multiple arenas for the betterment of human life. It has been conjectured that he also wrote the first Sanskrit grammar text and also writings in Ayurveda.

Renewed interest in Patanjali's works is no surprise to many. Here we would like to coin a term –Patanjalogy – a discipline of study where scholars decodes the wisdom stored in the codes (sutras) of Patanjali. Pratibha Gramann is one such scholar who has devoted her entire academic career to decoding the sutras toward a new psychology that Patanjali put together over 2000 years ago. A glimpse of her work follows.

FIVE STATES-OF-MIND IN PATANJALI'S YOGSUTRA WITH CONTEMPORARY IMPLICATIONS

Pratibha Gramann, (PhD in progress)

Synopsis: The key words used in this article are integral to the five mind-states described in the ancient Yogsutra, and they are relevant to the process of changing one's state-of-mind. The following is a list of the key words: **restless, dullness, distracted, one-pointed, mind without-thought, mental pain and suffering, awareness, consciousness, attention, concentration and meditation.**

Introduction

The science of yoga-psychology presents a science for understanding the mind and methods for making changes, attaining peace, and enhancing focus and concentration. A study of this subject requires a thorough examination of the constructs of a psychological nature contained in the ancient Sanskrit text, known as the Yogsutra written by sage Patanjali.

At the beginning of the text, Patanjali stated the mind is always in, or characterized by one of five states-of-mind (Aranya 1981; Leggett 1990; Yati 2009; Prasada 1912/1988; Rao 2002; Woods 1927). These states are *ksipta* = **restless**; *mudha* = **dull**; *viksipt*a = **distracted**; *ekagra* = **one-pointed** or single-in-intent; and *nirodha* = **mind without-thought**.

The five mind-states are stated as the characteristic support for all mental content of the mind. The states themselves do not refer to content, but rather to the underlying principle of how content is cognized and processed. Furthermore, Patanjali stated that the mind is accompanied with pain and miseries, and there is the desire by people to rid mental sufferings.

Statement of Problem

In this contemporary time, there many systems and cultures breaking down, and there is less available psychological supports coming from family and community. Devastations caused by nature and by wars are leaving more and more people without any basics of life, causing them to question the reason to live. Military personnel, who return from horrific experiences, are finding it very difficult to adjust to a normal way of life. Mainstream psychology has limited tools to bring the minds of suffering people into balance and normal functioning. More interventions are needed. The newer transformational therapies and mind-body medicine techniques are proving helpful, but they are not fully embraced, nor explored. Wilber (2004) stated that suffering is an indication that one is realizing that life outside of consciousness, or unified mind is painful, distressing, and sorrowful (p. 74).

Methodology

The methodology of this exploratory study is historical-archival, and the aim is to compare and contrast several commentaries made by scholarly experts on the Yogsutra's five states-of-mind. According to Patanjali, the five mind-states are a set of constructs of a psychological nature that show the essential process for transformation and removal of suffering. In this exploration of the Yogsutra's five states-of-mind, the writings of scholars are compared on the core, or kernel mind-constructs exactly as Patanjali presented them. These writings include the commentaries of Vacaspati Mishra who is recognized as the original commentator of the succinctly threaded sutras that lead to unification and liberation of mental suffering. From a general and reasonable viewpoint, the mind-constructs are clearly indicated as psychological principles. However, psychology as a discipline of study did not exist at the time that the Yogsutra was written. No claim is made that these constructs of a psychological nature parallel Western constructs of psychology. In this exploration to compare and contrast experts in the Yogsutra, the different viewpoints of both contemporary and ancient scholars are stated.

Terminology

Patanjali's five states-of-mind which are restlessness, dullness, distracted, one-pointed, and mind without-thought are essential words to this study along with suffering, awareness, consciousness, attention and meditation. The five mind-states have been described above. The other words are described below.

Suffering: In Sutra II.16, Yati (2009) interpreted the term *dukham* as pain, misery, distress, sorrow, and suffering. This definition of pain and suffering leaves the doors open to include a multitude of situations and emotions like anxiety, fear, stress, jealousy, obsessions, and other unwholesome thoughts and feelings. Yati completed the interpretation of this sutra with the statement, "the pain that has not yet come is to be avoided" (p. 95). The question then arises as to how to avoid the pain and sufferings as they arise. This in fact is a central theme of the Yogsutra. A key solution is to accept the suffering, and then with focus, one can work on developing solutions.

Because pain and suffering are a central focus of the text, it is appropriate to present Yati's (2009) explanation of the five basic causes of misery, which characterize humankind's dilemma throughout life. The first cause is the lack of knowledge that one is separate from the recording aspect, or the mind's memory upon which experiences and memories are registered. The second and third causes of misery revolve around love and hate. Yati stated that the situation of opposites like love and hate describes the phenomena of how the world works.

What attracts at one moment can repel in another moment because thoughts alternate in the same way that electrical charges move. For example, a cup of coffee with one spoon of sugar could be to a person's liking, yet if two more spoons of sugar are added, the person might consider the coffee distasteful. Another example would be a woman considering a certain man attractive, but if she experiences verbal abuse by that man, she then considers him repulsive. The fourth cause of suffering is the ego, or I-sense. When ego, or I-consciousness identified by the term *asmita* experiences love, the ego experiences happiness, and when it experiences dislike or hate, it is

overcome with darkness or misery (p. 196-197). The fifth cause of misery is the desire to live forever *abhinivesa*, or forgetting that life is short and death is inevitable (Yati, 2009 p. 195).

YOGSUTRA FIVE CAUSES OF MENTAL MISERY
(Yati's Commentary)

1) Lack of knowledge or forgetting that mankind is separate from memory, thoughts, and experiences recorded in the mind
2) & 3) Operation of principle of opposites in the mind: love / hate, like / dislike, acceptance / aversion. Interests alternate just like an electrical charge.
4) Principle of ego or I sense: nourishing the sense brings happiness; lack of ego nourishment may bring unhappiness.
5) Principle that life is short and death occurs; principle that we are born, live, die

Awareness: As it was used by William James, awareness meant the consciousness one has about one's own mind, or primary awareness. In *The Principles of Consciousness*, William James primarily wrote about primary consciousness, which included all normal explicit awareness of thoughts, perceptions, feelings, or beliefs. The same definition applies to this study. However in this study, awareness also means pure awareness of itself (Rao 2002, p. 32).

Consciousness: According to Rao (2002), James delineated five primary characteristics of consciousness: (1) consciousness is personal and subjective; (2) it is changing and (3) continuous; (4) consciousness has the function of knowing (noetic); and (5) it involves selective attention. Rao further stated that James considered each thought to be owned by the person as part of his/her inner life. For example, when one has pain, it is part of the personal experience of that person only, or when one experiences the red in a rose, it is only that person's experience (p. 33).

Attention: Rao (2002) stated that James considered attention to be the main process in all cognitive activities when the mind shifts, or when it remains stable in one state for a period of time (pp. 44-45). This is closely related to what is meant in the Yogsutra by the mind moving from state to state, as from restlessness to dullness to distraction to single-in-intent to without thought. In each of these stages, an increasing amount of attention span is needed; without it, one cannot move into progressively deeper concentrated states. Attention and concentration are intricately related to every construct contained in the Yogsutra. The five mental states just mentioned, and the five cognitive processes throw light upon the different degrees of attention and concentration. (Aranya, 1981; Leggett, 1990; Yeti, 2009 & 1987/2004; Rao, 2002; Woods, 1927).

Meditation: The term meditation has come to mean many things in the western world. It can mean focus and attention on our work, or any worldly activity. It can mean transcendence, or it can mean transformation from one mental state to another, such as restlessness to dullness or distracted to one-pointed which is the meaning in this study. A main focus of this comparative study was to present the Yogsutra's five mental states and their progressive attention levels, which are actually stages of concentration. In Part Two Patanjali's presents principles of breath which help to establish concentration of mind along with methods and practices of meditation. This process in turn removes pain and suffering and brings stillness and clarity to the mind.

Conclusion with Implications

The constructs called the five-states-of- mind are easily connected to some contemporary psychological disorders in order to show new ways of looking at some increasing psycho-physiological health conditions. Correspondingly, useful interventions for change and transformation can be developed from this ancient benchmark of knowledge about psychological health and wellbeing. Social scientists and others can utilize this knowledge to develop strategies that assist persons with ADD, trauma, and other mind-based pain to restore normalcy of functions.

It is generally accepted that psychology as a social science continues to explore deeper understandings of the principles of the mind. Neuropsychology is edging forward in this direction, but a lot more exploration is needed. Throughout recorded history written evidence suggests that humankind has sought not only to become self-reflective as represented by the ancient Greek adage, "Know thyself," and also, we have looked for ways to bring harmony and peace of mind to ourselves in the process of knowing more about ourselves. The Yogsutra consists of approximately 200 threaded or progressively-linked *sutras*, which can be considered to be constructs of a psychological nature. These form a framework upon which concepts and interventions can be developed for studying oneself and for healing which helps to remove pain and misery and restore harmony of mind, not just cover-up symptoms. In a novel way, this exploratory, comparative study is a clear contribution to the field of social science. (Rao, 2002, pp. 38-43).

Structured Procrastination

John Perry

Author practices jumping rope with seaweed while work awaits.

I have been intending to write this essay for months. Why am I finally doing it? Because I finally found some uncommitted time? Wrong. I have papers to grade, textbook orders to fill out, an NSF proposal to referee, dissertation drafts to read. I am working on this essay as a way of not doing all of those things. This is the essence of what I call structured procrastination, an amazing strategy I have discovered that converts procrastinators into effective human beings, respected and admired for all that they can accomplish and the good use they make of time. All procrastinators put off things they have to do. Structured procrastination is the art of making this bad trait work for you.

The key idea is that procrastinating does not mean doing absolutely nothing. Procrastinators seldom don't do absolutely nothing; they do marginally useful things, like gardening or sharpening pencils or making a diagram of how they will reorganize their files when they get around to it.

Why does the procrastinator do these things? Because they find are a way of not doing something more important. If all the procrastinator had left to do, was to sharpen some pencils, no force on earth could get them do it. However, the procrastinator can be motivated to do difficult, timely and important tasks, as long as these tasks are a way of not doing something more important.

Structured procrastination means shaping the structure of the tasks one has to do in a way that exploits this fact. The list of tasks one has in mind will be ordered by importance. Tasks that seem most urgent and important are on top. But there are also worthwhile tasks to perform lower down on the list. Doing these tasks become a way of not doing the things higher up on the list. With this sort of appropriate task structure, the procrastinator becomes a useful citizen. Indeed, the procrastinator can even acquire, as I have, a reputation for getting a lot done.

The most perfect situation for structured procrastination that I ever had was when my wife and I served as Resident Fellows in Soto House, a Stanford dormitory. In the evening, faced with papers to grade, lectures to prepare, committee work to be done, I would leave our cottage next to the dorm and go over to the lounge and play ping-pong with the residents, or talk over things with them in their rooms, or just sit there and read the paper. I got a reputation for being a terrific Resident Fellow, and one of the rare profs on campus who spent time with undergraduates and got to know them. What a set up: play ping pong as a way of not doing more important things, and get a reputation as Mr. Chips.

Procrastinators often follow exactly the wrong tack. They try to minimize their commitments, assuming that if they have only a few things to do, they will quit procrastinating and get them

done. But this goes contrary to the basic nature of the procrastinator and destroys his most important source of motivation. The few tasks on his list will be by definition the most important, and the only way to avoid doing them will be to do nothing. This is a way to become a couch potato, not an effective human being.

At this point you may be asking, "How about the important tasks at the top of the list, that one never does?" Admittedly, there is a potential problem here.

The trick is to pick the right sorts of projects for the top of the list. The ideal sorts of things have two characteristics, First, they seem to have clear deadlines (but really don't). Second, they seem awfully important (but really aren't). Luckily, life abounds with such tasks. In universities the vast majority of tasks fall into this category, and I'm sure the same is true for most other large institutions. Take for example the item right at the top of my list right now. This is finishing an essay for a volume in the philosophy of language. It was supposed to be done eleven months ago. I have accomplished an enormous number of important things as a way of not working on it.

A couple of months ago, bothered by guilt, I wrote a letter to the editor saying how sorry I was to be so late and expressing my good intentions to get to work. Writing the letter was, of course, a way of not working on the article. It turned out that I really wasn't much further behind schedule than anyone else. And how important is this article anyway? It is not so important that at some point something that seems more important won't come along. Then I'll get to work on it.

Another example is book order forms. I write this in June. In October, I will teach a class on Epistemology. The book order forms are already overdue at the book store. It is easy to take this as an important task with a pressing deadline (for you non-procrastinators, I will observe that deadlines really start to press a week or two after they pass.) I get almost daily reminders from the department secretary, students sometimes ask me what we will be reading, and the unfilled order form sits right in the middle of my desk, right under the wrapping from the sandwich I ate last Wednesday.

This task is near the top of my list; it bothers me, and motivates me to do other useful but superficially less important things. But in fact, the book store is plenty busy with forms already filed by non-procrastinators. I can get mine in mid-Summer and things will be fine. I just need to order popular well-known books from efficient publishers. I will accept some other, apparently more important, task sometime between now and, say, August 1st. Then my psyche will feel comfortable about filling out the order forms as a way of not doing this new task.

The observant reader may feel at this point that structured procrastination requires a certain amount of self-deception, since one is in effect constantly perpetrating a pyramid scheme on oneself. Exactly. One need to be able to recognize and commit oneself to tasks with inflated importance and unreal deadlines, while making oneself feel that they are important and urgent. This is not a problem, because virtually all procrastinators have excellent self-deceptive skills also. And what could be nobler than using one character flaw to offset the bad effects of another?

Procrastination and Perfectionism

Many procrastinators do not realize that they are perfectionists, for the simple reason that they have never done anything perfectly, or even nearly so. They have never been told that something they did was perfect. They have never themselves felt that anything they did was perfect. They think, quite mistakenly, that being a perfectionist implies often, or sometimes, or at least once, having completed some task to perfection. But this is a misunderstanding of the basic dynamic of perfectionism.

Perfectionism is a matter of fantasy, not reality. Here's how it works in my case. I am assigned some task, say, refereeing a manuscript for a publisher. I accept the task, probably because the publisher offers to pay me with a number of free books, which I wrongly suppose that if I owned I would get around to reading. But for whatever reason, I accept the task.

Immediately my fantasy life kicks in. I imagine myself writing the most wonderful referees report. I imagine giving the manuscript an incredibly thorough read, and writing a report that helps the author to greatly improve their efforts. I imagine the publisher getting my report and saying, "Wow that is the best referee report I have ever read." I imagine my report being completely accurate, completely fair, incredibly helpful to author and publisher.

Why do I have such fantasies? God knows. Or maybe my shrink. Perhaps my father did not praise me enough as a child. Or perhaps he heaped praise on me when once or accidentally, no doubt, I accomplished some task extremely well. Perhaps it is genetic. But this is just a practical three-step program, not an attempt at psychotherapy. (The first step is to read the essay "Structured Procrastination". This is the second step. I haven't figured out the third step.) So we won't worry about why I, or you, have such fantasies. The point is that if you are a procrastinator, of the garden variety sort, something like this probably goes through your mind.

This is perfectionism in the relevant sense. It's not a matter of really ever doing anything that is perfect or even comes close. It is a matter of using tasks you accept to feed your fantasy of doing things perfectly or at any rate extremely well.

How does the fantasy of perfection feed procrastination? Well, it's not so easy to do things perfectly. At least I assume that it is not. Perhaps someday I'll do something perfectly and then I'll know for sure. But I assume that it is not. One needs time and the proper setting. Clearly to referee this manuscript, I'll need to read it carefully. This will take time. I will no doubt want to go beyond the manuscript itself and read some of the material that the author cites, to make sure the author is accurate and fair in what he/she says about it. I've read book reviews by philosophers I admire and they obviously have done this.

It's very impressive but I'll need to be over in the library to do that properly. Well, in today's world, one doesn't need to be in the library. One can find a lot of this stuff on the web, if one

knows how. Well, I don't know how. I know that there is this thing called "J-store" that allows one to access lots of philosophy journals online. If you are working at Stanford you can access it through the library. But it would be nice to be able to access it at home. I may want to work late into the night on this referee job. To access J-store at home you need to set up something called a proxy-server. I'd better figure out how to do that. Well, seven or eight hours later I am done setting up the proxy server. Maybe I am done because I have managed to do it or more likely I have given up because every time I think I have done it, it doesn't work, or my screen goes blank. But one thing I won't have done is start on the referee job. I will have invested enough time to give the book a quick read and form an opinion of it, but I won't have actually done this, or even got started. I feel like a schmuck and of course I am.

Then what happens? I go on to other things. Most likely, the manuscript slowly disappears under subsequent memos, mail, half-eaten sandwiches, piles of files, and other things. (See the essay on "Horizontal Organization".) I put it on my "to do list", but I never look at my "to do list". Then, in about six weeks, I get an email from the publisher, asking when she can expect the referee report. Maybe, if she has dealt with me before, this email arrives a bit before I promised the report. Maybe if she hasn't, it arrives a few days after the deadline.

At this point, finally, I snap into action. My fantasy structure changes. I no longer fantasize writing the world's best referee job ever. I fantasize letting down some woman back in the New York office of Oxford University Press. I imagine her going to the editorial meeting, where she promised to have a report on the manuscript, empty-handed. "I'm sorry," she says to her boss, "I counted on this fellow from Stanford, but he let me down." "That's it," her boss says, "You're fired." "But I've got three small children, my husband is in the hospital, and the mortgage is overdue," she says. "I'm sorry," he replies, "I've got a business to run."

I imagine meeting this woman; she gives me a withering stare. "You cost me my job," she says.

And then there is the author. Maybe her tenure depends on getting this book accepted. It's probably a great book, a masterpiece that has been sitting on my desk unread while the tenure decision lies in the balance. Perhaps someday the whole world of philosophy will know that this deserving person lost tenure because John Perry sat on her manuscript -- like the editors at the physics journals that turned down Einstein's early manuscripts. (I'm not sure that ever happened -- I meant to look it up, but haven't got around to it.)

At this point, I dig through the files, sandwiches, unopened correspondence, and after a bit of panic (Have I lost the manuscript? Will I have to ask the publisher for another copy? Should I lie, and say that I thought I mailed the manuscript back with the review, but it must have been in that briefcase that the mugger took from me?) I find it.

I take a couple of hours, read it, write a perfectly adequate report, and send it off. Now let's analyze what happened. First of all, let's note that because I am a structured procrastinator, I have used the referee report as a way of doing a lot of other things. For example, I set up that proxy-

server. My colleague says plaintively at some point, "I'd like to access J-store from home, but I don't have the proxy-server set up," "Oh," I say jauntily, "I set mine up a couple of weeks ago. Works great." "How do you ever find the time," he says admiringly. I don't reply, but look smug.

Secondly, things turned out OK. I did finish the report, it wasn't too late, the publisher kept her job, the book was accepted or not, the author received tenure or not. True, the report wasn't perfect, but it was perfectly good enough. So structured procrastination seems to be working. But can't we do better? Can't we avoid the emotional turmoil, the waste of everyone's time that these perfectionist fantasies lead to?

Well, I think we can, but it does require a little self-discipline. Not a lot. What one needs to do, in order to bring one's perfectionist fantasies under control, is what I call Task Quality Triage.

Procrastinating was a way of giving myself permission to do a less than perfect job on a task that didn't require a perfect job. As long as the deadline was always away, then, in theory, I had time to go the library, or set myself up for a long evening at home, and do a thorough, scholarly, perfect job refereeing this book. But when the deadline is near, or even a bit in the past, there is no longer time to do a perfect job. I have to just sit down and do an imperfect, but adequate job. The fantasies of perfection, replaced by the fantasies of utter failure.

So I finally get to work on it. Now it would have been simpler for me, and for the publisher, and for the author, if I had sat down and spent four or five hours on the manuscript right off the bat. If only I had been able to give myself permission to do an imperfect job right at the outset. Is there a way we can bring that about?

You have to get in the habit of forcing yourself to analyze, at the time you accept a task, to consider the costs and benefits of doing a less than perfect job. You need to ask the questions: how useful would a perfect job be here? How much more useful than a merely adequate job? Or even a half-assessed job? What is the probability that I will really do anything like a remotely perfect job on this? And you need to ask: what difference will it make to me, whether I do or not?

The answer, in an enormous number of cases, will be that a less than a perfect job will do just fine, and moreover it's all I am ever going to do anyway. So I give myself permission to do a less than perfect job rather than waiting until it is overdue. I may as well do it now.

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Believe In Yourself

Brenda Newson

In life there is no "never" and there never too late to start what is good for your brain and mind – education. When things get tougher, day gets shorter, and wallets shrinks to a penny, is not the time to think but to do.

At California Takshila University we do not teach theories and formulas we build minds that are professionally productive, socially engaging and emotionally happy. Takshila is a think-tank style academic institution and students knowledge, experience and backgrounds-professionals and personal, are the part of the learning materials. Thus the whole environment is a shared-leaning circle.

Meet Ms. Brenda Newsom who brought 60+ years worth of life-experience to the classroom that enriched printed contents to a level of understanding that would require a classical academic student to spend 10+ years to achieve.

I am currently working on my MBA at the California Takshila University. I have come a long way from where I was 18 months ago. Upon starting my enrollment at the university, I was employed at the Mission College as a teacher. I was abruptly laid off by the State of California in December of 2009. My bills were due and I had no income. Life at that time was stressful. I was being threatened with eviction from resident.

The current President Obama was making speeches about returning to school. I met up with a comrade who was attending California Takshila University and he introduced me to Professor Ryan Baidya. Little did I know that this introduction was the beginning of a new adventure of many challenges and experiments? I had no idea what I was capable of doing, could I actually get a Masters in Business Administration? Professor Ryan, encouraged me and suggested that in order to have you must not be a have not. He also said you must not give up, you must have a goal and work towards it every day.

Illustration: Akianand

I chose a Masters in Business Administration because I would like to one day soon open my own business helping senior citizens with their rights of living in the United States. I myself am a baby-boomer and it our time to walk into the sunset. I turned 61 years old on my birthday this year and I feel like I have a new start with this new degree that I am soon to obtain. Sometimes when the storms of life come, you just have to dance in the rain and know that our heavenly father is there to see us through.

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Become the Best Speaker You Can Be

Gordon Bell

The ability to speak alone can take you from ordinary to special. Make no mistake about it, John F Kennedy, Bill Clinton and Barack Obama would not have become presidents were it not for this skill. For those who dedicate few days discovering the mechanics of an outstanding delivery would have the same skill.

This means anyone and everyone!

Meet Gordon Bell– the straight shooter, marketer and exec-coach

He asks….

Who Are THE GO-TO People When You Want To Eliminate The Fear of Public Speaking?

It's no big secret...Most presentation skills training does not work adequately. So says I... a retired professional presentation skills trainer to the Fortune 500.

There are two reasons that clients such as Westinghouse rated me Best Trainer.

1. I went to extreme lengths to find out where the very best (by far) speakers acquired their skills.
2. I traveled to and spent considerable time with those experts. Such expertise was well hidden at a cloistered source, the business world never suspect.

It was while there that a longhaired bearded man smoking a cigar approached me. He asked me if I ever considered being a trainer. I replied, " I always wanted to be a trainer."

Up until this new system was formed, the Dale Carnegie method was known as the standard. It is a system that is plain and simple. You get up, walk to the platform and face your audience and talk. Dale Carnegie developed a workshop for students to simply do it. Like a gym is for boxers to train.

Toastmasters, another big name, did the same. Everyone knows that if you join Toastmasters, you will be thrown to the wolves, so to speak and told to get up and speak.

I am here to tell you that such a system is NOT how to eliminate the fear of public speaking. It only deepens it. Think about it. Where is the logic in what I see as even Barbaric?

When you learned to walk, you crawled before you even attempted to stand up. You performed the basics or as the famous pianists, you did the one-fingered exercise before anything. So, it is nonsense to throw someone into a sink or swim situation and expect them to grow in a natural way ...After all, the more natural the speaker, the more successful the speech or talk.

Behind the closed doors of this cloistered organization was taught the refined basics of communications. They identified the formula to communication that you and I use every day.

It is the omission of elements of the formula that causes miscommunication. It can consequently cause misunderstanding, divorce, war etc., and emote fear which never leads to success.

When the communication formula is observed and implemented, real communication ensues. And as we all know real communication is easy and without fear. In fact, it congers up the sentiment of love. I ask you, can anything be absolutely stronger than love?

When this training recruiter told me he married the communication formula to Dale Carnegie's system, I instantly knew this was a real winner.

Yet, to this day most speakers still believe it is normal to get nervous before getting up to speak. To this I say Nonsense!

...Do you think speakers like JFK were nervous before he got up to speak? Absolutely not!

What is the difference in skills between the speakers who have some nervousness and those who are totally calm, cool and collected?

They know the secrets that others would be better off if they also knew.

Consequently, the information in this article can help you distinguish the best use for your presentation skills training dollars. The concept is so valid the firm, for which I worked started business without a dime or even an office to work out of, nor the clean-cut appearance expected in the Fortune 500 companies, yet we succeeded in a major fashion.

Our success accelerated when a major advertising agency hired us and divested their interest in the largest presentation skill consulting company at that time and re-trained their sales force with this powerful technology.

When NBC saw this occur, they followed in the tracks of this ad agency and put their anchor people through the training. Later, the head of the Olympic Committee in Australia along with his team went through the training and won the Summer Olympics for their nation. So, goes the history of this powerful system.

Obviously, these events were some years ago; however, since the methods are so simple and powerful, the field has not really changed all that much. It is still a matter of sorting out the methodologies and determining who teaches which? When you succeed in the best selection, your students will discover that human communication is possible.

Students will discover a simple method of communications to a group that enables them to listen better to their audiences that in turn completely eliminates stage fright. Virtually all their learning must be experiential and on a gradient. When a student is thrown into the fire to sink or swim so to speak, it is, in reality, counterproductive and often causes inner panic.

Another commonly taught philosophy is ...Since we all have different definitions to the words we use, true communications cannot exist. The system that caused me to switch skills still uses words; however, it teaches that words are the envelopes for mental image pictures.

This system shared by leading acting schools that have produced Academy Award winners, teaches the student to speak from their heart versus their head, and to see the mental image pictures in their minds as they speak. This seems to be one of the many underlying secrets that took Barack Obama from virtually unknown to world leader in record-breaking time.

If a student were to use three of say the ten techniques a presenter might employ, he or she would stand out as effective presenters ...Whereas, President Obama employs eleven. The eleventh being ...he uniquely comes from the point of view (POV) that all people and all things in our world are connected. While, you cannot prove he is actually doing this, I'd bet my last dollar, were he asked, he would confess to this POV.

Were this ultra simple concept that comes from Quantum Physics to be understood by all, we probably would have no wars, and perhaps no crime much less insanity. We would take the time to really communicate and even language differences would not present the complications initiated by interpreters.

For example, it was the interpreter for the President of Iran who said he wanted to see Israel banished from the face of the earth. It is known in inner circles that while his wishes may not have been benevolent; they also were not this extreme and history now stands written incorrectly, proving, communication skills are very important.

I don't know who said that "the most powerful knowledge is the simplest. It is mankind who is complicated."

"He, who ignores little things, shall perish little by little". Ralph-Waldo Emerson.

To learn more about how you might send your employees for the most dynamically valued training, contact. California Takshila University.

If There Was a Money Tree

Akianand Baidya, Grade III, Stevens Creek Elementary School

If there was a money tree, everything would be perfect because everyone will buy whatever he or she wants.

If there was that money tree, I will keep it in my house.

So nobody will steal it. I will be rich and keep it all. I will only share it to my friends

I could get the money from the tree, so I wish there was a money tree.

I could also get a new car. If there was a money tree, I can go to the store and get food, cleaning supplies and a bike. I can also get a big house to live.

I might get too too too many things that those things won't fit in my house. So I could build the biggest house in the world. I get many many many bricks and paints to build my house. I need lots of people to help.

Then it will be done. I need a big car too. It is like a big hotel. It has an elevator and stairs.

The tree wouldn't need water to grow. It just needs lots of sun. If you put water on the tree, the tree will get slowly smaller.

Also when you put water on the tree, the money on the tree would turn back to leaves.

When fall comes, the money turns into leaves, the leaves turn into the color orange, and some turn blue and after that, there won't be a money tree.

When someone tries to steal money from the tree, the money becomes poisonous. The person who was trying to steal the money would die.

If people try to cut down and steal the money tree, they can't because the money tree is strong and it can hold tight.

If a really really, REALLY, REALLY BAD storm comes, STILL the tree holds tight and never bends.

Suddenly,

A SUPER, SUPER, SUPER, SUPER strong rumble shook the ground. The earth splits in half.

Money tree still stands upright.

It is our money tree.

It is a money tree for all of us to use.

The End

Happiness 101

Spencer L. Brown

(**Illustration by**: Aizen Baidya, Kindergarten, Stevens Creek elementary school)

Definition: Happiness is a state of mind, feeling, characterized by contentment, love, satisfaction, pleasure, or joy

Can we go beyond the kiss of bliss, to a place where wild smiles remain? When was the happiest day of your life? What was the simple moment that brought you the most happiness? Are you happy now? Could you be happier? Do you have a list of things tangible or intangible that would make you even happier?

I used to think that sudden wealth would make me very happy. Now I know that money has its limitations. Studies have shown that many who won the California state lotteries were not as happy as they had hoped to be one year later. Some had faced tragic ends, lost friends who were attached to them like leaches and they were forced to remain guarded as more handouts were re-

quested. Their lives were not any better just because they could afford new exotic cars, big houses or buy all the cheese in the local deli.

Money cannot buy happiness. You can go to Disneyland and walk hand-in-hand with Mickey, but this artificial jubilance is not true happiness. Laughing at a funeral when someone reminds you of a funny experience in the life of the deceased do not make you happy. Laughing at a comedy show when the comedian really has jokes that do not make you happy, when you know that bills are due and money is short.

Happiness can neither be bought, nor earned. It cannot be deposited into your account or bequeathed, transferred or inherited. You cannot earn it or seize it. You cannot steal it. You cannot patent it, bottle it or market it.

It is possible to be happy and sad at the same moment. A mother who cries at her daughter's wedding is comforted with statements that she is not losing a daughter; she is gaining a son. An expectant mother goes through intense labor and feels the pain until the moment the newborn has been placed in her arms.

Measuring GNH-Gross National Happiness

Mostly, the happiness of any country has traditionally been measured in a ranked proportion to the accumulated wealth of that country.

The measurement meter of happiness has traditionally been linked to the economy of the country, nation or kingdom under a G.D.P. nomenclature, meaning the Gross Domestic Product. In short, this equates to stating that your happiness is determined by the comparative amount of your accumulated wealth. This prosperity-driven perspective concludes with a faulty rationale that would mean that the rich are happy and the poor are sad. The meter would ping to maximum happiness to the wealthiest among us and bottom out in sadness and despair for those well below the welfare line. Indigence is then more that a state of being impoverished by such a measurement: it is a state or condition.

Material well-being must be seen as more than material wealth. Happiness is more than a shiny new penny.

A healthy economy is more than the combined per capita measurement of health, wealth and educational degrees. Happiness is therefore not a function of ignorant bliss any more than an accomplishment of attaining a Ph.D.

In the World Values Survey, a project under way since 1995, Ronald Inglehart, a political scientist at the University Of Michigan, found that Latin American countries, for example, registered far more subjective happiness than their economic status would suggest.

In contrast, countries that had experienced communist rule were unhappier than noncommunist countries with similar household incomes-even long after communism had collapsed.

Someone once said that happiness is a warm puppy. There does seem to be some correlation of an improved state of happiness that may come from owning pets. Cats and dogs seem to bring out some level of reflective joy and happiness in pet owners. All that tail wagging and licking from the dog or soft stroking or rubbing massage from a cat can certainly put a smile on one's face. Even watching the fish in a tank move around can improve our mental state and give us a sense of serenity. This may not be the same thing as having pet rabbits, birds, snakes, ferrets, or other exotic or dangerous animals as pets. It certainly is not the same as having a pet rock. The presence of a penguin or a peacock may not rock the happiness meter any more than a sea lion but we do react with glee as we see trained pets perform clever tricks, this may create an increased level of happiness that exceeds the casual stroll through the zoo. I recently discovered that happiness can be found in something as simple as a swing or some wet warm sand. I sat and observed some youth swinging to their hearts content with exhilarated happiness as they moved back and forth, going higher and wider in their strokes in carefree ecstasy. The happiness state was improved slightly as they closed their eyes but this was also interrupted with a sense of fear for such a daredevil at-risk maneuver. I watched a young boy play in the sand for hours. He skipped the potluck meal and went directly to the playing field. There he made wet sand patties and threw the wet sand against the walls of the sandbox. It was fun for him and he was obsessed with playing in the mud. After lunch was over, other parents brought their children to the little park area and I noticed a sense of horror on their faces as they approached the sandbox and observed the dirty little muddy child who was enjoying himself so much. Reluctantly, one parent after another allowed their clean children to get into the sandbox and they tried to usher them to the dry side but the other children were so attracted to the mud making that it soon became their undertaking. Now there were nothing but a bunch of dirty little mud-pies and muddy children. They seemed so happy, but interestingly, the parents seemed to be so happy because their kids were happy.

A pregnant woman may not be as happy during her moments of delivery as the she endures misery from the time her water breaks until the moment her child is born. The moment mother and child meet, is a time of jubilee, and warm smiles. The delivery process might have caused extreme distress but the results of a single child or multiple children can bring mom and dad and all loved ones into a state of happiness. The baby's gentle smile can drive the rest of us wild. Happiness is in a hug. This little bundle of joy sends waves of happiness over a vast network as family, friends, co-workers, loved ones and those concerned learn about the arrival of the newborn.

Every epoch of our lives seems to be built around a sense of improved or reassessed happiness. "Happy birthday to you, happy birthday to you, happy birthday dear__, happy birthday to you" is sung in your ear once a year and it usually involves a party. See the birthday boy or girl is filled with glee and I have observed the celebration of life, for babies who turned one as well as those who are still alive at the time of this writing who have turned one hundred and five years young.

The Jamaicans have developed a theme that we should adopt and adapt to: "Don't worry, be happy!' The American Declaration of Independence guarantees its citizens their rights to "Life, liberty and the pursuit of happiness", which is part of each citizen's "unalienable rights" or sovereign rights of man. In the movie, "The Pursuit of Happiness", starring Will Smith, happiness was getting from a financial disaster to an opportunity to make a fortune.

Certain jobs may be stress-free, but consider the job of mayor, senator, or even the president of the United States of America. Certainly these are not stress-free positions. The presidency requires heightened security guards on a 24-7-360 basis. One can note the wrinkles, the puffy eyes, the white hair and aging that take place on the one who holds the office of presidency during those few short years in office. There are many who gladly go to their stressful jobs at least five days per week under the 40/40 plan of working 40 hours per week for 40 years to get a bonus of a retirement package that will continue a reduced salary for the rest of their life. This makes many people happy, but even retirement is not a state of constant euphoria.

I am aware of the many studies on depression and anxiety, but I was surprised to discover that there are now studies being done on happiness. One thing is for sure; happiness is not considered an illness. We do know that happiness seems to be contagious. When one person is outrageously happy this cheer seems to bring smiles to others. Right now, you can probably think of something or someone that will bring a smile to your face. Little babies seem to draw out smiles from us too easily. They even make us act silly and we offer them funny faces with "Ga-ga-goo-goo" sounds.

Human relationships are consistently found to be the most important correlation with human happiness. Having a loved one seem to increase happiness, especially if it is truly a loving relationship filled with daily hug, smiles and genuine admiration for each other. This means that happiness comes freely with love.

On the other hand, evil-doers may find happiness in the accomplishment of their evil deeds. A purse-snatcher or thief may be overjoyed when he looks at his new found booty. He may even take delight in having knocked down that little old lady and taking her purse. There is so much instant camaraderie in wishing bad upon the enemy that the phrase was borne, stating, "The enemy of my enemy is my friend."

A widely publicized study (from2008), in the British Medical Journal reported that happiness in social networks may spread from person to person. As a member of Facebook , I am always curious of how so many people are willing to share their intimate secrets with people they hardly know, or really do not know. The interesting thing is that they have developed the phrase "FB friends". One would think that true friends would get on the phone or pay a visit. I have even found out about the death of people I knew because someone posted the announcement on Facebook. This is interesting and now the new social networking and cellular texting seem to have networked us into a type of happy family.

According to Wikipedia, "Researchers followed nearly 5000 individuals for 20 years in the long-standing Framingham Heart Study and found clusters of happiness and unhappiness that spread up to3 degrees of separation on the average. Happiness, tended to spread through close relationships like friends, siblings, spouses and next –door neighbors, the researchers reported that happiness spread more consistently than unhappiness through the network. Moreover, the structure of the social network appeared to have an impact on happiness, as people who were very central (with many friends and friends of friends) were significantly more likely to be happy than those on the periphery of the network. Overall, the results suggest that happiness might spread through a population like a virus.

Michael Argyle developed the Oxford Happiness Questionnaire as a broad measure of psychological well-being. This has been criticized as an aggregate of self-esteem, sense of purpose, social interest and kindness, sense of humor and humor and aesthetic appreciation.

Though it may be impossible to achieve any comprehensive measure of happiness objectively, some physiological correlates to happiness can be measured through a variety of techniques. Stefan Klein, in his book, "The Science of Happiness", links the dynamics of neurobiological systems (i.e., dopaminergic, opiate) to the concepts and findings of positive psychology and social psychology.

In our next study we will look deeper into this subject of happiness. We would ask the reader to look deeply into your own heart and soul and ask yourself if you are truly happy. To pursue happiness may even mean stepping away from wrong or unhappy situations. It certainly is very difficult to be truly happy when you have gone astray from you own moral compass. It may involve stepping back into church with heightened thirst for fulfillment. It may even involve a deeper a more meaningful relationship with God.

BOS: An Object Oriented Biological Programming Environment

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ABSTRACT

Summary: BOS is an intuitive '*biological programming language and environment*' which enables researchers to seamlessly integrate, efficiently extract and effortlessly analyze data from various biological databases and algorithms. BOS enables the researcher to think, speak and 'code' in biology. BOS provides numerous biological entities like DNA, Protein as computational objects and respective biological functions as interface methods. The researcher needs to write his/her query in the form of instructions using BOS framework which resembles the controlled vocabulary used in biology. BOS is the first of its kind biological programming language solution; hence it can be used for analyzing genomic, structure and literature data independently or together, through its programming interface. This standalone desktop application software also provides the user, the ability to customize algorithms to improve the accuracy in discovery research or write and test one's own novel algorithms or hypotheses. In addition, BOS has features that enable automation which cuts the time and cost by over 75%.

Availability: BOSv2.0 is available for download at http://www.helixgenomics.com/Downloads.php

Contact: pburra@ucsd.edu

Introduction

A typical bioinformatics analysis starts with the task of filtering the results from online search engines like ENTREZ (Schuler, G.D. *et al.,* 1996), SRS (Zdobnov E.M. *et al*., 2002), RCSB (Burman, H.,2000) and others to remove redundant and/or irrelevant hits. The next step is to extract information from the curated data by implementing researcher specific 'bio-computational query'. It is at these two steps of the project that the biologist and/or the bioinformatics programmer spends most of the time which if avoided, could save lot of project time and cost. This unproductive time increases exponentially with the complexity of the query.

A hypothetical query is used to demonstrate the enormity of the problem. A simple query for example is comparing two protein/DNA sequences using an alignment tool, for example BLAST tool – 'bl2seq'. The minimum step which a researcher needs to do before running the tool, whether offline or online, is to prepare the input data to comply to the specifications of the tool, i.e., cutting/pasting or saving the two sequences in a specified format which is FASTA file format for 'bl2seq' tool. When the tool is run either on command line or clicking the 'Align' button on the web page, the result needs to be saved as a separate file or is shown in a separate page on the browser. The researcher has little control over the output/result. If the objective of the researcher is to know the percent identity between two sequences as is assumed in this case, he/she needs to manually look for the word 'Identities' in the saved result. In essence, to run a simple query such as comparing two sequences using a tool, the researcher is spending time in a) formatting the data into tool specific input format b) manually cutting/pasting the input and c) manually looking for the result of interest.

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The time spent increases exponentially as the query gets complicated, for example a) the number of cut/paste and input data formatting and hence the associated time will increase if the researcher desires to align part of the sequences b) more time is spent if the tool's input specifications are complex for example formatting structure information c) the time spent gets multiplied many fold if researcher seeks to align sequences across genomes (for example, in the pursuit of identifying orthologs and paralogs), d) the time further gets multiplied if the researcher seeks to use the important biological information provided in the fully annotated biological data formats such as Genbank, EMBL, Swissprot, DDBJ, PDB, PUBMED and others, in addition to sequence information. Further, the researcher would want to do an alignment under certain conditions such as i) A+T% >60%, ii) exact pattern ('CCCGGG') match, iii) same sequence length, iv) having a 3'UTR region, v) a keyword (like 'phosphatase') in description and others. The researcher would further want to process other tasks downstream if certain alignment criteria is successful, for example, translating the DNA sequence and searching for SCOP based structural domains if the percent identity between the sequences is >80%.

To accomplish these tasks, the current scenario, a bioinformatics researcher follows is: he/she spends enormous time in a) searching for relevant tools available online or offline, b) downloading, c) if needed customizing and/or compiling from source, d) learning and validating them before using for one's project and e) writing 'glue' code using computer programming languages and/or scripting languages in an attempt to automate and/or analyze.

Complex bio-analytical tasks have become common place in systems biology, genomics and proteomics domains. Hence, the next generation of biological software solutions should be a) biologically intelligent and biology specific b) of high quality, c) useable, d) easily maintained e) adaptable to the variety of researcher specific conditions and queries and f) extendable for new requirements.

The paper describes the evolving bio-software engineering design principles and the current requirements and needs. It touches upon the proven software engineering designs which would provide more effective and efficient solutions, especially to tackle problems as complex as that encountered in biological data analysis today. It describes BOS - a novel biological software solution designed and developed taking advantage of the proven software engineering principles and solutions.

Design and Implementation

The biological entities such as DNA, proteins, carbohydrates and others have data/information and a unique associated behavior making them ideal candidates to form Biological Abstract Data Types (BioADTs). This characteristic is exploited to create an OOAF for biology. The biological information was categorized into categories such as sequence, structure, algorithm, library, input

formats etc., with an aim of creating a biologist friendly vocabulary to communicate and/or instruct the software (Table 1).

The principles of abstraction, polymorphism, inheritance and encapsulation of object oriented paradigm were extensively used to systematically abstract each category resulting in approximately 500 basic BioADTs. These BioADTs have respective biologically meaningful functions in the form of interface methods. A few BioADT examples are presented here with their interface methods: BioDnaSequenceGlobalAlignment has getIdentity(..), setGapPenalty(..), showAlignment(…), setSequence(…) etc,.; BioMultipleEmbl, BioMultipleSwissProt, BioMultipleFasta have getNumberOfEntries(), getEntry(..); BioGenBank has getSequence(..), getNumberOfCdss(…), getAccession(...) etc as methods. It is through these BioADTs and associated interface methods (~15000) that the researcher can communicate and/or collaborate with other BioADTs in addition to the inherent feature of applying conditions and iterations.

BOS architecture is currently two tiered: a) Kernel, which executes the instructions passed to it and b) Editor, which is a GUI to facilitate and help the researcher to write the biological instructions rapidly and accurately. Figure 1 is a snapshot of the Editor and its various components (Table 2). BOS Kernel is written in C++ programming language with ~300,000 loc and counting.

BOS Editor provides the necessary functions such as 'open', 'cut', 'copy', and so on. There are bioinformatics specific features such as substitution matrix dialog boxes to create and use one's own customized substitution matrices. Many short-cut key functions are provided to write faster and efficient code. A 'dot' operator and 'ctrl'&'alt' key combination provide on-the-fly help on various BioADTs and interface methods. This greatly reduces BOS learning curve. A project can be sub-divided into up to 20 sub-projects and run individually or all at once. Once a script is written & saved in the editor, it can be executed/run any time using function key 'F5' (refer to the sample BOS Scripts provided in supplementary data). The scripts follow C/C++ programming language syntax. BOS is tested on Windows 95, 98 and XP.

Results and Discussion

Programming Paradigms

There have been many approaches to programming analysis and design, for example, function-oriented, reports-oriented, data-oriented and object-oriented (OO) paradigms, in addition to the primitive method – the 'design-as-you-program' method (Brown, 1997; Schach, 1999). OOP is considered as a revolution rather than an evolution. The main difference between OO analysis and the other methods is that in OO analysis, *functionality* and *data* are both considered together and given equal importance throughout the analysis and design phase, where as the other me-

thods consider either *data* or *functionality*. There have been reports showing OOP outperforming the other paradigms in every aspect. It is reported that there were major decreases in the number of faults reported and far fewer change requests during development and maintenance. There were also a significant improvement in adaptive and perfective maintainability and usability (Capper, 1994).

In software engineering, object oriented application frameworks (OOAFs) are considered as the cornerstones of modern software engineering, for example, MacApp, ACE, Microsoft's MFC and DCOM, JavaSoft's RMI, and implementations of OMG's CORBA (Fayad, M. and Schmidt, D. C., 1997). An OOAF is a reusable, 'semi-complete'' application that can be specialized to produce custom applications. The primary benefits of OOAF stem from the modularity, reusability, extensibility and inversion of control it provides to developers. In addition to the advantages offered by OOAFs, programming environments provide convenience and user friendliness to end-users by avoiding the source code compilations, dependencies, linking and debugging. Domain specific and object oriented programming environments can be considered as culmination points in software application development since they establish necessary standards and systematic methodologies for problem solving. Domain specific programming environments enable on-the-fly programming, testing, validation, scripting, automation and bench marking which eliminates the unproductive time. MATHEMATICA (http://www.wolfram.com), MATLAB (http://www.mathworks.com) and 'gnuplot' (http://www.gnuplot.info) are few of the successful programming environments though they are not strictly object oriented.

Evolving Biological Software Designs

From software engineering perspective the designs implemented to develop biological software have been evolving, primarily driven by the need for flexibility and speed to analyze and extract information and knowledge hidden in the voluminous biological data. They have been evolving from specific task to processes and flow implementations.

Tools are designed to run independently which make it difficult to integrate hindering the opportunity to automate hence the task becomes laborious and extremely time consuming. The researcher does not have the flexibility to modify and/or incorporate control statements such as conditions (if, if-else and switch statements) and iterations (for, do-while and while loops) while using tools. There have been advancements in addressing the above limitations. To avoid the laborious process of running each tool and to provide better user interactivity, integration systems were developed. Integration systems provide an interface to running many tools such as InsightII, EMBOSS (Rice,P. *et al.*, 2000). However, integration systems could not be scaled up to analyze large data; in addition, they did not provide programming capabilities which is essential

to explore the complex parameters and understand. Programming toolkits and APIs essentially provide modules/libraries for biological analysis such as BioPERL, BioPython, BioRuby and BioJava (Mangalam H., 2002). Table 3 summarizes the different attributes that project the evolving nature of bio-software solutions.

Current software solutions are extensions of conventional programming languages and/or scripting languages. With the existing biological software solutions and methods, whether it is a simple query or a complex query, the researcher is forced to digress from his core area of expertise which is biology. To accomplish one's tasks, the researcher spends major part of the project time in learning new computer programming languages and/or scripting languages instead of focusing on the analysis and interpretation of data.

The exploration intensive bioinformatics discipline needs a biology specific object oriented framework and a biological programming environment. Figure 3 is a depiction of the comparison between various designs illustrating the time spent at a particular complexity of the task.

Example Illustrations

The following simple BOS scripts provide the necessary code to understand the biological programming paradigm and implement one's own query using BOS. As mentioned, the biological data, biological objects, associated algorithms and the output features are provided to the researcher as BioADTs. The researcher has to write the biological flowchart/protocol (computational) using the BioADTs and their associated interface methods as shown in the following examples. The BioADTs are designed and implemented to be reusable and extendable. Further, the names of all the BioADTs, their interface methods are biologist friendly vocabulary. The current version strictly follows the vocabulary described in the specifications from various public database repository providers such as EMBL, PDB, SWISSPROT and others. For example, the BioADTs and respective interface methods are designed as per the controlled vocabulary described in the INSDC Feature Table Definition Document (http://www.insdc.org/files/documents/feature_table.html).

- **Mining and extracting a Swissprot file for Active Site sequence segment**

In this example, the query is to extract the sequence segment which represents the active site of the protein under investigation from a file in SWISSPROT format. Line 1 is instantiating the BioSwissProt object with the file 'phos.swp'. The 2nd line checks for existence of 'active sites' information in the 'phos.swp' file using the associated interface method - getNumberOfActSites (). If information on active sites is found, the value returned by the method will not be equal to -1. Under the event of success, it shows the number of active sites in the protein, the sequence segment and the description using the interface methods getNumberOfActSites (), getSequence (..) and getDescription() respectively. Under the event of failure it shows the message - 'No act sites

found in the protein'. BioGetChar () is global function which is used for pausing and step-by-step execution.

```
1 BioSwissProt sprot1 ("BOS_Scripts\\BOS_Inputs\\swissprot\\phos.swp");
2 if(sprot1.getNumberOfActSites()!= -1)
3  {
4 cout<<"Number of Act sites :"<<sprot1.getNumberOfActSites ()<<endl;
5 cout<<sprot1.getActSite (0).getSequence (sprot1)<<endl;
6 cout<<sprot1.getActSite (0).getDescription ()<<endl;
7  }
8 else
9 cout<<"No act sites found in the protein"<<endl;
10 BioGetChar ();
```

- **Extracting locus names from multi-entry GenBank file**

One of the complexities involved in querying is to run a similar condition over a number of entries. This is efficiently handled in BOS using the multiple entry BioADTs such as BioMultipleGenBank, BioMultipleSwissProt, BioMultipleFasta and others. The following example illustrates the same.

```
BioMultipleGenBank b("BOS_Scripts\\BOS_Inputs\\GBK\\p53.mgbk");
// get the name of the 3rd entry.
cout<<"Name of the third entry: "<<b.getEntry(3).getLocusName()<<endl<<endl;
// get the locus names of all the entries.
for (int i =0;i<b.getNumberOfEntries();i++)
cout<<"entry number - "<< i + 1 <<" " <<b.getEntry(i).getLocusName()<<endl;
// get the locus names of entries from Homo sapiens
for (i =0;i<b.getNumberOfEntries();i++)
{
  if( b.getEntry(i).findOrganism("Homo sapiens"))
  cout<<b.getEntry(i).getLocusName()<<endl;
}
BioGetChar ();
```

- **All to all global alignment of protein sequences in multi-entry FASTA file**

It is a common query to do an all-to-all alignment of complete gene sequences or protein sequences provided, in general, in multiple entry FASTA format. This example demonstrates on how to use an algorithm BioADT such as BioProteinSequenceGlobalAlignment in conjunction with other BioADTs.

```
BioMultipleFasta aspfas("BOS_Scripts\\BOS_Inputs\\Fasta\\asp.mfaa");
cout<<"The Number of Sequences : "<<aspfas.getNumberOfEntries()<<endl;
for ( int j = 0; j < aspfas.getNumberOfEntries(); j++)
{
BioFasta entry1 = aspfas.getEntry(i),
for ( int j = 0; j < aspfas.getNumberOfEntries(); j++)
{
BioFasta entry2 = aspfas.getEntry(j);
BioProteinSequenceGlobalAlignment pgl(entry1, entry2, "BLOSUM62");
pgl.showAlignment ();
if ( pgl.getIdentity() > 80.0 )
cout<<"% Identity: "<<pgl.getIdentity()<<endl;
}
}
BioGetChar();
```

As it can be seen from the above examples, the code follows the protocol/flowchart very closely indicating the reduction in the number of lines of code and also eliminating the need for glue code and other parsing code. A quick reference of the various BioADTs and respective associate interface methods is available at http://www.helixgenomics.com/docs/BOS_QuickReference.html. More example scripts can be found in the supplementary material.

Conclusion and Future Scope

BOS is first of its kind object oriented biological programming environment. BOS provides seamless integration of various forms of biological data needed in numerous queries, hence ideally suited for advanced bioinformatics queries including systems biology approaches. BOS design enables easy and systematic simulation of complex biological systems reusing available BioADTs and/or defining new BioADTs. The extensible and reusable design facilitates faster and easier implementation of algorithms and test hypotheses. BOS editor provides many short cut features and keys which reduces the BOS learning curve. The biology specific one-stop and one-language solution eliminates digressing from one's core competence. BOS can be used for teaching bioinformatics as it gives an opportunity to conduct simple to complex in silico experiments. BOS framework can be reused for developing novel bioinformatics software solutions rapidly and reliably. Future versions of BOS are aimed to make it stable, feature rich and compliant with computational biology standards.

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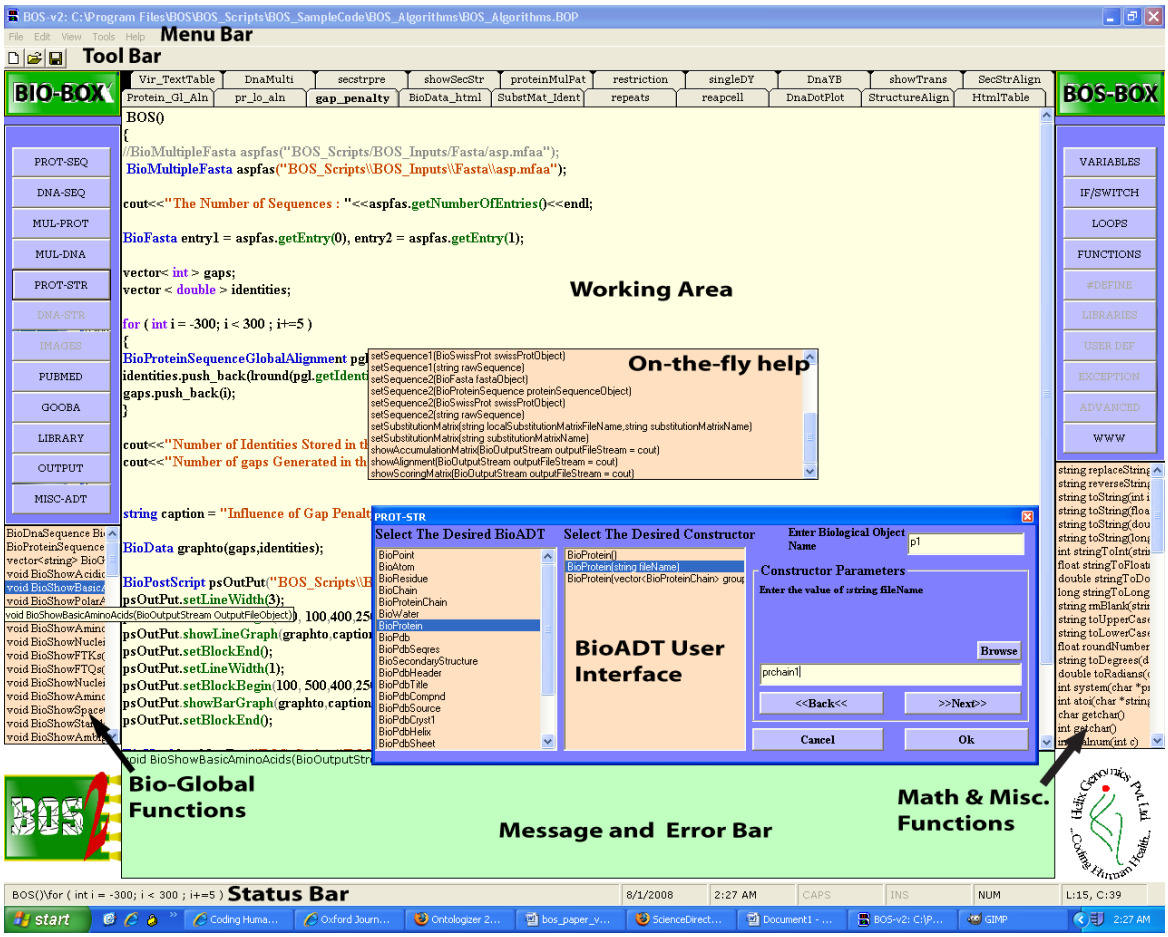

Fig. **1.** BOS user interface illustrating various components

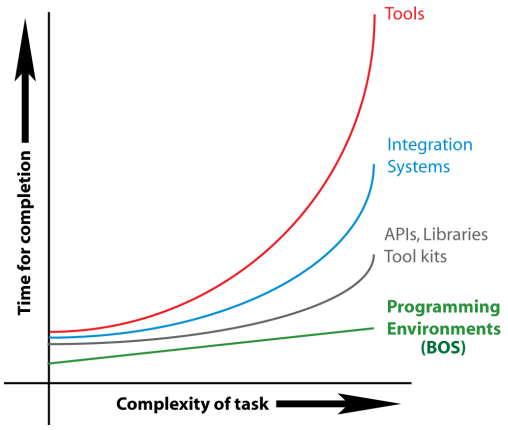

Fig. **2.** A schematic representation of time savings using programming environments such as BOS in biology.

Table 1: BOS Programming Features

S.No	Category	BOSv2.0
1	**Supported file formats**	Genbank, Fasta, Raw, PDB, Swissprot, Embl, Clustal, MSF, PUBMED, Structure factor Data (HKL format)
2	**Generic Object Oriented Biological Algorithms**	Global, Local, Repeat, Overlap Sequence Alignments (DNA & Protein), Protein Structure Alignment, Restriction map, Protein Secondary Structure Prediction (CF Algorithm), Phylogenetic Tree Construction using UPGMA, Gene Prediction/ ORF finder
3	**The Biological Libraries**	AminoAcid, Nucleotide, Element, Space Group, Restriction Enzyme
4	**The Output Stream**	Postscript, HTML, Text
5	**The System /Environment**	reading, creating, checking and removing directories and / or files
6	**The Miscellaneous**	Basic Statistics, Basic Matrix Operations, Basic Data handler like Column data or CSV data imports

Table 2: BOS Editor Components and Description

S.No	Editor Component	Description
1	**Menu Bar**	Creating new project, new file, Open, Cut, Copy, Paste, Find , replace, run, help, view
2	**Tool Bar**	Common icons for creating, opening and saving files
3	**Message and Error Box**	Displays error messages if any and for displaying prototypes of function/methods to avoid syntax errors
4	**Status Bar**	Displays the cursor position and scope of instructions
5	**Working Area**	The editor where instructions are written for execution
6	**Bio-Box**	Provides access to the various BioADTs through an easy to use and click interface which automatically takes care of syntax of the instructions
7	**Bos-Box**	User interface as an aid for learning basic programming syntax
8	**Bio-Global Functions**	A set of globally available biologically useful functions such as functions to calculate torsion angle, angle, distance, direction cosines and others
9	**Math & miscellaneous**	A set of commonly used math and other system functions

Table 3: Evolving bio-software engineering designs (0-10 scale)

	Tools	**Integration systems**	**APIs/ Libraries / Tool kits**	**Programming environments (BOS)**
	1970-	**1980-**	**2000-**	**2002-**
Tasks	**10**	**10**	**10**	**10**
Integration	**0**	**10**	**5**	**10**
Programming/ Automation	**0**	**0**	**6**	**10**
Biological Design	**0**	**0**	**1**	**10**

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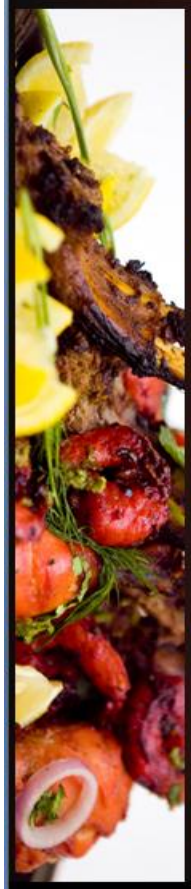

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